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Reason for the Supplement

This supplement revises *Design Manual* 400.03, Procedures, Sections (1) and (2). It provides revised project procedures related to survey monumentation.

If you maintain a printed manual, replace Sections 400.03(1) and (2) with this December 2013 Supplement. Electronic *Design Manual* users will find the Supplement online:

www.wsdot.wa.gov/publications/manuals/m22-01.htm

Note: When the *Design Manual* is updated in July 2014, this Supplement will be incorporated into the manual and will be retired.

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Effective Date: December 2013

Development Division Director &
State Design Engineer

Survey Monumentation Procedures Revised

I. Introduction

A. Purpose

The purpose of this *Design Manual Supplement* is to revise procedures for protecting and archiving geodetic survey monuments.

B. Background

The Statewide Survey Committee prepared this revision, and they requested expedient dissemination via a *Design Manual Supplement*.

C. Implementation

This *Design Manual Supplement* is effective immediately and is available online:

 <http://www.wsdot.wa.gov/publications/manuals/m22-01.htm>

II. Instruction to *Design Manual* Users

If you maintain a hard copy of the current *Design Manual*, replace sections 400.03(1) and 400.03(2) with the attached.

Electronic *Design Manual* users will find this Supplement available at the link above.

400.03 Procedures

For WSDOT projects, it is recommended that surveying activities include (if appropriate) but not be limited to the following items.

(1) *Project Definition Phase*

During the Project Definition phase, perform the following:

- (a) Record any pertinent surveying information as detailed in the Design Documentation Checklist: www.wsdot.wa.gov/design/projectdev/
- (b) Conduct research to find recorded survey monuments existing within the project area.
- (c) Determine and prioritize project survey needs and tasks to be completed. Needs and tasks may include the following issues:
 - Cadastral
 - Right of way
 - Geodetic
 - Photogrammetry
 - Other issues as needed

(d) Contact city, county, state, and federal agencies, the Region Survey Office, and the GeoMetrix Geodetic Survey section for potential impact to existing monuments.

(2) *Design and Development of the Plans, Specifications, and Estimates*

During the design and development of the Plans, Specifications, and Estimates (PS&E), perform the following:

- (a) The project manager and project surveyor hold a preliminary survey meeting, regarding:
 - Project schedule.
 - Anticipated survey requests.

For preliminary survey meeting specifics and roles and responsibilities of the project manager and project surveyor, see the *Highway Surveying Manual*.

- (b) Perform field reconnaissance, mark existing recorded survey monuments, and determine the location of possible new survey monuments. Also, mark found unrecorded monuments for preservation if practical.
- (c) Contact the GeoMetrix Geodetic Survey section by email, memo, or other written notification for assistance in determining the impact to state and federal geodetic monuments.
- (d) Refer to the *Highway Surveying Manual* to:
 - Convert Washington State Plane Coordinates to project datum.
 - Document the procedure and combined factor used for converting between datums.
 - Determine survey collection methods.
 - Collect primary, secondary, and tertiary survey data.
 - Process and import secondary, tertiary, or other survey data into design software for use by designers.

- (e) Apply to the Department of Natural Resources (DNR) for permits for monuments that will be disturbed or removed (see [Chapter 410](#)).
- (f) [The GeoMetrix Geodetic Survey section will archive](#) new primary survey control data in the WSDOT Monument Database for future retrieval.
- (g) Ensure that all survey monuments within the project right of way are shown on the contract plans in order to avoid accidental damage.
- (h) Develop a Record of Survey ([RCW 58.09](#)) or a Monumentation Map as required (see [Chapter 410](#)).

(3) After Construction is Completed

- (a) Complete a post construction survey as described in the [Highway Surveying Manual](#).
- (b) Have the DNR Completion Report signed and stamped by the appropriate professional in direct charge of the surveying work, then file with DNR as described in [Chapter 410](#).

400.04 Datums

A datum is a geometrical quantity (or set of quantities) that serves as a reference, forming the basis for computation of horizontal and vertical control surveys in which the curvature of the earth is considered. Adjusted positions of the datum, described in terms of latitude and longitude, may be transformed into State Plane Coordinates.

All engineering work (mapping, planning, design, right of way, and construction) for WSDOT projects is based on a common datum.

(1) Horizontal

[WAC 332-130-060](#) states, “The datum for the horizontal control network in Washington shall be NAD83 (1991) [the North American Datum of 1983] as officially adjusted and published by the National Geodetic Survey of the United States Department of Commerce and as established in accordance with chapter [58.20 RCW](#). The datum adjustment shall be identified on all documents prepared; i.e., NAD83 (1991).” (See the [Highway Surveying Manual](#) for further information.)

(2) Vertical

The North American Vertical Datum of 1988 (NAVD88) as defined by the National Geodetic Survey (NGS) is the official civilian datum for surveying and mapping activities in the United States. WSDOT has adopted this datum. (See the [Highway Surveying Manual](#) for further information.)

400.05 Global Positioning System

A Global Positioning System (GPS) uses a constellation of satellites and earth stationed receivers to determine geodetic positions (latitude and longitude) on the surface of the earth. WSDOT personnel use this survey technology. (See the [Highway Surveying Manual](#) for more detailed discussions.)

GPS technology is changing rapidly. The key point is for the designer and surveyor to select the best tool (GPS or conventional applications) for doing the survey fieldwork. Often, a combination of GPS and conventional (Total Station) surveying is appropriate.