

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
CONSTRUCTION DIRECTIVE
MEMORANDUM

GENERAL SUBJECT:	<u>Pre-Advertisement Construction Schedule Development</u>	NUMBER:	<u>CD-2007-11</u>
		DATE:	<u>December 27, 2007</u>
SPECIFIC SUBJECT:	<u>Guidelines for Preparing and Submitting the Contract Time Determination Report (CTDR)</u>	SUPERSEDES:	<u>NA</u>
DATE EFFECTIVE	<u>January 1, 2008</u>	SUNSET/ EXPIRES:	<u>December 27, 2012</u>

Original with signatures on file in the office of the
Scheduling and Contract Division

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Scheduling and Contract Division

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DIRECTED TO - DISTRICT ADMINISTRATORS

I. PURPOSE

All VDOT projects must include a logically developed timeline for construction and project completion. This memorandum details the process and standard procedures for preparing and submitting the Contract Time Determination Report (CTDR) on which contract time limits, interim milestones, or other schedule related contract requirements will be based. Additionally, a document titled *VDOT Contract Time Determination Guidelines* is simultaneously being issued to aid the Project Manager in accomplishing the development and submission of CTDRs for each project to which he/she has been assigned.

II. DIRECTIVE

Effective January 1, 2008, **ALL** projects that are submitted to the Scheduling and Contracts Division for advertisement shall include a Contract Time Determination Report (CTDR) for setting the contract time limits and other schedule related requirements. The final CTDR will be submitted along with the Plan and Proposal Submission Documents at Plan Submission date (project task 72X). The District Administrator or designee will ensure that the CTDR is prepared by District Staffs and submitted in accordance with these directives and guidelines. Additionally, the Project Manager will ensure that the findings described in the CTDR are used to establish the contract time limits, interim milestones, or other schedule related contract requirements including, but not limited to the project specific specifications relative to these requirements.

III. GUIDELINES

The following sub-sections provide general guidelines for the preparation and submittal of the CTDR as well as outline the pre-advertisement schedule development process. For additional guidelines on preparing the CTDR, see the *VDOT Contract Time Determination Guidelines*.

A. Contract Time Determination Report – The CTDR will be used to describe the methodology, thought process, assumptions, and schedule calculations performed to arrive at the conclusions. The findings will then be used to establish the contract time requirements. The CTDR should include the following information:

- i) An overview of the project to provide general information and objectives of the project;
- ii) Methodology and assumptions, as well as factors considered in performing the time analysis including, but not limited to the means and method, logic, limiting factors, production rates, working calendar, etc.;
- iii) Contract time determination schedule based on the Bar-chart Method or CPM or a Duration Analysis based on the Estimated Cost Method as appropriate;
- iv) Any known potential issues that may impact the project duration or contract schedule;
- v) Findings which include recommended contract time limit(s) and other schedule related contract requirements.

B. Determination of Contract Time – When determining contract time, it is of utmost importance to strive for the best work plan from possible alternatives that allows for the shortest practical traffic interruptions to the road user, with considerations for costs, safety and quality:

- i) Gather, research, and analyze available project information;
- ii) Establish project goals and objectives;
- iii) Evaluate project requirements, limiting factors, and other factors that influence contract time including, but not limited to administrative, procurement, seasonal constraints, access to project, environmental, utility, permits, etc.;
- iv) Develop project Work Breakdown Structure (WBS). (optional for Categories I and II projects, required for Category III and up);
- v) Breakdown the project into work packages (e.g., construction phase, MOT stage, etc.) applying the WBS as appropriate;
- vi) Breakdown the work packages into discrete work tasks, as appropriate;
- vii) Determine the best work plan, with considerations for seasonal and project constraints, costs, safety and quality;
- viii) Develop logical and practical sequence of operations;

- ix) Estimate durations based on experience or available historical data and production rates with considerations for seasonal and project constraints;
- x) Develop a contract time determination schedule based on the Bar-chart Method or CPM or perform a duration analysis based on the Estimated Cost Method as appropriate;
- xi) Distribute and review with the Constructability Review Team at each applicable review meeting.

C. Pre-Advertisement Schedule Development Process – The pre-advertisement schedule development process establishes the overall process by which the CTDR will be developed and submitted. The CTDR should be prepared based on the minimum level of scheduling required for each Project Category as defined in the attached *Project Categories*.

1. Category M Projects: For most Category M projects (typically SAAPs), the process should begin after project scoping is completed and once project sketches, plans, and quantities are available, and proceed as follows:

- i) Determine the contract time limit and other schedule related requirements based on the Estimated Cost Method or Bar-chart Method as appropriate ;
- ii) Develop a draft CTDR and distribute to the Constructability Review Team prior to and for review and discussion at the Constructability Review (project task 71C);
- iii) Update the draft CTDR as necessary to address any issues from the PAC meeting and submit the final CTDR along with the PM Certification (LD-406NP) to the District SAAP Coordinator;
- iv) Submit the final CTDR along with the Plan and Proposal Submission Documents at Plan Submission date (project task 72X) to the Scheduling & Contracts SAAP Coordinator for Bidability Review (project task 72B) and preparation for advertisement.

2. Category I and II Projects: For Category I and II projects, the process should begin after Field Inspection (FI) Team Meeting (project task 65X) and proceed as follows:

- i) Determine the contract time limit and other schedule related requirements based on the Estimated Cost Method or Bar-chart Method as appropriate (CPM schedule may also be utilized);
- ii) Develop a draft CTDR and distribute to the Constructability Review Team prior to and for review and discussion at the Constructability Review (project task 71C);
- iii) Update the draft CTDR and submit to the PAC Team prior to and for discussion at the PAC Meeting (project task 71X);
- iv) Update the draft CTDR as necessary to address any issues from the PAC meeting and submit as the final CTDR along with other schedule related requirements to Plan Coordination Section;
- v) Plan Coordination Section will submit the final CTDR along with the PM Certification (LD-406) and Plan and Proposal Submission Documents at Plan Submission date

(project task 72X) to Scheduling & Contracts for Bidability Review (project task 72B) and preparation for advertisement;

- vi) S&CD will include the final CTDR with the PS&E packet sent to FHWA for projects that require FHWA review and concurrence.

3. Category III Projects: For Category III projects, the process should begin after the Design Approval date (project task 49X) and proceed as follows:

- i) Develop summary level bar-chart schedules for each feasible alternative sequence of construction and distribute to the Constructability Review Team prior to and for review and discussion at the FI Constructability Review (project task 65C);
- ii) Review the summary level bar-chart schedules against the Maintenance of Traffic (MOT) Plan, Traffic Management Plan (TMP), and any suggested sequence of construction to determine the best work plan from possible alternatives;
- iii) Update the summary bar-chart schedules as necessary for Field Inspection (FI) (project task 65X);
- iv) Develop a Detailed CPM schedule for the selected work plan to determine the contract time limit and other schedule related requirements for review and discussion at the Constructability Review (project task 71C);
- v) Develop a draft CTDR and distribute to the Constructability Review Team prior to and for review and discussion at the Constructability Review (project task 71C);
- vi) Update the draft CTDR and submit to the PAC Team prior to and for discussion at the PAC Meeting (project task 71X);
- vii) Update the draft CTDR as necessary to address any issues from the PAC meeting and submit as the final CTDR along with other schedule related requirements to Plan Coordination Section;
- viii) Plan Coordination Section will submit the final CTDR along with the PM Certification (LD-406) and Plan and Proposal Submission Documents at Plan Submission (project task 72X) to Scheduling & Contracts for Bidability Review (project task 72B) and preparation for advertisement;
- ix) S&CD will include the CTDR with the PS&E packet sent to FHWA for projects that require FHWA review and concurrence.

4. Category IV & V Projects: For Category IV and V projects, the process should begin after Preliminary Field Inspection (PFI) (project task 36X) and proceed as follows:

- i) Develop summary level bar-chart schedules for each feasible alternative sequence of construction and distribute to the Constructability Review Team prior to and for review and discussion at the PE Constructability Review (project task 49C);
- ii) Update the summary bar-chart schedules as necessary for the Public Hearing Team Meeting (project task 48X), as required;

- iii) Review the summary bar-chart schedules against the Maintenance of Traffic (MOT), Traffic Management Plan (TMP), and any suggested sequence of construction to determine the best work plan from possible alternatives;
- iv) Develop a draft CPM schedule for the selected work plan to determine the contract time limit and other schedule related requirements for Field Inspection (FI) (project task (65X));
- v) Revise the draft CPM schedule to determine the contract time limit and other schedule related requirements for review and discussion at the Constructability Review meeting prior to PAC (project task (71C));
- vi) Develop a draft CTDR and distribute to the Constructability Review Team prior to and for review and discussion at the Constructability Review meeting (project task (71C));
- vii) Revise the draft CTDR and submit to the PAC Team prior to and for discussion at the PAC Meeting (project task 71X);
- viii) Update the draft CTDR as necessary to address any issues from the PAC meeting and submit the final CTDR along with other schedule related requirements to Plan Coordination Section;
- ix) Plan Coordination Section will submit the final CTDR along with the PM Certification (LD-406) and Plan and Proposal Submission Documents at Plan Submission (project task 72X) to Scheduling & Contracts for Bidability Review (project task 72B) and preparation for advertisement;
- x) S&CD will include the CTDR with the PS&E packet sent to FHWA for projects that require FHWA review and concurrence.

IV. REFERENCES/RESOURCES/TOOLS

1. FHWA Guide For Construction Contract Time Determination Procedures (TA 5080.15)
2. VDOT Contract Time Determination Guidelines (Chowdhary Gondy, NOVA District)
3. VDOT Contract Time Determination Template (MS Excel)
4. VDOT Production Rates (MS Excel)
5. Other DOT Production Rate Averages (MS Excel)
6. VDOT Performance Time Database (PTD) (*Under Development*)
7. FHWA National Highway Institute, Course No. 134049 - "Critical Path Method for Estimating, Scheduling, and Timely Completion"
8. VDOT Training Module – Establishing Contract Time for Small and Simple Projects (Bobby Phlegar, Salem District)
9. VDOT Training Module – Pre-advertisement Summary Level Schedule Development (Duane Mann, Salem District)
10. VDOT Training Module – Developing Pre-Advertisement CPM Schedules (Sam Giallombardo, Richmond District)

Attachment

fg\CC: Commissioner
Deputy Commissioner
Commissioner's Staff
Division Administrators

District Construction Engineers
District Maintenance Engineers
District Materials Engineers
District Preliminary Engineering Managers
District Location and Design Engineers
District Civil Rights Managers
District Contract Administrators
Regional Operations Directors
Residency Administrators
Area Construction Engineers
Construction Managers
Project Inspectors
Federal Highway Administration
Office of the Attorney General
Virginia Department of Minority Business Enterprise
Virginia Transportation Construction Alliance
Old Dominion Highway Contractors Association
Virginia Asphalt Association
American Concrete Pavement Association
Virginia Ready-Mixed Concrete Association
Precast Concrete Association of Virginia
Division Library

ATTACHMENT

PROJECT CATEGORIES

Introduction: In recognition that projects undertaken by VDOT vary in size, complexity, and schedule risks, a project ranking system has been defined to group projects by category based primarily on complexity and schedule risks. The grouping of projects by category allows for the assignment of the appropriate schedule provision to ensure that the specified schedule requirements correspond with the level of scheduling efforts and schedule control required to coordinate and manage the work. A total of six categories have been defined to include Category M for typical maintenance projects and five categories (Category I-V) for construction projects to represent various levels of complexity and schedule risks ranging from low to high. Characteristics of each project category are described as follows:

- A. **Characteristics of Category M:** Category M represents maintenance contracts that involve typical maintenance and schedule type work such as pavement schedules (asphalt overlay, surface treatments and slurry seals); pavement marking schedules; bridge repairs (minor miscellaneous or district wide); guardrail improvements or hits contracts; signal maintenance and repair (district wide); curb and gutter or incidental concrete repairs; etc. Category M projects are typically Special Advertisement and Award Process (SAAP) projects except for certain complex projects that involve major traffic impacts such as major bridge repairs. Requirements will be based on the information necessary for the Department to plan for and manage cash flow, resources, and traffic. Schedule submittal requirements will consist of a Schedule of Operations that will include a written Narrative to provide summary level schedule information to indicate the general sequence of operations and approximate timing for completing various segments of the work; as well as a rolling detailed look-ahead schedule for completing the work planned for the next two-week period.
- B. **Characteristics of Category I:** Category I represents the lowest level of the project ranking system that include small or simple construction projects and *certain maintenance* projects that require similar level of schedule control. Only the very basic schedule information is required of the Contractor. This consists of a baseline narrative describing the work plan for the project and a tabular schedule listing the key dates associated with the work; and an anticipated monthly progress earnings schedule required to assess progress of the work. This information needs updated only when either the plan or the work has changed significantly; at such time, the Engineer will request submission of a revised schedule to include the updated information. Progress of the work will be monitored relative to the planned earnings or the project milestone dates.
- C. **Characteristics of Category II:** Category II represents the second level of the project ranking system that includes relatively simple, single season construction projects with low to medium complexity and schedule risk; and *certain relatively complex maintenance* projects that require similar level of schedule control. As the level of complexity and the number of activities grow, a scheduling tool that graphically depicts the relationship of each activity to time and to other activities will be required to monitor the work. The category II schedule submittal will include a baseline narrative describing the work plan for the project and a bar-chart schedule depicting the time-based tasks and key dates associated with the work; and an anticipated monthly progress earnings schedule to assess progress of the work. The bar-chart and earnings schedule will be updated monthly to reflect actual status of work accomplished and the proposed plan to complete the remaining work. The schedule will be revised accordingly when either the plan or the work has changed significantly; at such time, the Engineer will request submission of a revised schedule to include the updated information. Progress of the work will be monitored relative to the planned earnings or the project milestone dates.

- D. **Characteristics of Category III:** Category III represents the middle level of the project ranking system that includes multi-season construction projects of medium level complexity and risks. As the possibility of delays and the consequences for delays grow, a scheduling tool that provides an effective means of monitoring and managing several overlapping activities and multiple work paths will be required. Such a scheduling tool will require the establishment of relationships to represent the inter-dependencies between the activities needed to form network paths and to determine the longest network path through the project. The submittal requirements will be expanded from Category II to replace the Bar-Chart with a Critical Path Method (CPM) schedule and the anticipated monthly progress earnings schedule will be based on the CPM schedule.
- E. **Characteristics of Category IV:** Category IV represents the fourth level of the project ranking system that includes the largest of the single-contract multi-season construction projects of medium to high level complexity and risks. This category is the middle of three categories of schedule submittal that will be based on the CPM. The submittal requirements will be expanded from Category III to include additional requirements for monitoring the Contractor's progress and resources.
- F. **Characteristics of Category V:** Category V represents the highest level of the project ranking system that is intended for multi-contract or multi-project construction that may involve multiple Contractors. This category is the highest of three categories of schedule submittal that will be based on the CPM. The submittal requirements will be expanded from Category IV to include additional requirements for schedule organization and coordination.