



United States Department of the Interior

NATIONAL PARK SERVICE

1849 C Street, N.W.

Washington, D.C. 20240

IN REPLY REFER TO:

DIRECTOR'S ORDER #10A: DESIGN AND CONSTRUCTION DRAWINGS

Approved:  APR 15 2003
Director, National Park Service

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NPS Guideline #10, "Preparation of Design and Construction Drawings," (Release No. 3, August, 1995) is superseded and replaced by this Director's Order and Reference Manual 10A.

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I. Purpose and Scope

The purpose of this Director's Order is to set forth policy and required procedures governing the preparation of preliminary design (final submittal), construction, and as-constructed drawings (referred to hereafter as "drawings"), in order to:

- assure permanent and durable drawings which can be readily reproduced as legible (1) half-sized prints for bid sets, etc., and (2) microfilm;
- maintain uniformity of work; and
- facilitate review of both architectural and engineering (A/E) submittals and National Park Service (NPS) generated products.

The policies and procedures contained in this Director's Order and Reference Manual 10A will apply to *all* NPS drawings (1) whether prepared by NPS personnel, other

agencies, or A/E contractors, and (2) no matter the method of drafting, e.g., computer aided design and drafting (CADD), manual drafting, etc.

II. Authority

Authority to issue this Director's Order is contained in the NPS Organic Act (16 USC 1 through 4), and delegations of authority contained in Part 245 of the Department of the Interior Manual.

III. Instructions/Requirements/Responsibilities

A. General Requirements

1. Acceptable Drawings. All drawings will comply with the requirements of this Director's Order and Reference Manual 10A. Non-conforming drawings are unacceptable and will be disregarded. The NPS contracting officer will return non-conforming drawings for necessary redrafting.
2. Waivers. If conditions make it impractical or impossible to adhere to the requirements of this Director's Order, a waiver may be requested from (1) the Denver Service Center (DSC) Project Manager, or (2) in the case of park- or support office-produced projects, the official responsible for the project.
3. Additional Guidance. This Director's Order sets forth basic requirements. For more specific information, and graphic examples of drawing requirements, see Reference Manual 10A, a level 3 document prepared by the Associate Director, Professional Services. Reference Manual 10A can be obtained from the DSC Technical Information Center. A CADD Users Guide is available from DSC to assist in the preparation of acceptable computer-generated drawings.

B. Drawing Format

1. Sheet Size. The NPS standard drawing sheet size is 22" x 34". Border sheets (electronic format) may be obtained from DSC upon request of the project manager. Use of any sheet size other than standard requires prior written approval of the official responsible for the project.
2. Drawing Numbers. DSC's Technical Information Center (TIC), the central repository for all drawings, assigns blocks of drawing numbers to parks, support offices, etc., in accordance with Director's Order #10B: Drawing and Map Numbers. In turn, the office/official responsible for a project will assign a drawing number from the block in accordance with Director's Order #10B.
3. Cover Sheets. Standard cover sheets must be used for all project drawings. Pre-developed cover sheets may be available from the project manager. All cover sheets should contain:

- a vicinity map;
- a park map showing project site location;
- basic data (source of information and date of cover sheet base preparation);
- a bar scale including a metric scale;
- required approval and revision blocks;
- a solicitation number assigned by the contracting office (on drawings prepared for bid);
- a construction contract number (on as-constructed drawings); and
- information regarding the A/E firm, subcontractors, and an A/E contract number (if applicable).

A/E logos on bid sets are permitted with restrictions. Formatting for A/E firm and subcontractor information is specified in Reference Manual 10A. When a set of drawings is prepared in part by DSC and in part by an A/E firm, place only the A/E information block on the drawing sheets prepared by the firm. If a project is located in a state that requires a professional stamp(s), submit one A/E stamped set of non-reproducible record drawings (each sheet stamped) to DSC. Place the stamp to the left of the A/E information block.

An index to the sheets in a drawing set should be located on the cover sheet if possible; if not possible, place the index on a separate sheet.

4. Second Sheets. Second sheets should be used for all drawings subsequent to the cover, with the exception of (1) plan and profile sheets, and (2) survey sheets. Specifications for all drawing sheets are contained in Reference Manual 10A.
5. Survey Sheets. Survey sheets are to be used for all NPS Survey projects.
6. Title Blocks. Title block requirements for cover sheets and all subsequent sheets are detailed in Reference Manual 10A.
7. Approval Blocks. Approval blocks for all preliminary design and construction drawings are described in Reference Manual 10A. Such drawings require approval signatures when prepared by parks, support offices, and DSC.
8. Revision Blocks. A revision block is required for changes to construction drawings which have been issued for bid (and therefore are official contract drawings). Requirements for revision blocks include:
 - an identifying mark (a triangle with a number or letter, used to key the information in the revision block to the part of the drawing it pertains to);
 - the sheet number(s) of the affected sheet(s);
 - a brief description of the revision;
 - the date of revision; and
 - the initials of the person responsible for the revision.

Information in the revision block should be keyed to a drawing by encircling the affected part of the drawing and placing a revision mark on or within the circle. When major revisions are made to a sheet, place the note “General Revision” above the title block.

9. Construction Contract Modifications. This Director’s Order also governs drawings prepared to accompany a construction contract modification. The contracting officer is responsible for submitting such drawings or sketches – in most cases, prepared by the project designer – for inclusion in the contract modification package. In the event changes are made to the design drawings during the modification negotiation process, the contracting officer will furnish copies of the drawings or sketches to DSC for filming within 30 days of approval, to avoid loss. The contracting officer should also notify TIC by e-mail or written memorandum if the modification is not executed in writing. In addition, the contracting officer is responsible for incorporating the changes into the as-built drawings and furnishing copies of the approved as-constructed drawings to DSC for microfilming.

If sketches are used rather than standard drawing sheets, they should include the project and drawing numbers, project title, person responsible for drawing, and the date prepared.

10. Orientation. When possible, drawings will be laid out so north is toward the top, or left, of the drawing sheet. The orientation of north should be maintained throughout a set of drawings, when possible. Where a north arrow is required, it should be placed in the lower right-hand corner above the title block. If multiple north arrows are used on the same sheet, place each arrow near the title of the specific view. Additional guidance on north arrows, including recommended style therefor, is contained in Reference Manual 10A.

11. Scale. All scales used will be graphic scales. If a single scale applies to an entire drawing sheet, place it above the title block. If an entire sheet is not to scale, “NO SCALE” should appear above the title block. Should more than one scale appear on a sheet, place scales below the title of each section or detail (if a specific section or detail is not to scale write “NO SCALE” below the title of that section or detail). If more than one scale is used on a sheet, but one or more is used repeatedly, group all scales above the title block and reference the corresponding section or detail. Guidance for drawing section or detail symbols is found in Reference Manual 10A.

C. Drafting Practices

1. Line Weights. All NPS drawings, particularly construction drawings being issued for bid, are microfilmed, and therefore must be capable of being reproduced as clear and legible half-sized prints. Consistency of line density and clear, legible lettering are essential. Originals and photographic duplicates that cannot be reproduced as clear and legible half-sized prints are unacceptable. The following drafting practices, illustrated in Reference Manual 10A, ensure legible bid sets:

- consistent even line weight;
 - lack of line congestion;
 - line weights of additions or changes match existing line weights;
 - drawings are clean and uncreased;
 - little or no erasures;
 - consistent dark, clear, sharp, uniform lines to ensure good reproduction and microfilming;
 - outlines and section lines are differentiated by varying the width of lines, not by changing densities; the density of the line should be constant;
 - line work techniques used for distinctive symbols and crosshatching;
 - pencil is not used for shading or toning;
 - consistent open spacing of lines and lettering;
 - absence of graphics behind text to ensure good legible drawings; and
 - layout lines and guidelines are used in such fashion so as not to appear on reproduced drawings.
2. Screened Pens. New work will be easily distinguishable from other information shown on drawings. New work will be shown at 100% (unscreened); existing conditions, including text, will be screened at 50%. Background information shown for orientation or clarification may be screened at 50%.
3. Additions and Changes. Additions, changes, and corrections will be marked on check prints and as-constructed prints using the following color code: (1) RED-additions; (2) GREEN-deletions; (3) BLUE-general notation or specific instruction to draftsman; and (4) YELLOW-okay as shown (use when necessary).
4. Abbreviations. All abbreviations will be described in a legend and used consistently throughout a set of drawings. See Reference Manual 10A for NPS recommended abbreviations.
5. Dimensions. All dimensions 1'-0" and over will be called out in feet and inches. If another measurement is accepted industry-wide to describe a product or spacing, such measure should be used. For example, 48" pipe (not, 4'-0" pipe), and 16" o.c. (not, 1'-4" o.c.). Both slash marks and arrows are acceptable as line terminators as long as they are used consistently.
6. Details. If a detail of a certain item is enlarged, it will be shown with the same orientation as the item itself; detail will not be turned 90 degrees or shown in reverse direction.
7. Use of Text. Text within drawings will be limited to required notations, avoiding duplication of information within the drawings and the written specifications.
8. Lettering. Only one lettering style, vertical and all uppercase, will be used in drawings. Standard lettering height is .130. For all line weight and lettering height specifications, see Reference Manual 10A.

9. Symbols. NPS-preferred symbols and line symbols with abbreviations for the most common drawing elements can be found in Reference Manual 10A.

10. Discipline-Specific Requirements. See Reference Manual 10A for discipline-specific drawing requirements, such as slope designations for site drawings, building code data for architectural drawings, and design information requirements on structural drawings.

D. Archival Quality

1. Minimum Life Expectancy. The NPS is responsible for the lifetime administration and maintenance of its buildings. Accordingly, the materials used for all drawings must have a minimum life expectancy of 100 years. Various reproduction methods, such as ink jet and diazo printing, and wash-off photographic processes, do not produce acceptable archival products. Drawing production standards for archival copies are summarized in Reference Manual 10A.

2. Photo Techniques. An A/E firm wishing to use photo drawing techniques (for example, photos of a site or building), must provide the NPS with a high quality half-size photographic mylar reproducible of the photo drawing sheet in addition to the full-size original. When photographs are used as information on a photographic sheet, such photos will be screened using a magenta or gray halftone screen with 120 dots per inch, with either conventional square dots or elliptical dots, for both standard 22" x 34" and half-sized drawings. The half-sized reproducible must be capable of producing clear, legible prints using the xerographic printing process.

3. Microfilming and Indexing. All completed and approved drawings should be sent to DSC for microfilming and indexing in paper or mylar format (as required by drawing phase). Electronic files of the drawings should also be forwarded to DSC for archival storage in accordance with Director's Orders #19: Records Management, and #10B: Drawing and Map Numbers.

E. Drafting and Detailing References

A list of detailing manuals used by the NPS in the preparation of drawings can be found in Reference Manual 10A.

---- *End of Director's Order* ----