

Chapter 1 Introduction

1-1. Purpose

This manual establishes procedural guidance, specifications, and quality control criteria for performing field topographic surveying in support of planning, engineering and design, construction, and environmental restoration activities.

1-2. Applicability

This manual applies to all HQUSACE elements, major subordinate commands, and districts which perform, contract, or monitor topographic surveys in support of civil works and military construction activities. It is also applicable to surveys performed or procured by local interest groups under various cooperative or cost-sharing agreements.

1-3. References

Required and related references are listed in Appendix A.

1-4. Scope of Manual

This manual establishes standard procedures, minimum accuracy requirements, instrumentation and equipment requirements, and quality control criteria for performing field topographic surveys. It shall be used as a guide in planning and performing topographic surveys with USACE hired-labor forces. The manual has been written to include the electronic surveying methods which have changed conventional equipment and procedures in topographic surveying. Traditional methods, such as plane-table surveying, are included because these methods remain effective topographic surveying methods. Accuracy specifications, procedural criteria, and quality control requirements contained in this manual should be directly referenced in the scopes of work for Architect-Engineer (A-E) survey services or other third-party survey services to ensure that uniform and standardized procedures are followed by both hired-labor and contract service sources throughout USACE.

a. Throughout the manual, topographic survey criteria standards are in specific terms and are normally summarized in tables. Guidance is in more general terms where methodologies are described in readily available references or survey instrumentation operating manuals.

Where procedural guidance is otherwise unavailable, it is provided herein. Sample computations and survey recordation formats are shown for some of the more common field operations.

b. The manual primarily focuses on the preparation of design drawings and other documents associated with engineering projects, including related contracted construction performance activities. Topographic mapping using photogrammetry or remote sensing methods is not covered in this manual. See EM 1110-1-1000.

1-5. Metrics

The use of both the metric and English systems of measurement in this manual is predicated due to the common use of both systems throughout the surveying and mapping profession. Spatial location coordinates are almost universally expressed in feet. Construction measurement quantities are normally measured in linear feet, square feet, or cubic yards. Spatial coordinates relative to the North American Datum of 1983 (NAD 83) are usually represented in metric units (International System of Units [SI]). Universal Transverse Mercator (UTM) projection coordinates are usually metric as well. Due to the variety of mixed measurements, equivalent conversions are not shown in this manual -- the most common measurement unit is used for example computations. Most metric conversions are based exclusively on the U.S. Survey Foot, which equals (exactly) 1,200/3,937 meters (or 3.280833333333 feet per meter). The SI conversion (1 International Foot = 30.48/100 m exactly) is used in a few states.

1-6. Brand Names

The citation in this report of brand names of commercially available products does not constitute official endorsement or approval of the use of such products.

1-7. Accompanying Guide Specifications

This manual is designed to be used in conjunction with guide specifications in Appendix B as a quality control and quality assurance aid in administering A-E contracts for topographic surveying services.

1-8. USACE Capabilities

An inventory of USACE instrumentation and hardware is given in Appendix C.

1-9. COGO System

The coordinate geometry (COGO) software system is described in Appendix D.

1-10. Sample Scope of Work

A sample scope of work for an A-E contract is shown in Appendix E.

1-11. Glossary

Abbreviations used in this manual are explained in the Glossary (Appendix F).

1-12. Manual Development and Proponency

The HQUSACE proponent for this manual is the Surveying and Analysis Section, General Engineering Branch, Civil Works Directorate. Recommended corrections or modifications to this manual should be directed to HQUSACE, ATTN: CECW-EP-S, 20 Massachusetts Ave. NW, Washington, DC 20314-1000.

1-13. Distribution

Copies of this manual may be obtained from the HQUSACE Publications Depot, 2803 52nd Avenue, Hyattsville, MD 20781-1102.