

*Chapter 1*  
**General Information**

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# 1. General Information

## A. Introduction

The Data Collection Manual was written by the Photogrammetry and Surveys Section (P&S) to standardize the preliminary surveying process. As with the Surveys Manual, this manual pertains only to the collection, editing, processing, and mapping of preliminary and supplemental data. For information on construction surveys or land surveys, please refer to the Construction Manual or the Right-of-Way Program.

This manual provides instructions for the set-up and operation of optical total stations and digital levels, the use of feature codes, and instructions on editing, processing, and mapping survey data. In the previous edition of this manual, Chapter 2 outlined the hardware, firmware, and software required for the collection of survey data. Because P&S is no longer responsible for the maintenance of field surveying equipment, this subject matter has been omitted. Any questions regarding hardware, firmware, and software used with WYDOT surveying equipment should be directed to the Construction Staff.

Periodic revisions of this manual are necessary due to the continual advance of technology. The majority of the changes in this version are due to the Trimble TCS2 data collector replacing the now obsolete ACU. All set-up and collection procedures in this revision will be dedicated solely to the use of the TSC2. All references to the Trimble ACU data collector have been omitted.

By publishing this manual on the WYDOT website, it is much easier to keep its content as current as possible. Any comments or suggestions submitted from the users of this manual would be greatly appreciated. Additions, deletions, corrections, and general improvements to the manual can be made almost overnight. Hardcopy reproductions of the manual will not be distributed by P&S and will be the responsibility of each user to print paper copies as needed.

## 1. Data Collection

Field notes provide documentation that enables personnel not involved with the survey to interpret and use the raw data. Field notes also make it possible to retrace the work of the original surveyor. As the technology for measuring distances and angles has improved, so has the method of note taking. Older methods of recording survey data with handwritten notes has progressed to electronically stored data.

Each generation of data collectors allow surveyors to be more efficient when collecting raw survey data. In 1992, WYDOT began purchasing the Sokkia SDR33 Electronic Field Book as the primary electronic data collection instrument. At the inception of electronic data collection, field surveyors were trained to collect preliminary survey data in this manner. In late 2003, WYDOT began a migration to Trimble total station instruments with Trimble ACU data collectors. This process was completed in early 2006 when the last Sokkia SDR33 data collector was retired. Beginning in 2008, WYDOT began purchasing the Trimble TSC2 data collectors for use with Trimble GPS receivers. As of late 2011, nearly all of the ACU data collectors have been replaced with the TSC2 to operate Trimble total stations and GPS receivers.

Due to the shorter lifecycles of surveying technology these replacements will be occurring more frequently. However, the basic concepts of data collection will remain relatively unchanged through the ever evolving hardware, firmware, and software versions.

## **2. Data Processing**

P&S personnel utilize MicroStation and Geopak software to process and map survey data. All of the survey data being processed has either been collected in-house by P&S personnel or has been submitted to P&S by district personnel or consultants. The use of CADD software enables WYDOT to develop planimetric and DTM mapping files in a consistent manner with defined preferences and tolerances. Similar to data collectors, the CADD software used by WYDOT also experiences periodic version updates. The latest version of MicroStation/Geopak is V8i (SELECT series 3). However, the V7/V8 hybrid and full V8 versions are also being used to map older projects.

The data in the survey files contain specific information for each individual measurement. The point number, horizontal angle, vertical angle, slope distance, feature code, attributes, and miscellaneous notes. Due to the changes in processing software, it is occasionally necessary to change the requirements of survey files submitted to P&S. Requiring a Trimble format instead of the older Sokkia format and column delineation changes in coordinate files are two examples of these changes.

## **B. Policies**

The following policies have been implemented by P&S in order to maximize the time and resources of personnel involved in the preliminary surveying process:

- Surveyors shall set the various parameters for the data collector as outlined in this manual, including the job name, specific accuracy tolerances, and appropriate units of measure. These settings should be made before any data collection occurs.
- Each edited survey shall be mapped in MicroStation using Geopak before being submitted to the State Photogrammetry & Surveys Engineer. Mapping errors should be corrected prior to submittal. Common errors include incorrect use of feature codes and control codes and crossing breaklines.
- The State Photogrammetry and Surveys Engineer shall approve the WYDOT feature code list, including any additions or deletions to the list.
- The official version of the feature code list shall be distributed by the Photogrammetry and Surveys Section (P&S). Surveyors may not use their own feature codes.
- For each project, surveyors shall use the appropriate version of the WYDOT feature code list as determined by the State Photogrammetry and Surveys Engineer.
- Unless previously agreed to, the use of arbitrary coordinates will no longer be considered a viable project datum.
- Whenever a survey file is submitted to P&S, the field office or consultant should archive the survey data for their records.

## **General Information**

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P&S may refuse to accept survey data files under the following conditions:

- The survey is based on a datum other than the WYDOT project datum assigned by P&S (i.e. the use of arbitrary coordinates).
- The survey is received in a format other than those listed as acceptable in this manual.
- The survey does not meet defined accuracy specifications and procedures. Refer to Section XIII, Survey Standards, in the WYDOT Survey Manual.
- Feature codes assigned inconsistently or inappropriately or an insufficient use of linking codes to accurately describe the intended line or shape.
- Duplicate point numbers or dual coded shots.
- A large number of mapping errors including but not limited to incorrect feature/linking codes and crossing breaklines.