I. Purpose and Background

Determination of an accurate construction contract duration is vital to the overall success of a project. Allowing more time than necessary may increase road user delay, increase Mn/DOT contract administration costs, and may have a negative influence on public opinion when work does not appear to progress within a work zone. Specifying a small timeframe to complete the work may unnecessarily increase projects costs by requiring the contractor to mobilize extra forces and work overtime on projects that may not necessarily need expedited timelines.

This memo serves as guidance for project engineers and supervisors developing construction project timelines. This guide should be used as a supplement to “hands-on” knowledge and experience. If preparing a construction timeline for a particular aspect of a project that you are unfamiliar with, the project engineer/manager should consult with experts in this field of construction. The project engineer/manager should use sound engineering judgment necessary to determine the sequencing of operations and identify construction overlap to ascertain the appropriate project timelines.

Preparation of accurate construction times becomes extremely important when allowing for incentives/disincentives on contracts.

II. Project Acceleration

In many cases, it is important to complete the project as quickly as possible to reduce traffic impacts, meet construction deadlines, minimize environmental impacts, or for other reasons specifically related to your project.

Listed below are three general categories of projects.

Table 1. General Mn/DOT Project Categories

<table>
<thead>
<tr>
<th>Minor Projects</th>
<th>Minimum Impact Projects</th>
<th>Major Impact Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aesthetics</td>
<td>Bituminous Overlays</td>
<td>Long detour route projects</td>
</tr>
<tr>
<td>Turn Lanes</td>
<td>Rural National Highway System (NHS) Projects</td>
<td>Reconstruction of roadways with lane closures</td>
</tr>
<tr>
<td>Signals</td>
<td>Local Road System Projects</td>
<td>Major River Crossing</td>
</tr>
<tr>
<td>Landscaping</td>
<td></td>
<td>Urban construction projects</td>
</tr>
</tbody>
</table>

Projects that fall in the minor projects or minimum project impacts generally do not need accelerate schedules. The determination of the project type should be made by district management.

To accelerate projects, the determination of contract time should consider extra crews to increase productivity and longer work days. In addition, the use of A+B bidding and specifying lane rentals may also help accelerate contract time and/or reduce impacts to the traveling public. Careful consideration should be given to the cost impacts, schedule impacts and staffing requirements of these projects.
III. Factors that Influence Contract Time

**Holiday Work** – Consult 1806 for construction and 1404 for traffic restrictions.

**Environmental Commitments** – Regulating agencies may restrict times when work may occur on certain aspects of a project (e.g. stream/river impacts on bridge projects). Consult with design staff.

**Political Commitments** – Agreements with local officials on roadway closures, access to business and traffic impacts need to be considered.

**Local Events** – Consult with the design project managers, Mn/DOT public affairs or local officials to see if the construction project will influence a local event.

**Utilities or Railroads** – Utility or railroad impacts may influence the schedule.

**Delivery of Materials** – Steel bridge beams, signal poles, and other items may take several months for fabrication and delivery. Consult with the associated Mn/DOT office, other districts, or several contractors to obtain estimated delays.

**Seasonal Construction** – Consider construction activities during the fall/spring construction season. Examples include:
- Harvest time impact to farmers
- Spring Road Weight Limits (including detour routes)
- Low Slump Overlay Spring and Fall date restrictions
- Late season bituminous wear course paving
- School year and bus routes

**Production Rates** – The production rates need to be tailored to meet the conditions of each individual contract. See the next section for a more detailed discussion on production rates and crew sizes.

**Plant Locations** – Locations of plants, haul time and the number of plants available.

**Right of Way** – Areas where title and possession will occur after letting

**Construction Staging** – Examples of construction staging influence include:
- Access to work areas resulting in decreased production
- Lane closure restrictions (refer to Lane Closure Manual or Mn/DOT district traffic office)

**Equipment Availability** – Consider what is reasonable for the contractor to build simultaneously. For example, don’t assume the contractor has 6 pile hammers to drive pile on 6 bridges concurrently. It is more reasonable to assume that the one or more pile hammers will sequentially perform this work rather than simultaneously. Other examples include re-use of forms, concrete pours sequencing, and paving operations.

**Local Laws** – Consult with local officials and include pertinent information in the time and traffic provisions. Examples include:
- *Noise* - In many cases, the contractor may be required to obtain a permit or variance to work at night.
- *Planning and Zoning* – Contractors may also need obtain local concurrence for obtaining materials from borrow pits or setting up plants
IV. Specification Time Restrictions

The following areas highlight a few of the time and temperature restrictions identified in the spec book. The following list is only a sample of some of the major items that may influence contract and does not represent a comprehensive list. When determining contract time, cross-check the major items with the spec book and special provisions.

Working Day Assessment – Not valid between November 15 and April 15, but can be modified in the proposal or via supplemental agreement. (1806)

Cold Weather Concrete Construction – Refer to the spec book and special provision on curing methods and restrictions for various types of concrete construction (e.g. bridge, pavement, walks). The specs may outline dates and/or temperature restrictions.

Bituminous Wearing Course – Refer to the spec and special provision on the dates, location and temperature restrictions for placing bituminous wearing courses.

Bituminous Seal Coats – Refer to the spec and special provisions on the dates, times and temperature restrictions.

Bridge Wearing Course (low-slump) – Refer to spec 2404 and special provisions on the dates and location restrictions.

Bridge Removal – Refer to special provisions on date restrictions.

Turf Establishment – Refer to spec 2575 and special provision on time, location and temperature restrictions

Pavement Markings – Refer to specs, special provisions or contact district traffic unit on date and temperature restrictions. Restrictions may vary based on type of marking and manufacturer.

V. Production Rates

Production rates will vary on the type of project, location, season, and constraints of each project. Production rates will generally be lower on smaller projects, urban projects, and projects with heavy traffic impacts which decrease material delivery. Production will increase on larger projects and projects in rural areas where material delivery haul time is not extreme.

Table 2 lists average production rates collected from past projects. These rates are based on a “normal” (i.e. non-accelerated) project constructed during the peak season and assuming approximately an 8 hour working day.

When determining contract time based on an accelerated work schedule (longer hours, additional crews), consider adding language similar to the following in Section 1803 Prosecution and Progress.

It is anticipated that the Contractor’s work schedule will consist of working at least six (6) days per week (Monday through Saturday) using multiple crews and shifts, nights, and long hours during the duration of the Contract to meet the completion deadlines.

In certain cases, the project manager may need to indicate higher production rates than provided in Table 2 in order to meet the project deadline dates. When using higher rates, the project manager/engineer should check to see if these rates are feasible with the availability of equipment and work timeframes.
VI. Types of Construction Contracts

Listed below are the types of Construction Contracts and typical applications.

**WORKING DAY** – A calendar day, exclusive of Saturdays, Sundays, and State recognized legal holidays, on which weather and other conditions not under the control of the Contractor will permit construction operations to proceed for at least 2 hours, with the normal working force engaged in performing the progress-controlling operation.

- Constructed typically within one construction season
- Allows more flexibility for contractor and Mn/DOT staff for scheduling
- Completion date deadline is not a concern
- Should not be used on projects with CPM schedules
- If the definition of working day is required, modify 1806.

**WARNING** - Careful consideration should be given to using Working Day projects. If the intention is to complete a project within one year, consider the potential for a working day contract to extend beyond the November 15th limitations of 1806. Projects with a large number of working days or projects that start late in the year have a high potential for this occurrence.

**COMPLETION DATE** – The date shown in the proposal on or before which the work in the contract shall be completed. No time extensions allowances are made for normal delays or lack of progress.

- Larger and complex projects
- Single or multi-year projects
- Used where specific completion date is a concern

**TIME EXTENSIONS** – Consider that quantity overruns, added work, or unavoidable delays (see 1806) may extend the contract date. On projects that are to be completed by winter, allow for additional time for potential extensions (e.g. Use October 15 or 30 instead of November 15th as a completion date).

**CALENDAR DAY** – Every day shown on the Calendar (including weekends and holidays)

- Used as intermediates completion time (e.g. close ramp)
- Completion deadline is a concern
- Allows for a more flexible start compared to Completion Date contract

**A+B CONTRACTS** – Cost-plus time bidding where the contractor bids on the number of days it will take to complete the work. A+B contracting can be used with either working or calendar days.

- Project acceleration is a concern
- High roadway user costs and impacts
- Usually Single year projects

**A+B Limitations** - Refer to the Innovative Contracting Guidelines when considering an A+B project:
http://www.dot.state.mn.us/const/tools/
VII. Computing Contract Time

The following steps should be taken on all Mn/DOT construction projects.

1. Meet with the designers and traffic operations to review project specific information (commitments, timelines, and design considerations).

2. Perform constructability review on the 30-50% completed plans and provide feedback to designers.

3. Determine project type based on Table 1 in coordination with district management and determine the type of construction contract (working day, completion date, calendar day, A+B).

4. Determine the contract time according to one of the following two methods:

   **Straightforward Projects**
   Complete the “Contract Time for Completion” form (Figure 1)
   - Use the major controlling items in the Item Analysis Section
   - Use production rates (or variations based on experience) from Table 2.
   - Determine Probable Working Days from Table 3.
   - In the remarks section, state any assumptions (assume Saturday work, night work, additional crews, work restrictions).

   **Complex Projects**
   On complex projects, it may be necessary to use critical path software such as Microsoft Project or Primavera to assist in compiling to estimated contract time. The schedule should incorporate interdependencies between tasks, extraordinary production rates, and seasonal calendars (e.g. overlay and paving restrictions). You may want to consider hiring a consultant to assemble the schedule for you.

   Questions regarding critical path software and scheduling for complex projects can be directed to Mn/DOT’s Office of Construction and Innovative Contracting (Tom Wiener 651-296-3151).

5. Review the estimated time for completion with the Resident Engineer, design staff and Assistant District Engineer for Construction.

   - Do not use versions from previous projects, the template is updated frequently
   
   [http://www.dot.state.mn.us/tecsup/prov/index.html](http://www.dot.state.mn.us/tecsup/prov/index.html)
   - Include CPM Schedule requirement special provision for complex projects
   - Indicate special concerns (work restrictions times, dates for local events)

7. Send the special provisions and “Contract Time for Completion Chart” to the Special Provisions Engineer.