

## Appendix B Guide Specification

# GUIDE SPECIFICATION FOR TOPOGRAPHIC MAPPING SERVICES

### INSTRUCTIONS

1. General. This guide specification is intended for use in preparing Architect-Engineer (A-E) contracts for professional surveying and mapping services. These specifications are applicable to all surveying and mapping contracts used to support U.S. Army Corps of Engineers (USACE) civil works and military design and construction, operations, maintenance, regulatory, and real estate activities. This guide is primarily for use in establishing procedures and specifications obtained through contracts under Public Law (PL) 92-582 (Brooks Act) qualification-based selection procedures and for which unit prices in the contract schedule are negotiated.

2. Coverage. This guide specification contains technical standards and/or references necessary to specify the more common phases of a topographic and planimetric feature detail mapping project performed by conventional methods. Specification of mapping requiring photogrammetric methods are contained in Engineer Manual (EM) 1110-1-1000, Photogrammetric Mapping.

3. Applicability. The following types of A-E contract actions are supported by these instructions:

- a. Fixed-price service contracts.
- b. Indefinite delivery type (IDT) contracts.
- c. A multi-discipline surveying and mapping IDT contract in which topographic mapping services are a line item supporting other surveying, mapping, hydrographic, and photogrammetric services.
- d. A work order or delivery order placed against an IDT contract.
- e. Design and design-construct contracts that include incidental surveying and mapping services (including Title II services). Both fixed-price and IDT design contracts are supported by these instructions.

4. Contract Format. The contract format outlined in this guide follows that prescribed in Appendix B of Principal Assistant Responsible for Contracting Instruction Letter 92-4 (*PARC IL 94-4*), dated 18 December 1992. *PARC IL 92-4* incorporates changes to Part 14.201(a)(1) of the 1989 edition of the Engineer Federal Acquisition Regulation Supplement (*EFARS*). The *PARC IL 92-4* contract format is designed to support PL 92-582 (SF 252) qualification-based A-E procurement actions.

5. General Guide Use.

5.1 This guide is primarily intended for field-to-finish topographic and planimetric feature detail survey contracts for large-scale site plan mapping to support engineering design for civil works and military construction projects. The final mapping product with supporting data should be completely suitable for use as a medium to support design and development of contract construction plans and specifications. Specifying field-to-finish implies that all phases of the mapping process, from establishing control, field acquisition, compilation, and delivery of the final compiled product will be performed by the contractor in which the contractor is responsible for complete quality control over all phases of the work.

**EM 1110-1-1005**  
**31 Aug 94**

5.2 In adapting this guide to any project, specific requirements will be modified as necessary for the work contemplated. Changes will be made by deletions or insertions within this format. With appropriate adaptation, this guide form may be tailored for direct input in the Standard Army Automated Contracting System (SAACONS). Clauses and/or provisions shown in this guide will be renumbered during SAACONS input.

6. Insertion of Technical Specifications. EM 1110-1-1005, Topographic Surveying, should be attached to and made part of any service contract for mapping services. This manual contains specifications and quality control criteria for field-to-finish execution of a mapping project.

a. Technical specifications for topographic mapping that are specific to the project (including items such as the scope of work, procedural requirements, and accuracy requirements) will be placed under Section C of the SF 252 (Block 10). The prescribed format for developing the technical specifications is contained in this guide. Project-specific technical specifications will not contain contract administrative functions as these should be placed in more appropriate sections of the contract.

b. Technical specifications for other survey functions required in a surveying and mapping services contract should be developed from other guide specifications applicable to the discipline(s) required.

c. Standards and other specifications should be checked for obsolescence and for dates of applicability of amendments and revisions issued subsequent to the publication of this specification. Use Engineer Pamphlet (EP) 25-1-1, Index of USACE/OCE Publications. Maximum use should be made of existing EM's, Technical Manuals, and other recognized industry standards and specifications.

7. Alternate Clauses/Provisions or Options. In order to distinguish between required clauses and optional clauses, required clauses are generally shown in capital letters. Optional or selective clauses, such as would be used in a work order, are generally in lower case.

8. Notes and Comments. General comments and instructions used in this guide are contained in asterisk blocks. These comments and instructions should be removed from the final contract.

9. IDT Contracts and Individual Work Order Assignments. Contract clauses which pertain to IDT contracts, or delivery orders thereto, are generally indicated by notes adjacent to the provision. These clauses should be deleted for fixed-price contracts. In general, sections dealing with IDT contracts are supplemented with appropriate comments pertaining to their use. Work orders against a basic IDT contract may be constructed using the format contained in Section C of this guide. Clauses in the basic contract should not need to be repeated in work orders. Contract section C is applicable to any type of surveying and mapping service contracting action.

THE CONTRACT SCHEDULE

SECTION A

SOLICITATION/CONTRACT FORM

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**NOTE: Include here SF 252 in accordance with the instructions in EFARS.**  
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SF 252 -- (Block 5): PROJECT TITLE AND LOCATION

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**NOTE: Sample title for fixed-price contract**  
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TOPOGRAPHIC AND PLANIMETRIC DETAIL SURVEYS IN SUPPORT OF SITE PLAN DEVELOPMENT FOR PRELIMINARY CONCEPT DESIGN OF ENGINEERING INSTALLATION FACILITY, \_\_\_\_\_ AFB, TEXAS.

TOPOGRAPHIC MAPPING SERVICES \_\_\_\_\_ CHANNEL IMPROVEMENT, \_\_\_\_\_ LOCAL FLOOD PROTECTION PROJECT \_\_\_\_\_ WASHINGTON.

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**NOTE: Sample title for indefinite delivery type contract.**  
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INDEFINITE DELIVERY CONTRACT FOR PROFESSIONAL SURVEYING AND MAPPING AND RELATED SERVICES IN SUPPORT OF VARIOUS \*[CIVIL WORKS] [MILITARY CONSTRUCTION] PROJECTS \*[IN] [ASSIGNED TO] THE \_\_\_\_\_ DISTRICT.

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**NOTE: When other surveying services are also required as part of a broader surveying contract, the clause shown in IL 92-4 shall be used.**  
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**SECTION B**  
**SERVICES AND PRICES/COSTS**

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**NOTE: The fee schedule for topographic mapping and related survey services should be developed in conjunction with the preparation of the independent government estimate (IGE) along with the technical specifications.**  
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ITEM	DESCRIPTION	QUAN U/M U/P AMOUNT
0001	[Two][Three][Four][ <input type="checkbox"/> ] Man Survey Party; Includes Labor, Travel, Survey Equipment and Materials, Vehicle Cost	Day
0002	Registered/Licensed Land Surveyor - Office	Day
0003	Registered/Licensed Land Surveyor - Field	Day
0004	Supervisory Survey Technician Survey Party Chief	Day
0005	Survey Technician Survey Instrumentman	Day
0006	Surveying Aid Survey Rodman/Rodman	Day
0007	Supervisory Engineering Technician CADD Manager	M/Hour
0008	Engineering Technician Draftsman/CADD Operator	M/Hour
0009	Project Manager/Principal	M/Hour
0010	Computer Charges CADD Processing/Compilation (Operator not included)	Hour
0011	Compilation Materials/Reproduction	C/Sht

**SECTION C**  
**STATEMENT OF WORK**

C.1 GENERAL. THE CONTRACTOR, OPERATING AS AN INDEPENDENT CONTRACTOR AND NOT AS AN AGENT OF THE GOVERNMENT, SHALL PROVIDE ALL LABOR, MATERIAL, AND EQUIPMENT NECESSARY TO PERFORM THE PROFESSIONAL SURVEYING AND MAPPING AND \*[RELATED SERVICES] \*[FROM TIME TO TIME] DURING THE PERIOD OF SERVICE AS STATED IN SECTION D, IN CONNECTION WITH PERFORMANCE OF TOPOGRAPHIC SURVEYS AND THE PREPARATION OF SUCH MAPS AS MAY BE REQUIRED FOR \*[ADVANCE PLANNING] [DESIGN] [AND CONSTRUCTION] [or other function] ON [VARIOUS PROJECTS] [specify project(s)]. THE CONTRACTOR SHALL FURNISH THE REQUIRED PERSONNEL, EQUIPMENT, INSTRUMENTATION, AND TRANSPORTATION AS NECESSARY TO ACCOMPLISH ALL REQUIRED SERVICES AND FURNISH TO THE GOVERNMENT DETAILED MAPS, PLATS, DIGITAL TERRAIN DATA, UTILITY DETAIL SHEETS, CONTROL DATA FORMS, REPORTS, AND OTHER DATA WITH SUPPORTING MATERIAL DEVELOPED DURING THE FIELD DATA ACQUISITION AND COMPILATION PROCESS. DURING THE PROSECUTION OF THE WORK, THE CONTRACTOR SHALL PROVIDE ADEQUATE PROFESSIONAL SUPERVISION AND QUALITY CONTROL TO ASSURE THE ACCURACY, QUALITY, COMPLETENESS, AND PROGRESS OF THE WORK.

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**NOTE: The above clause is intended for use in an IDT contract for topographic and planimetric mapping services. It may be used for fixed-price service contracts by deleting appropriate IDT language and adding the specific project survey required. This clause is not repeated on individual delivery orders.**  
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C.2 LOCATION OF WORK.

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**NOTE: Use the following clause for a fixed-scope contract of individual work order.**  
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C.2.1. TOPOGRAPHIC MAPPING AND RELATED SURVEYING SERVICES WILL BE PERFORMED AT [\_\_\_\_\_] \*[list project area, installation, etc.]. \*[A MAP EXHIBIT DEFINING THE SITE LOCATION AND PROJECT AREA IS ATTACHED AT SECTION G OF THIS CONTRACT.]

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**NOTE: Use the following when specifying an indefinite delivery contract for topographic mapping services.**  
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C.2.2 TOPOGRAPHIC MAPPING AND RELATED SURVEYING SERVICES WILL BE PERFORMED IN CONNECTION WITH PROJECTS \*[LOCATED IN] [ASSIGNED TO] THE [\_\_\_\_\_] DISTRICT. \*[THE \_\_\_\_\_] DISTRICT INCLUDES THE GEOGRAPHICAL REGIONS WITHIN \*[AND COASTAL WATERS] [AND RIVER SYSTEMS] ADJACENT TO:]

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\*[list states, regions, etc.]

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**NOTE: Note also any local points-of-contact, right-of-entry requirements, clearing restrictions, installation security requirements, etc.**  
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C.3 TECHNICAL CRITERIA AND STANDARDS. THE FOLLOWING STANDARDS ARE REFERENCED IN THIS GUIDE. STATE OR LOCAL CODES MAY HAVE PRIORITY.

C.3.1 USACE EM 1110-1-1005, TOPOGRAPHIC SURVEYING. THIS REFERENCE IS ATTACHED TO AND MADE PART OF THIS CONTRACT. (SEE SECTION G.)

C.3.2 USACE EM 1110-1-1002, SURVEY MARKERS AND MONUMENTATION. \*[THIS REFERENCE IS ATTACHED TO AND MADE PART OF THIS CONTRACT (SEE SECTION G)]

C.3.3 USACE EM 1110-1-1807, STANDARDS MANUAL FOR USACE COMPUTER-AIDED DESIGN AND DRAFTING (CADD) SYSTEMS.

C.3.4. \*ASPRS Accuracy Standards for Large-Scale Maps.

C.3.5. \*[District Drafting Standards, sheet sizes, types, formats, etc.].

C.3.6. \*[Other applicable references, appendices].

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**Note: List other reference standards that may be applicable to some phase of the work such as other Engineer Manuals or standard criteria documents. Such documents need not be attached to the Contract; if attached, however, reference should be made to their placement in contract Section G.**  
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C.4 WORK TO BE PERFORMED. PROFESSIONAL SURVEYING AND MAPPING AND RELATED SERVICES TO BE PERFORMED UNDER THIS CONTRACT ARE DEFINED BELOW. UNLESS OTHERWISE INDICATED IN THIS CONTRACT \*[OR IN DELIVERY ORDERS THERETO], EACH REQUIRED SERVICE SHALL INCLUDE FIELD-TO-FINISH EFFORT. ALL MAPPING WORK WILL BE PERFORMED USING APPROPRIATE INSTRUMENTATION AND PROCEDURES FOR ESTABLISHING CONTROL, FIELD DATA ACQUISITION, AND COMPILATION IN ACCORDANCE WITH THE FUNCTIONAL ACCURACY REQUIREMENTS TO INCLUDE ALL QUALITY CONTROL ASSOCIATED WITH THESE FUNCTIONS. THE WORK WILL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH SURVEYING AND MAPPING CRITERIA CONTAINED IN THE TECHNICAL REFERENCES (PARAGRAPH C.3 ABOVE), EXCEPT AS MODIFIED OR AMPLIFIED HEREIN.

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**NOTE: The following clauses in this section of the guide may be used for either fixed-price surveying and mapping contracts, IDT work orders under an IDT contract, or IDT contracts where surveying and mapping services are part of a schedule of various survey disciplines.**  
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C.4.1. PURPOSE OF WORK. THE WORK TO BE PERFORMED UNDER THIS CONTRACT IS TO BE USED AS BASIC SITE PLAN MAPPING INFORMATION TO SUPPORT \*[BE INCORPORATED INTO] [INSTALLATION/BASE COMPREHENSIVE MASTER PLANNING] [ENGINEERING DESIGN] [CONSTRUCTION] [OPERATION] [MAINTENANCE] [REAL ESTATE] [REGULATORY] [HAZARDOUS AND TOXIC WASTE SITE \_\_\_\_\_]; INCLUDING ALL RELATED ACTIVITIES.

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**NOTE: A description of the functional purpose of the mapping product should be stated in order for the contractor to focus his efforts and quality control toward the more critical aspects of the project. The above clause should fully define the intended use of the mapping product to be furnished by the contractor.**  
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C.4.2. GENERAL SURVEYING AND MAPPING REQUIREMENTS. TOPOGRAPHIC AND PLANIMETRIC FEATURE DETAIL MAPS SHALL BE COMPILED AT A TARGET SCALE OF 1 IN. = [\_\_\_\_] FT FOR THE SITE DELINEATED ON EXHIBIT ATTACHED AT SECTION G. THE MAPPING AND/OR RELATED DIGITAL PRODUCTS SHALL MEET OR EXCEED USACE (ASPRS) CLASS \*[\_\_\_\_] ACCURACY STANDARDS AS SPECIFIED IN EM 1110-1-1005. PLANIMETRIC FEATURE DETAIL WILL BE COMPILED IN ACCORDANCE WITH THE HORIZONTAL ACCURACY STANDARDS SET FOR THIS CLASS. CONTOURS SHALL BE DEVELOPED AT [\_\_\_\_] - FT INTERVALS IN ACCORDANCE WITH THE VERTICAL ACCURACY STANDARDS SET FOR THIS CLASS. FEATURE AND TERRAIN DATA SHALL BE DELIVERED IN \*[HARD COPY AND] DIGITAL FORMAT.

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**NOTE: The above clause should be used for fixed-scope contracts of IDT contract work orders to give an overview of the general mapping effort. Technical requirements will be described in subsequent paragraphs.**

**Note that the final map compilation target scale and ASPRS Accuracy Class/Standard is defined upfront in the scope of work.**

**IDT contracts and work orders: Since specific project scopes are indefinite at the time a basic contract is prepared, only general technical criteria and standards can be outlined. Project of site-specific criteria will be contained in each delivery order along with any deviations from the technical standards identified in the basic IDT contract. The clauses contained within the remainder of the contract are used to develop general requirements for a basic IDT contract. Subsequent delivery orders will reference these clauses, adding project-specific work requirements as required. Delivery order formats should follow the outline established for the basic IDT contract.**

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C.4.3. FIELD PROCEDURES AND REQUIREMENTS. APPROPRIATE INSTRUMENTATION AND PROCEDURES, CONSISTENT WITH ACCEPTED PROFESSIONAL SURVEYING AND MAPPING INDUSTRY STANDARDS AND PRACTICE, SHALL BE SELECTED TO ACHIEVE THE ACCURACY STANDARDS REQUIRED. THE CONTRACTOR SHALL FIELD A FULLY EQUIPPED SURVEY CREW(S), CONSISTING OF PROFESSIONAL SURVEY PERSONNEL, EXPERIENCED IN PERFORMING THE REQUIRED SURVEYS AND CAPABLE OF COMPLETING THE WORK WITHIN ALLOTTED SCHEDULES. ALL FIELD OBSERVATIONAL DATA REQUIRED TO SET AND ESTABLISH PROJECT CONTROL SHALL BE RECORDED IN STANDARD PERMANENT BOUND FIELD BOOKS WHICH WILL SUBSEQUENTLY BE DELIVERED TO THE GOVERNMENT. ALL SURVEY WORK SHALL BE PERFORMED UNDER ADEQUATE SUPERVISION AND QUALITY CONTROL MEASURES. \*[ALL SURVEY WORK, INCLUDING OFFICE COMPUTATIONS AND ADJUSTMENTS, IS SUBJECT TO GOVERNMENT REVIEW AND APPROVAL FOR CONFORMANCE WITH PRESCRIBED ACCURACY STANDARDS. DEFICIENCIES WILL BE RECOGNIZED AND STEPS TO INITIATE CORRECTIVE ACTIONS SHALL BE TAKEN AS REQUIRED]. \*[THE CONTRACTOR SHALL ALLOW DIRECT CONTACT WITH RESPONSIBLE-IN-CHARGE PERSONNEL FOR EACH PHASE OF THE WORK FOR PURPOSES OF PROGRESS ESTIMATES AND COMPLIANCE WITH THE CONTRACT REQUIREMENTS].

C.4.3.1. HORIZONTAL CONTROL SHALL REFERENCE EXISTING PROJECT AREA CONTROL. CONTROLLING POINTS SHALL BE OCCUPIED AS A STATION WITHIN A CLOSED TRAVERSE THAT WILL

MEET OR EXCEED \*[THIRD][ ]- ORDER, \*[CLASS\*][ ] RELATIVE ACCURACY CLASSIFICATION \*[OR 1 PART IN 10,000] [ ] AS ESTABLISHED FOR ASPRS CLASS \*[ ] MAPPING STANDARDS. THE TRAVERSE SHALL INITIATE AND CLOSE UPON ACCEPTABLE CONTROL MONUMENTATION USED TO ESTABLISH THE EXISTING PROJECT GRID SYSTEM. ALL GRID COORDINATES SHOWN ON THE MAP PRODUCTS SHALL BE EXPRESSED IN OR CONVERTED TO, \*[US SURVEY FEET] [INTERNATIONAL FEET] [METERS]. COORDINATES SHALL BE REFERENCED TO THE LOCAL \*[SPCS 27] [SPCS 83] [UTM ZONE].

C.4.3.2. VERTICAL CONTROL SHALL BE REFERENCED TO \*[NGVD 29][NAVD 88]. CONTROLLING POINTS SHALL BE ESTABLISHED WITHIN A CLOSED LEVEL LOOP THAT WILL MEET OR EXCEED \*[THIRD] [ ]-ORDER, ACCURACY STANDARDS AS ESTABLISHED FOR ASPRS CLASS \*[ ] MAPPING STANDARDS. ELEVATIONS SHALL ORIGINATE AND CLOSE ON ACCEPTABLE BENCHMARKS IN THE PROJECT AREA. UNLESS OTHERWISE INDICATED, INITIATING AND CLOSING THE LEVEL LOOP ON THE SAME BENCHMARK SHALL NOT CONSTITUTE AN ACCEPTABLE CONTROL CIRCUIT.

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**NOTE: Few USACE surveying and mapping projects require relative accuracy classifications in excess of Third Order, Class I, 1:10,000 for horizontal control and Third Order 1:5,000 for vertical control. Although instrumentation, conventional and GPS, are capable of achieving higher accuracy requirements, specifying higher levels of accuracy may adversely impact the overall project cost and should be thoroughly justified relative to the required mapping accuracies and other factors.**  
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C.4.3.3. EXISTING PROJECT/NETWORK CONTROL. A TABULATION AND/OR DESCRIPTION OF EXISTING PROJECT/NETWORK CONTROL POINTS \*[IS SHOWN BELOW] [IS SHOWN IN ATTACHMENT] [WILL BE PROVIDED IN THE DELIVERY ORDER]. THE SOURCE AGENCY, COORDINATES, DATUM, AND ESTIMATED ACCURACY OF EACH POINT ARE INDICATED. PRIOR TO USING ANY CONTROL POINTS, THE MONUMENTS SHOULD BE CHECKED TO ENSURE THAT THEY HAVE NOT BEEN MOVED OR DISTURBED.

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**NOTE: List existing control station(s) or, alternately, refer to a map exhibit, tabulation attachment, and/or descriptions that would be included in an attachment.**  
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a. \*The contractor shall perform the necessary surveys to connect existing project control to assure that such control has sufficient relative accuracy to adequately control the overall project. Should these surveys indicate deficiencies in the existing control, the contractor shall advise the Contracting Officer \*[or Contracting Officer Representative]. The contractor shall furnish the appropriate data indicating a deficiency. If the Contracting Officer \*[or Contracting Officer Representative] deems it necessary to perform resurveys of the existing network, appropriate modification may be made to the contract.

b. \*Suitable control monumentation shall be set as required to adequately control construction phases. All stations shall be monumentated in accordance with EM 1110-1-1002, Survey Markers and Monumentation. Monumentation for this project shall be Type \*[ ] for horizontal and Type \*[ ] for vertical, per EM 1110-1-1002 criteria. \*[Monumentation shall be defined to include the required reference marks and azimuth marks required by EM 1110-1-1002.]

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**NOTE: Deviations from EM 1110-1-1002 should be indicated as required. USACE project control rarely requires supplemental reference/azimuth marks - the optional specification clauses below should be tailored accordingly.**  
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c. \*At each station, angle and distance measurements shall be made between a network station and reference/azimuth marks established in accordance with the requirements set forth in EM 1110-1-1002. All observations shall be recorded in a standard bound field book.

(1) \*For reference marks, two (2) directional positions are required (reject limit  $\pm$  10-second arc) and with steel taping performed to the nearest  $\pm$  0.01 ft.

(2) \*Four directional positions are required for azimuth marks. The reject limit for a 1-second theodolite is  $\pm$  5 seconds. Azimuth mark landmarks shall be easily defined/described natural features or structures of sufficient distance to maintain a [ ]-second angular accuracy. [ ]-order astronomic azimuths shall be observed to azimuth marks.]

(3) \*A compass reading shall be taken at each station to reference monuments and azimuth marks.

#### C.4.3.4. STATION DESCRIPTION AND RECOVERY REQUIREMENTS.

a. \*Station descriptions and/or recovery notes shall be written in accordance with the instructions contained in EM 1110-1-1002. \*[Form [ ] shall be used for these descriptions.] Descriptions shall be \*[written] [typed].

b. \*Descriptions \*[are] [are not] required for \*[existing] [and/or newly established] stations.

c. \*Recovery notes \*[are] [are not] required for existing stations.

d. \*A project control sketch \*[is] [is not] required.

C.4.4. FIELD CLASSIFICATION AND MAP CHECK SURVEYS. FIELD CLASSIFICATION, INSPECTION, AND/OR CHECK/MAP ACCURACY TEST SURVEYS \*[WILL] [WILL NOT] BE PERFORMED \*[ON THIS PROJECT].

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**NOTE: Tests for compliance of a map sheet are optional. Check points are based on "well-defined points" established in a manner agreed upon by the contracting parties. Criteria for testing for map accuracy compliance are defined in the ASPRS Accuracy Standards for Large-Scale Maps.**  
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#### C.5. MAP COMPILATION, DRAFTING, AND CADD SPECIFICATIONS.

C.5.1. MAP COMPILATION SCALE. THE CONTRACTOR SHALL FURNISH \*[REPRODUCIBLE] FINISHED MAPS AT A SCALE OF 1 IN. = \*[ ] FT. THE MAP MEDIA SHALL BE COMPUTER-GENERATED PLOTS ON \*[PAPER] [HIGH-GRADE, STABLE BASE MYLAR NOT LESS THAN \*[ ] IN. IN THICKNESS] \*[E] [ ] - SIZE SHEETS].

C.5.2 TOPOGRAPHIC AND PLANIMETRIC FEATURES. THE MAPS SHALL CONTAIN ALL TOPOGRAPHIC AND PLANIMETRIC FEATURES ENCOUNTERED WITHIN THE PROJECT LIMITS. THE MAPS SHALL PROPERLY DEPICT THE EXISTING SITE CONDITIONS AS NECESSARY FOR THE PROPER USE OF THEIR INTENDED PURPOSE. THE FINAL MAPPING PRODUCT GENERATED BY THE CONTRACTOR SHALL COMPLY WITH AND CONTAIN BUT NOT BE LIMITED TO THE FOLLOWING:

a. TERRAIN FEATURES/CONTOUR DEVELOPMENT. \*[THE CONTOUR INTERVAL FOR THIS PROJECT IS \_\_\_\_\_ FT.]. CONTOURS SHALL BE LEGIBLE AND DRAWN SHARP AND CLEAR AS SOLID LINES. EVERY \*[FIFTH] [ ] CONTOUR (INDEX COUTOUR) SHALL BE ACCENTUATED AS A HEAVIER

LINE THAN THE INTERMEDIATE FOUR. HALF-INTERVAL OR [ ] FT. SUPPLEMENTAL CONTOURS SHALL BE ADDED AS DESIGNATED. LABELING OR NUMBERING OF CONTOURS SHALL BE PLACED SO THE ELEVATIONS ARE READILY DISCERNIBLE. LABELING OF INTERMEDIATE CONTOURS MAY BE REQUIRED IN AREAS OF LOW RELIEF.

(1) TURNING POINTS THAT DEFINE DRAINAGE CHANNELS, DITCHES, ETC., SHALL BE CONSISTENT IN DEPICTING CORRECT ALIGNMENT AND DIRECTION OF DRAINAGE.

(2) SPOT ELEVATIONS SHALL BE ESTABLISHED AND SHOWN ON THE MAPS AT WATER SURFACES ON SHORELINES OF LAKES, RESERVOIRS, PONDS, AND THE LIKE; HIGH AND LOW POINTS AT HILLTOPS AND DEPRESSIONS; AT INTERSECTIONS AND ALONG CENTER LINES OF STREETS AND, WHERE APPLICABLE, TOP CURB AND GUTTER; AT TOPS AND BOTTOMS OF VERTICAL WALLS AND OTHER STRUCTURES; AND AT CENTER LINE OF END OF BRIDGES. GROUND SPOT ELEVATIONS SHALL SUFFICIENTLY SUPPLEMENT CONTOURED ELEVATIONS AND SHALL NOT EXCEED \*[ ]IN. AT TARGET SCALE. SPOT ELEVATIONS SHOWN ON THE MAP SHEETS SHALL BE ACCURATE TO [ ] DESIGNATED CONTOUR INTERVAL.

(3) DIGITAL TERRAIN MODEL (DTM) GENERATION. DIGITAL ELEVATION MODELS (DEM) SHALL BE GENERATED BY \*[GRID, TRACE METHODS] CONTROLLING METHODS ON A NETWORK OF RANDOM POINTS SUPPLEMENTED WITH BREAK-LINE POINTS TO PROPERLY ESTABLISH THE TERRAIN MODEL. CONTOURS WILL BE GENERATED USING STANDARD DTM/CADD APPLICATION SOFTWARE.

b. PLANIMETRIC FEATURE DATA DETAILING. THE MAPS SHALL CONTAIN ALL PLANIMETRIC FEATURES ENCOUNTERED WITHIN THE PROJECT LIMITS AND COMPATIBLE WITH THE TYPE OF PROJECT INVOLVED (I.E., MILITARY MASTER PLANNING, ENGINEERING SITE PLAN MAPPING, ETC.) THESE SHALL INCLUDE, BUT NOT BE LIMITED TO, BUILDINGS; ROADS; SEWER SERVICE LINES; UTILITY SYSTEMS, SURFACE AND SUBSURFACE INCLUDING ALL APPURTENANCES, SUCH AS COMMUNICATION, GAS, WATER, FUEL, ELECTRIC, TELEPHONE, OVERHEAD POWERLINES, TRANSMISSION PIPELINES; STORM DRAINAGE FEATURES AND STRUCTURES, BRIDGES, CULVERTS, PIERS, SPILLWAYS, CHANNEL SYSTEMS; TIMBERED AREAS, LANDSCAPES AND INDIVIDUAL TREES THAT ARE RECOGNIZED AS SUCH; RECREATION AREAS; CEMETERIES; \*[ ], ETC. \*[ FEATURES/UTILITIES SHALL BE SKETCHED IN DETAIL AND SHOWN ON A SEPARATE SHEET OR, WHERE APPLICABLE, SHOWN ON THE MAP SHEET(S) PROPERLY INDEXED IN RELATION TO LOCATION].

(1) \*SURFACE UTILITY DATA. LOCATE AND IDENTIFY ALL CULVERTS (PIPES OR BOX DRAINS); WATER SYSTEMS INCLUDING VALVES AND METERS; CATCH BASIN INLETS AND OUTLETS; MANHOLES (STORM, SANITARY, TELEPHONE, GAS, ELECTRIC); METER/VALVE BOXES; OVERHEAD POWER POLE LOCATION AND TYPE; LOW WIRE HEIGHTS; OVERHEAD TOWERS; AND TRANSFORMERS. OBTAIN PHOTOGRAPHS AND/OR SKETCHES AS DESIGNATED. \*[SPECIFY UTILITY DETAIL REQUIREMENTS, SKETCHES, DETAIL SHEETS, ETC.]

(2) \*SUBSURFACE UTILITY DATA. FOR DESIGNATED SUBSURFACE UTILITIES, SHOW ALL SYSTEMS AND APPURTENANCES. PROVIDE PIPE/CONDUIT ALIGNMENT, TYPE, SIZE, \*[SUBSURFACE PROFILE], JUNCTION POINTS, ETC.; OBTAIN TOP AND INVERT ELEVATIONS OF ALL [ ].

(3) \*HIGHWAYS, ROADS, AND STREETS. OBTAIN NAMES, DESCRIPTIONS, CLASSIFICATIONS; CENTER-LINE PROFILES OR SECTIONS AS DESIGNATED; ROUTE CLASSIFICATION; PAVEMENT WIDTH AND TYPE AND CONDITION OF SURFACE. WHERE DESIGNATED, SHOW CURB AND GUTTER AND JOINT LAYOUT FOR CONCRETE PAVEMENT.

(4) \*BRIDGES AND CULVERTS. OBTAIN DIMENSIONS AND STRUCTURAL TYPE AND CONDITION; MEASURE DECK, FLOW LINE, AND CLEARANCE ELEVATIONS; HORIZONTAL CLEARANCES BETWEEN ABUTMENTS AND PIERS, IF ANY; AND WIDTH OF PIERS. INCLUDE DETAILED PLAN AND ELEVATION SKETCHES, OBTAIN PHOTOGRAPHS UPSTREAM AND DOWNSTREAM.

(5) \*BUILDINGS AND PERTINENT STRUCTURES. OBTAIN PROPER NAMES OF ALL BUILDINGS OR LANDMARKS; PROPER NAMES, INSTALLATION NUMBERING, AND/OR DESCRIPTIONS OF ALL BUILDINGS AND OTHER STRUCTURES AFFECTED OR POSSIBLY AFFECTED BY THE PROJECT; FOUNDATION AND FIRST-FLOOR ELEVATIONS OF THOSE STRUCTURES WITHIN DESIGNATED LIMITS AND/OR ELEVATIONS BELOW [ ] FT; BASEMENT ELEVATIONS; SEWER/DRAIN OUTLET INFORMATION BELOW ELEVATION [ ]. OBTAIN PHOTOGRAPHS OF BUILDINGS AND STRUCTURES.

(6) \*LOCATE AND SHOW TYPE, SIZE, AND APPROXIMATE NUMBER OF TREES PER \*[ ] SQUARE FEET OF AREA AS REQUIRED TO PROPERLY ACCESS CLEARING REQUIREMENTS. ACCURATELY LOCATE AND DESCRIBE ALL SCATTERED, INDIVIDUAL TREES IN EXCESS OF \*[ ] IN. DIAMETER.

\*\*\*\*\*  
**NOTE: Describe any special requirements for detailed drawings. Add to and elaborate on any of the above instructions on feature detail or utility data as required to properly develop a utility plan and that which may be critical to the particular project, especially if relocation work is to be performed. Specify any areas where planimetric/utility feature detail is especially important, or where it may be deemphasized. Also specify any requirements for field verification of utilities vs. taken from as-built plans.**  
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### C.5.3 FINAL SITE PLAN MAPS AND/OR DIGITAL DATA CONTENTS.

a. COORDINATE GRID. UNLESS OTHERWISE SPECIFIED, THE GRID SYSTEM SHALL BE ESTABLISHED ON THE LOCAL STATE PLANE COORDINATE SYSTEM (SPCS) \*[UNIVERSAL TRANSVERSE MERCATOR (UTM)]. GRID TICKS SHALL BE PLACED ON THE MAP SHEETS AT FIVE (5) INCH INTERVALS WITH COORDINATE VALUES PROPERLY ANNOTATED AND SHOWN AT THE TOP AND RIGHT EDGE OF EACH MAP SHEET.

b. ALL HORIZONTAL AND VERTICAL CONTROLS SHALL BE PLOTTED ON THE MAP TO AN ACCURACY OF \*[ ] RELATIVE TO THEIR TRUE POSITION. PRIMARY CONTROL SET TO CONTROL CONSTRUCTION PHASES SHALL BE LABELED AS SUCH.

c. MULTIPLE MAP SHEETS SHALL CONTAIN AN INDEX OF THE SHEET LAYOUT ORIENTED \*[NORTH ][ ] TO EACH SHEET. MATCH LINES/MATCH GRID SHALL BE PROVIDED AND PROPERLY LABELED SUCH THAT EACH SHEET MAY BE JOINED ACCURATELY TO ADJACENT SHEETS.

d. SYMBOLOGY USED ON THE MAP SHEETS SHALL BE IN ACCORDANCE WITH SYMBOLS PROVIDED, REFERENCE \*[ ].

e. THE TITLE BLOCK, SHEET INDEX, AND LEGEND SHALL BE PLACED ON THE MAP SHEETS TO THE DESIGNATED SIZE AND ARRANGEMENT. THE TITLE BLOCK SHALL INCLUDE THE NAME OF THE CONTRACTING AGENCY, PROJECT NAME, DATE, SCALE, AND NAME OF THE CONTRACTOR PERFORMING THE WORK. THE TITLE BLOCK CONTENTS \*[SHEET INDEX REQUIREMENTS][LEGEND REQUIREMENTS] WILL BE FURNISHED TO THE CONTRACTOR. \*[THE CONTRACTOR'S NAME/ADDRESS, CONTRACT/DELIVERY ORDER NUMBER, AND LOGO WILL BE PLACED ON EACH MAP SHEET] \*[ADD APPLICABLE PROFESSIONAL CERTIFICATION REQUIREMENTS].

f. ALL DESIGN FILES WITH SUPPORTING DATA SHALL BE FURNISHED ON HIGH-DENSITY 5-1/4" OR 3-1/2" DISKETTES \*[BERNOULLI CARTRIDGE, OTHER MAGNETIC MEDIA]. THE FORMAT SPECIFIED WILL BE DEPENDENT ON THE OPERATING SYSTEM OF THE DESIGN WORKSTATION, I.E, DOS, UNIX, OTHER.

g. COMPLETED MAPS, REPRODUCTIONS, COMPILATION DATA, DIGITAL DATA SHALL BE DELIVERED IN ACCORDANCE WITH THE WORK ORDER REQUIREMENTS.

C.6 QUALITY CONTROL AND ASSURANCE STANDARDS.

C.6.1. CONTRACTOR QUALITY CONTROL.

a. GENERAL. ALL FINAL MAPPING DATA SUBMITTED UNDER THIS CONTRACT SHALL CONFORM TO THE ACCURACY STANDARDS OUTLINED IN EM 1110-1-1005 UNLESS MODIFIED OR SUPPLEMENTED BELOW. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INTERNAL QUALITY CONTROL FUNCTIONS FOR ALL PHASES OF THE WORK AS REQUIRED TO ASSURE THE COMPLETENESS AND ACCURACY OF FINAL COMPILED MAPS.

b. MATERIALS. ALL MATERIALS, SUPPLIES, OR ARTICLES REQUIRED FOR WORK THAT ARE NOT COVERED HEREIN, OR BY WORK ORDER SPECIFICATIONS, SHALL BE STANDARD PRODUCTS OF REPUTABLE MANUFACTURERS, AND ENTIRELY SUITABLE FOR THE INTENDED PURPOSE. UNLESS OTHERWISE SPECIFIED, THEY SHALL BE NEW AND UNUSED AND SUBJECT TO THE APPROVAL OF THE CONTRACTING OFFICER.

c. METHODS FOR EVALUATING MAP ACCURACY. ALL MAPS COMPILED SHALL BE SUBJECT TO MAP TESTING BY THE GOVERNMENT, BY INDEPENDENT THIRD-PARTY FORCES, OR BY CONTRACTOR FORCES WORKING UNDER DIRECT GOVERNMENT REVIEW, TO ENSURE THAT THEY COMPLY WITH THE APPLICABLE ACCURACY REQUIREMENTS STATED IN THE CONTRACT. THE MAP TEST RESULTS WILL BE STATISTICALLY EVALUATED RELATIVE TO THE DEFINED ACCURACY CRITERIA, AND PASS/FAIL DETERMINATION MADE ACCORDINGLY. THE DECISION OF WHETHER OR NOT TO PERFORM RIGID MAP TESTING ON ANY PROJECT, DELIVERY ORDER, OR PORTION OF A PROJECT RESTS WITH THE CONTRACTING OFFICER. IN ALL CASES, THE CONTRACTOR WILL BE ADVISED IN WRITING WHEN SUCH ACTION WILL BE TAKEN.

\*\*\*\*\*  
**NOTE: Specify and reference the map accuracy standard and accompanying testing criteria required. The ASPRS standard is recommended for USACE large-scale mapping work. Alternatively, standards set forth in EM 1110-1-1005 or, if applicable, contained in other EM's may be used and simply referenced in this contract.**  
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**NOTE: For fixed-scope contracts, indicate the degree of formal map testing contemplated, and by whom. If performed by contractor survey forces, allow adequate field survey time in Section B. On IDT contracts, formal map accuracy tests are optional for each delivery order. The need for map tests is a function of the ultimate or intended use of the maps.**  
\*\*\*\*\*

C.7 SUBMITTAL REQUIREMENTS.

C.7.1. SUBMITTAL SCHEDULE. THE COMPLETED WORK, MAPS, AND REPORTS SHALL BE DELIVERED WITHIN \*[ DAYS AFTER NOTICE TO PROCEED IS ISSUED] \*[BY CALENDAR DATE].

\*\*\*\*\*  
**NOTE: Include a more detailed submittal schedule breakdown if applicable to the project. Note any preliminary, priority, or partial delivery requirements, with reference to specific Section B line items.**  
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**C.8 PROGRESS SCHEDULES AND WRITTEN REPORTS.**

C.8.1. \*PREWORK CONFERENCE/IN-PROGRESS REVIEW CONFERENCES.

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**NOTE: Detail any requirements for prework or in-progress review conferences, including requirements for preparing written reports for such conferences.**  
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**SECTION D**

**CONTRACT ADMINISTRATION DATA**

**SECTION E**

**SPECIAL CONTRACT REQUIREMENTS**

**SECTION F**

**CONTRACT CLAUSES**

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**NOTE: See instructions in Appendix B of PARC IL 92-4.**  
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**SECTION G**

**LIST OF ATTACHMENTS**

G.1 U.S. ARMY CORPS OF ENGINEERS EM 1110-1-1005, TOPOGRAPHIC SURVEYING. THIS REFERENCE IS ATTACHED TO AND MADE PART OF THIS CONTRACT.

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**NOTE: List any other attachments called for in contract Section C or in other contract sections. This may include such items as:**

- a. Marked-up exhibits, project sketches/drawings.
- b. Station/Monument descriptions or Recovery Notes.
- c. Drafting Standards.
- d. CADD Standards.

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**SECTION H**  
**REPRESENTATIONS, CERTIFICATIONS, AND OTHER**  
**STATEMENTS OF OFFERERS**

**SECTION I**  
**INSTRUCTIONS, CONDITIONS, AND NOTICES TO OFFERERS**

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**NOTE: See PARC IL 92-4 for guidance in preparing these clauses/provisions.**  
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