

CHAPTER 1 INTRODUCTION

1.1 Table of Contents

CHAPTER 1 INTRODUCTION	1-1
1.1 TABLE OF CONTENTS	1-2
1.2 GENERAL	1-3
1.2.1 Purpose	1-3
1.2.2 Prerequisites	1-3
1.2.3 Contract Documents	1-3
1.2.4 Explicit vs. Performance-Based Detailing.....	1-3
1.2.4.1 Explicit Detailing.....	1-3
1.2.4.2 Performance-Based Detailing.....	1-3
1.2.5 Clients	1-4
1.3 PLAN DEVELOPMENT PROCESS	1-5
1.3.1 Overview	1-5
1.3.2 Plan Development Checkpoint Process.....	1-5
1.4 PLAN SET ORGANIZATION	1-7
1.4.1 Preliminary Plans	1-7
1.4.2 Final Plans.....	1-7
1.4.3 Border Information	1-8

1.2 General

1.2.1 Purpose

This guide has been developed to aid the draftsman, technician and engineer in the preparation of bridge structure contract documents.

1.2.2 Prerequisites

It is assumed that the audience is fluent in the graphic language of technical drawing, including geometric constructions, multi-view projections, sectional views, and dimensioning. This guide aids in the application of these skills to the specialized task of bridge working drawing preparation.

1.2.3 Contract Documents

Working drawings are one component of the contract document package (construction plans, *Standard Details* and *Standard Specifications*) required to describe the project. The detailer must be familiar with all three components so that the drawings properly describe the project, complementing without duplicating information presented elsewhere.

Bridge plans include site-civil details as well as structural details, and occasional utility details (conduit, lighting, etc.) Structures may be a minor element of a much larger highway project, which will require coordination with a second design group. They may include limited approach work with the structure details. They may be a simple rehab of a small portion of a structure.

1.2.4 Explicit vs. Performance-Based Detailing

The Detailer is asked to provide different types of details depending on the requirements of the project.

1.2.4.1 Explicit Detailing

In explicit detailing, the Detailer is providing all the information required to fabricate and erect a structure. Often, these details need to be used in conjunction with the *Standard Details*, which will provide additional information about common structures.

Examples: Abutments, CIP Walls, Structural Steel, Expansion Joints

1.2.4.2 Performance-Based Detailing

In performance-based detailing, the Detailer is providing geometry and design constraints for an element to be designed by others. Typically this means diagrammatic representations of the structural element.

Examples: T-Wall, MSE Walls

1.2.5 Clients

The details provided on the plans are used in different ways by different clients, and some details serve the needs of one more than another. The three potential clients are:

- 1) **Designer:** performance-based detailing is providing information to a Designer who will be working out the explicit details of the structure.
- 2) **Fabricator:** many explicit details provide information to the Fabricator, who is responsible for the manufacture of the elements of the structure. Examples of details for use by the fabricator would be: camber diagrams, stress-type diagrams, precast plans and sections, reinforcing steel schedules.
- 3) **Contractor:** many explicit and performance-based details provide information to the Contractor to assist in the erection of the structure. The Contractor needs to know how and where to assemble all fabricated elements. The Contractor is also responsible for the CIP concrete.

1.3 Plan Development Process

1.3.1 Overview

The development of working drawings occurs during two stages of the project development process: preliminary and final design.

Preliminary design documents communicate the design intent to the team and other agencies and provide a permanent record of the preliminary design process.

Final design drawings communicate to the general contractor and the fabricators:

- a. Where the structure is physically located in space,
- b. The construction of the individual elements of the structure (beams, piles, concrete structures, miscellaneous metals, etc.).
- c. How each element fits into the whole.
- d. Payment methods for all elements

1.3.2 Plan Development Checkpoint Process

The following process is based on internal MaineDOT procedures and modified to include consultant-oriented checkpoints and further differentiation that should help the detailer get perspective on where their specific jobs and responsibilities fit into the overall process.

- 1) Project Kickoff
- 2) Team organized
- 3) Team compiles preliminary data
- 4) Initial team meeting/point of communication
- 5) Preliminary public meeting
- 6) Begin preliminary design
- 7) Develop alternate horizontal and vertical alignments
- 8) Develop preliminary toes of slope/impacts for alternate alignments
- 9) Horizontal/vertical alignment OK by team
- 10) Finalize PDR
- 11) Prepare PDR preliminary plan and profile
- 12) PDR/ Preliminary plan OK by team
- 13) Formal public contact
- 14) Midway team meeting/point of communication
- 15) Begin Approaches and Final Structural Design
- 16) Finalize General Plan, Profile, Cross-Sections, Geometry (Approach Design).
- 17) Bridge approach plans OK by team and Checker (or “Impacts Complete”)

- 18) On structures with complex substructure geometry, Prepare 30% bridge plans depicting the general structural features including concrete outlines, superstructure plan, and section prior to designing reinforcing steel.
- 19) 30% plan review by team
- 20) Structure geometry check and Final design.
- 21) Finalize plan details and develop reinforcement for concrete elements.
- 22) Distribute 80% construction plans (with estimate items but no quantities.)
- 23) Check the final details.
- 24) 80% plans OK by team
- 25) Final Engineers Estimate
- 26) Engineers Estimate Checking
- 27) Package to contracts
- 28) Final contract document review.
- 29) Advertise & Award
- 30) Construction
- 31) Final team meeting/point of communication

1.4 Plan Set Organization

The following lists are intended to clarify the order in which plans should be presented in a plan set. Refer to further chapters for information about the contents of these plans.

1.4.1 Preliminary Plans

- 1) Plan
- 2) Profile
- 3) Additional Details

1.4.2 Final Plans

- 1) Title Sheet
- 2) Estimate & Notes
- 3) General Plan(s)
- 4) Profile(s)
- 5) Boring Location Plan and Interpretive Subsurface Profile
- 6) Boring Logs
- 7) Additional Geometry Sheets (Curb, Intersection, etc., if req'd)
- 8) Guardrail Layout (if req'd)
- 9) Cross Sections
- 10) Staged Construction
- 11) Abutments
- 12) Retaining Walls
- 13) Piers
- 14) Framing (Structural support layout for superstructure)
- 15) Framing Details
- 16) Superstructure (Interaction of structural support with deck)
- 17) Superstructure Details
- 18) Rail Details
- 19) Reinforcing Steel Schedule
- 20) Utility Details
- 21) Property Map

1.4.3 Border Information

Each sheet needs to contain the following information:

- 1) Sheet number(s)
- 2) PIN & Project numbers
- 3) Bridge number
- 4) Title block (Preliminary Plan)
- 5) Personnel names or initial