

# REAL ESTATE GEOSPATIAL DATA AND MAPPING

## Course Author:

Department of the Army, U.S. Army Corps of Engineers

**6 Professional Development Hours**

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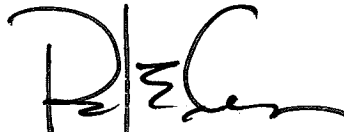
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30 SEPTEMBER 2016

Real Estate  
REAL ESTATE GEOSPATIAL DATA AND MAPPING

1. Purpose. This manual provides detailed technical guidance and procedures for compliance with the policy in Engineer Regulation (ER) 405-1-3, Real Estate Geospatial Data and Mapping. ER 405-1-3 establishes general requirements and policy for the development and use of geospatial data and related materials for planning, acquisition, management, and disposal of lands and interests in lands acquired by the U.S. Army Corps of Engineers (USACE) for Department of the Army, military and civil works projects.
2. Applicability. This manual applies to all USACE Commands having Real Estate responsibilities for civil works and military missions. It specifically applies to functional areas having responsibility for real estate functions of USACE. It does not apply to real estate support provided under Interagency and International Services programs.
3. Distribution. This publication is approved for public release; distribution is unlimited.
4. Discussion. This manual provides guidance for developing and providing geospatial data, maps, surveys, legal descriptions, and related material for planning, acquisition, management, disposal, and historical records of lands and interests in lands acquired by the U. S. Army Corps of Engineers (USACE) for Department of the Army, military and civil works projects. As such, this manual sets forth the criteria, general format, forms development, approval authority, maintenance, and distribution of geospatial data and hardcopy maps reflecting the geospatial representation of USACE real estate interests. It conforms to the overall USACE geospatial guidance provided in ER 1110-1-8156 and related guidance.

FOR THE COMMANDER:



PAUL E. OWEN  
COL, EN  
Chief of Staff

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## CHAPTER 1

### Introduction

#### 1-1. Purpose.

a. This Engineer Manual (EM) describes the requirements and procedures for developing and providing geospatial data, maps, surveys, legal descriptions, and related material for planning, acquisition, management, disposal, and historical records of lands and interests in lands acquired by the U. S. Army Corps of Engineers (USACE) for Department of the Army, military and civil works projects. Work done for the Department of the Air Force or as agent for other Federal agencies, should follow the intent of this guidance. Specifics may vary where procedures of the other agencies will control. The criteria, general format, forms development, approval authority, maintenance, and distribution of geospatial data and hardcopy maps reflecting graphic depiction of all lands acquired and disposed of are set forth in this manual. Specific or unusual problems or inquiries concerning project planning, field instrument surveys, and development of geospatial data, hardcopy maps, and legal descriptions, including requests for deviations from criteria established in this manual, will be forwarded to the appropriate division office for evaluation and determination.

b. This EM is intended to support the transition from manual to digital (i.e. Computer Aided Drafting and Design (CADD) and Geographic Information System (GIS) based) methods for preparation of Real Estate cadastral map and collection of associated geospatial data. References to and descriptions of manual mapping methods and formats are included in this EM due to the volume of legacy hardcopy maps and the need to recognize and understand how such maps were developed. It is the intent of this manual that all Real Estate mapping be conducted using digital methods, in accordance with the USACE Enterprise Geographic Engineering Systems (EGES). EGES is the integrated geospatial technology infrastructure delivering spatial information products, services, and standard data sets to all functional elements and business processes of the organization (ER 1110-1-8156 (Policies, Guidance, and Requirements for Geospatial Data and Systems), EM 1110-1-1005 (Control and Topographic Surveying) and EM 1110-1-2009 (Geospatial Data and Systems).

c. The intent to utilize digital methods for geospatial data collection, development, and management does not preclude or override the need to prepare hardcopy map products for various reports, studies, or real estate activities. Furthermore field surveys and the resulting plats, maps, and legal descriptions remain integral parts of the cadastral function and processes.

#### 1-2. Applicability

a. This manual applies to all USACE Commands having Real Estate responsibilities for Civil Works or Military missions.



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b. This EM also applies to both in-house and contracted Real Estate mapping efforts.

1-3. Distribution. This manual is approved for public release; distribution is unlimited.

1-4. References.

a. Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*

b. DoD Instruction Number 4165.57, *Air Installations Compatible Use Zones*

c. ER 405-3-10, *Military Planning*

d. ER 405-2-12, *Real Estate Planning, Acquisition, Responsibilities, and Crediting Principles for Civil Works*

e. ER 1110-1-8156, *Policies, Guidance, and Requirements for Geospatial Data and Systems*

f. EM 1110-1-1000, *Photogrammetric Mapping*

g. EM 1110-1-1002, *Survey Markers and Monumentation*

h. EM 1110-1-1003, *NAVSTAR Global Positioning System Surveying*

i. EM 1110-1-1005, *Control and Topographic Surveying*

j. EM 1110-1-2909, *Geospatial Data and Systems*

k. ER 1110-2-8160, *Policies for Referencing Project Evaluation Grades to Nationwide Vertical Datums*

l. EM 1110-2-6056, *Standards and Procedures for Referencing Project Evaluation Grades to Nationwide Vertical Datums*

m. FGDC-STD-001-1998, *Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata*

n. 14 CFR 77, *FAA Regulations*

o. International Organization for Standardization (2003) *Geographic Information – Metadata*. ISO 19115:2003. International Organization for Standardization, Geneva, Switzerland.

## CHAPTER 2

### Mapping General

2-1. Timing. The real estate mapping program described in this manual is subject to the availability of project funds. Once funds have been made available through appropriate directives or authorizations, real estate mapping activities can be accomplished. Final project geospatial data will be compiled within a reasonable time but not more than 3 months after the completion of the transaction. Updates to geospatial data will be completed within a reasonable time but not more than 1 month after the completion of the validation process for any real estate actions involving civil projects or military installations.

2-2. Funding. Real estate mapping is an essential component of project development and management. As such real estate mapping should be budgeted for as part of the overall project budgeting process. For new real estate actions, the cost of performing cadastral mapping activities should be calculated into the cost of the overall real estate effort. No additional funds for real estate mapping will be made available as part of this Engineer Manual.

2-3. Qualifications. All real estate mapping activities, whether performed by government staff or contractors, will be performed by qualified persons using applicable cartographic, land surveying, and GIS standards and practice.

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## CHAPTER 3

### Assembling Pertinent Data

3-1. Assembly of Data. The initial phase of the real estate mapping program involves the assembly of existing digital data (District EGES, online sources from Federal, State and local agencies, commercial sources (e.g., Google Earth, Bing, RealQuest, Land Vision, etc.)), available maps and tract ownership data pertinent to the area to be acquired. The magnitude, extent, and complexity of the project determines the extent of reconnaissance but the early assembly of all available information will support the later phases of mapping, determination of ownerships, description writing, and actual acquisition. Whenever possible revisions and additions to existing projects not in electronic format should be accomplished by migrating to digital methods using Commercial Off-The-Shelf (COTS) CADD, GIS, and other approved Government or commercial software and systems rather than through traditional manual means. New projects and significant revisions and additions to existing projects will be accomplished by the use of COTS CADD, GIS, and other approved Government or commercial software and systems. Whenever available, digital data should be procured in the initial and final mapping phases. Digital data should be referenced to known coordinate systems and datums with proper horizontal and vertical control. However, caution must be exercised when using data obtained from online sources as to data accuracy and to avoid any violation of data licenses granted by the data suppliers. The following products and existing sources of information should be considered. If available, this data should be procured in digital format suitable for use in GIS or CADD.

a. National Spatial Data Infrastructure (NSDI) Clearinghouse and USACE-maintained Enterprise Geospatial Data. Before acquiring any geospatial data from outside sources, the cadastral or geospatial SME should determine if data may be available from the National Spatial Data Infrastructure (NSDI) Clearinghouse or from USACE sources including CorpsMap or the District. The cadastral or geospatial SME should inspect the data for accuracy, presence of metadata, sound topological structure and compliance with the Spatial Data Standards for Facilities, Infrastructure, and the Environment (SDSFIE) or Architect/Engineer/Contractor (A/E/C) CADD standards. A determination should be made if the data is suitable for the intended use or purpose. If the data is suitable for the intended use NSDI data should be used before data from other outside sources. [Refer to EM 1110-1-2909 for details about accessing the NSDI Clearinghouse](#). USACE sources of geospatial data can be identified with the help of the local EGES coordinator.

b. Public Land Survey Data. For projects within the public land surveys, information concerning the issuance of patents, the status of homestead entries, approved field notes, plats of the public land township surveys, plats of the mineral patents, and plats of the special surveys and resurveys, may be procured from the Bureau of Land Management, from regional and public land survey offices, or from the appropriate state offices. Plats of the original township surveys are essential, as are any dependent resurveys or re-plats filed of record with the appropriate

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county or other government office.

c. **Published Geospatial Products.** Copies of the 7.5-minute and 15-minute quadrangle maps of the National Topographic Map Series prepared by the United States Geological Society (DRG's) and other small scale data can be valuable sources of base map information. Hardcopy maps, geospatial data, property data, and topographic data, are readily available in raster and vector formats from many Federal, state, and local government agencies. Helpful cartographic educational information is often available from the same sources. County assessors' offices, state highway departments, state universities, local and regional geographic information system centers, online geospatial data clearinghouses, or other appropriate Internet resources may also have pertinent base map and real estate data in a usable format.

d. **Imagery and Mosaics.** There are generally two types of imagery that Real Estate staff may find useful: satellite imagery and aerial photography. The Army Geospatial Center Imagery Office (AIO) is the USACE central depository and clearinghouse for all existing satellite imagery and should be contacted first to conduct a search for available imagery. The AIO can also advise users on procurement of new imagery, including specifications and providers. Refer to Appendix N of EM 1110-1-2909 (*Geospatial Data and Systems*), for details and procedures for working through the AIO. For aerial photography, the Center of Expertise (CX) is located in the St. Louis District (CEMVS). This CX can provide technical assistance on a reimbursable basis for procurement of new aerial photography, photogrammetric mapping, and LIDAR. The use of the St. Louis CX for Photogrammetric Mapping is not mandatory but is encouraged.

3-2. **Determination of Ownership.** Preliminary ownership information may be obtained from: online tax records, commercial plat books, local land records; or, in areas in which there are oil and mineral leasing activities, commercial land ownership maps and tax maps. Many counties or other government agencies may also have digital cadastral data that can be procured to be used as preliminary data. The sources identified above should be considered as guides only and must be confirmed in the project development process.

a. Ownership data can often be obtained by title searches. However occasionally cadastral staff may be required to visit local government offices to obtain ownership information. When this occurs, parcel ownership information will be obtained by USACE personnel or by contract. Collection documents will be dated and signed by the person collecting the information if collected in hardcopy; if collected in digital format care should be taken to make note of the information sources, acquisition method (i.e., declaration of taking, deed, etc), and date for file records. Each parcel record should include the name of the project, the tract number, state, county, township and range and any other pertinent information.

b. The collection document will include as much information as possible relating to the current parcel including owner, address, tax parcel id (if applicable), a record of the last conveyance of the property and any relevant previous conveyances that can be obtained to include the method of conveyance such as by deed, will or inheritance, and any outstanding third party rights, occupants and tenants. Recordation information including book and page number or

instrument ID should be collected and a record made of the office of record from which any documentation was obtained. If used in compilation of digital geospatial data the above collection information should be referenced in the corresponding Federal Geographic Data Committee (FDGC) compliant metadata for the resulting data.

3-3. Additional Ownership and Survey Information. Recorded plats, maps, and surveys that can be found in the local courthouse should be utilized when available for preparing preliminary maps and base maps. Other useful resources include highway mapping, utility mapping, aerial mapping, tax mapping, imagery, etc. This mapping can be found from several sources including landowners, private surveying and engineering firms, libraries, state and local governments, online geospatial data clearinghouses, or appropriate other internet resources.

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## CHAPTER 4

### Preparation of Base Real Estate Geospatial Data Sets

4-1. General. After assembly of data and before preparation of project segment maps, the next step is the verification of tract ownership data and deed descriptions and preparation of a base map data set from which the layout of each segment will be determined. Tract ownership may be verified through courthouse searches or by contracting for deed research services, as necessary. Project maps will be developed from this base map using the sources discussed in this chapter (provided that each of these types of maps have been geo-referenced with the appropriate horizontal and vertical control and do not violate copyright laws).

4-2. Digital Mapping. Use of COTS GIS, CADD, or any other approved Government or commercial software and systems is the preferred method for preparing base and final maps and digital geospatial data. Utilization of such systems and software applications for creation of maps and digital geospatial database products shall be in compliance with all current policy, guidance, regulations, and standards. Requirements and general procedures for geospatial data development are provided in EM 1110-1-2909. Specific geospatial data (GIS) and CADD standards are defined in the SDSFIE, published by Department of Defense, and the A/E/C CADD Standard, published by the US Army Engineer Research and Development Center (ERDC), CADD/BIM Technology Center. Links to these websites are available through the USACE CorpsMap website.

4-3. Imagery. Satellite and aerial imagery in digital or printed form may be used if they are geo-referenced with appropriate horizontal and/or vertical control. If the tract corners cannot be depicted accurately on this imagery, then a field survey will be necessary to locate the actual corners, particularly in mountainous terrain where relief errors in imagery are inevitable. This field reconnaissance is required to prevent distortion and to produce accurate control. Reference EM 1110-1-1000 (*Photogrammetric Mapping*).

4-4. Planimetric Maps. Planimetric maps have the advantage of full horizontal control and usually show roads and natural boundaries sufficiently to permit the direct plotting of deed descriptions. Some field reconnaissance may be required to tie the property corners to photo-identifiable points. Planimetric mapping may also be used independently or in combination with other resources such as imagery, private surveys, and USGS digital raster graphic (DRG) files to tie property corners to identifiable points.

4-5. Verification of Tract Ownership Data. Whenever direct plotting of deed descriptions reveals some form of discrepancy, field reconnaissance may be required for verification of correction, as follows:

a. Verify locations of property lines and corners. If the owner is unable to satisfactorily identify property lines, a sketch of the property, based on the deed description, may prove



helpful. In the course of viewing the tract for reconnaissance purposes, notes should be made concerning geographic or cadastral features not evident on available maps, and data may be procured through survey or GPS collection of features during field reconnaissance.

b. The description in the deed will be studied for obvious errors or discrepancies. Any deviations between calls and actual location of lines will be discussed with the owner for purposes of correction or clarification. Copies of deeds from adjoining properties should be acquired for comparison and information from surveyors, assessors, or other parties who may be familiar with the property should be obtained as well. The property owner or designated representative will be asked about the transactions made to acquire the land (number of such transactions and descriptions thereof) and a record made of the information, particularly if the present owner's title does not contain a description capable of being located on the ground.

c. A record will be made regarding location and ownership of all cemeteries (including family burial plots and single graves) within the proposed project area. The reason for mapping all cemeteries and burial plots as separate tracts, even though they may not be covered by deed or by exception, should be explained to the owner when applicable.

d. The owner will be asked about any unrecorded conveyances, including fee or outstanding estates, easements, licenses, mineral rights, rights of tenants, lessees, or other occupants.

e. In rugged, heavily wooded, or otherwise remote areas where adequate maps do not exist and land descriptions may be unsatisfactory, field reconnaissance will be required to identify property corners and sufficient field surveys will be made to permit plotting the tracts. Field instrument property line surveys of interior property lines will be made only when the lines cannot be established or reestablished by the plotting of deed descriptions, or by other means to the satisfaction of both the government and the owners concerned.

4-6. Pertinent Contour Lines. For civil works projects in which the extent of acquisition is controlled by ground elevation, as in reservoir projects and navigation projects, the critical contours which define the guide acquisition line or change in estates will be plotted on the base map to define the extent of the acquisition and the layout of the project maps. All guidance referring to datums should reference the current National Spatial Reference System (NSRS) as mandated in ER 1110-2-8160 (*Policies for Referencing Project Evaluation Grades to Nationwide Vertical Datums*), and its implementing manual EM 1110-2-6065 (*Standards and Procedures for Referencing Project Evaluation Grades to Nationwide Vertical Datums*). Datum transformation procedures are outlined in EM 1110-1-1005. Contours will be shown in proper relationship to property lines, property corners, and other points of control. Digital elevation data is widely available and can be obtained using the National Digital Elevation Program, a multi-agency federal partnership chaired by the US Geological Survey to expedite the collection and availability of elevation data. Elevation data shown on maps should be generated from the most current elevation data, compiled using methods consistent with the timeframe in which the project is established. For historic contours used in acquisitions, the contours as they existed at

the time of acquisition should be shown on maps and reflected in geospatial datasets. Datum transformation does not change the previous guide acquisition contour line, nor does it change the extent of Federal interest in the land. In cases where the reference vertical datum is other than the current NSRS, the guide acquisition contour line is to be referenced to the vertical datum as originally defined for the line. The reference vertical datum is to be indicated in the geospatial metadata. The elevation value recorded in the geospatial data and shown on any hardcopy is to reference the vertical datum as originally defined. The NSRS elevation value may be shown on hardcopy products in parenthesis adjacent to the original reference elevation; for example 880' (884.3' NAVD88).

4-7. International System of Units (SI) or Modernized Metric System. Executive Order 12770 requires the use of the metric system of measurement (A.K.A. International System or SI), to the extent “economically feasible,” except “that such use is impractical or is likely to cause significant inefficiencies.” USACE Real Estate mapping will use the dominant units of the State, Commonwealth or Territory where the project is located.

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## CHAPTER 5

### Compilation of Project Segment Map Data

5-1. Geospatial and Map Forms. Following assembly of the base map data, development of the project Real Estate data will commence. Project data shall represent the extent of the project, pertinent contours, tract ownerships, acreage, and other necessary cadastral information for the first programmed acquisition. All Real Estate geospatial data will be integrated into the respective District's EGES. Real Estate geospatial data will conform to the requirements for geospatial data as defined in ER 1110-1-8156 and EM 1110-1-2909. In particular, data shall be compliant with the SDSFIE and shall have the requisite geospatial metadata.

5-2. Segments. Although digital geospatial data allow for much flexibility in viewing a project's real estate, segments still provide a logical means for arranging hardcopy map layouts. If a district determines that segmenting a project is worthwhile because of the size of the project area or the number of tracts, they may divide the mapping into convenient segments. Segments serve as organizational structure for projects. Normally, each segment will be identified by a number (e. g., "Segment 1", "Segment 2", etc.), with the numerical segment designation being indicative of the series of tract numbers assigned thereto. For example, all tracts in Segment 2 will be numbered in the "200" series and all tracts in Segment 13 will be numbered in the "1300" series, etc. Exceptions to this procedure would be any instance where continuous parent ownership traverses more than one segment, as stated in paragraph 5-5 below, and in instances of public lands as discussed in paragraph 5-5g(1). Tract number series will also agree with sheet numbers except in cases where composite or index sheets are prepared, as explained below. Each segment will be limited to one sheet. The number of parent tracts in each segment should not exceed 100. The shape of a project, such as a flood control project, or projects containing unusually large tracts, may make it necessary to divide the project into segments of less than 100 tracts. In cases of projects involving large numbers of segments, segment registers and composite or index maps may be prepared and used as a cover sheet showing the entire scope of the project, statistical summaries, etc. Sheets comprising the project will be numbered consecutively beginning with Sheet one which will also correspond to Segment 1, except in instances where composite or index maps are prepared. In such instances, the composite map will be numbered Sheet one. Succeeding sheet numbers then will not agree with the segment numbers. For example, Segment one will be mapped on Sheet two, Segment two will be mapped on Sheet three, etc. Recapitulation of acquisition data is required to be shown on Segment one (or Sheet one). The perimeter of each segment will follow property lines so that no single contiguous ownership will be severed by the boundaries of a segment, except in cases of railroads, highways, utility lines, and ownerships too large to depict on one sheet. For tracts crossed by political boundaries, such as city, county, or state lines, it is usually advantageous to subdivide the tract by assigning a numerical suffix for each tract (i.e., 200-1 and 200-2). Additionally, for tracts crossed by political boundaries where segment registers are utilized, consideration may be given to cross-referencing political jurisdiction identifiers such as assessor parcel numbers and ownerships to the segments.

5-3. Scale. The scale of the hardcopy map will be such that the map is legible and sufficiently large to permit ready interpretation of the pertinent real estate features if reduced to half size. Scales may vary from segment to segment where warranted because of the size or shape of the tracts. The scale of the plotted map should be in multiples of 100 or 10, if larger scales are required. The scale will be shown graphically and numerically. Digital geospatial data is, in effect, "scaleless". The data does have accuracy limitations that will be documented in the metadata. This means that a point or feature shown on a map has its "probable" location is within a 40 foot area of its rendered reference, according to area representations and scale).

5-4. Delineation and Attribution of Tracts. Tracts will be delineated based on the intersection of the defined project requirements and ownership parcels. The tracts will be digitally captured and stored in compliance with the Real Property model of the SDSFIE. Additionally all tracts defined, identified, acquired, disposed, or outgranted during the Real Estate processes of planning, acquisition, control, management, and disposal will be made part of the EGES database for the custodial District. Attribution of tracts will be done through appropriate linkage to the Real Estate Management Information System (REMIS) using the Property ID Code, which is the primary key between the geospatial tract data and the attribute tract data. The Property ID Code is found in the REMIS table REMISPRD.Property.

5-5. Numbering of Tracts.

a. Real estate staff will assign tract numbers during preliminary field work, or as soon as the tentative taking line is established, and will not be changed after acquisition has started. Real estate tracts will be associated with a Military Installation or Civil Works District. For all real estate tracts, the current REMIS generated Property ID Code must be utilized as the unique identifier to link the geospatial data to records in REMIS. Tracts comprising military installations will also be part of a military site which will have a Real Property Site Unique Identifier (RPSUID). When operational, the assignment of a unique, non-intelligent RPSUID will be accomplished by the Department of Defense (DOD) RPSUID registry. The Military Installation will be assigned an RPSUID in the planning stage. The RPSUID will always remain associated with the site. After the DOD Real Property Unique Identifier (RPUID) registry is operational, all existing military real property assets (land parcels or facilities) will be assigned a unique, non-intelligent RPUID from the registry. Additionally, the RPUID for each military tract will be requested through the appropriate automated inventory data systems at the planning phase of a Real Estate action. The RPUID will serve as a the valuable secondary key for management of tracts and reporting of Army land interests, however the Property ID Code will be the primary key. The RPUID and RPSUID are further defined in the DOD Instruction 4165.14 (*Real Property Inventory and Forecasting*). If an instance occurs where the tract number must be changed, the original tract number should be deleted and not used again, and a new number should be assigned. Each tract will be identified on the map by the number or letter originally assigned and the tract number will be shown encircled. However, neither the Property ID Code nor RPUID shall be indicated on the project segment maps. Where a large number of segments are anticipated, necessitating as many as four digits for a tract number, ellipses or stacking the numbers within circles may be used. The acquisition Tract Register (ENG Form 1019 or its

replacement) will reflect the same tract number used on the segment maps. Regardless of the number of tracts in a project, or the number of segments required to map a project, numbering will begin with 100 and not exceed 199. Segment 2 will begin with 200 and not exceed 299. If segments have been defined and tract numbers run out (more than 99 on a single segment map), the numbering system will be explained by notation on the segment map and in the Map Description field in the REMIS RD-2 screen. By this system of numbering, identification of the segment is apparent from the tract number except as stated in paragraph 5-2 above. If two or more noncontiguous parcels are acquired from a single parent tract, the same basic number will be used, but each parcel will be numbered successively beginning with the number "1" (e. g., 200-1, 200-2, 200-3); if the acquisition of lands is for easement tracts the tract number will be suffixed by the capital letter "E" (e.g., 200E-1, 200E-2, 200E-3). New basic numbers will be assigned to additional tracts subsequently authorized by new (not amended) directives. During the planning stage when the segments are being laid out and numbers are being assigned to tracts within a segment, the possibility of additional tracts in the segment should be kept in mind. For purpose of mapping for acquisition, an ownership or parent tract of land is considered to be contiguous even though traversed by easements for roads, railroads and other rights-of-way, non-navigable bodies of water, political subdivision lines, etc. Irrespective of the number of parcels or interests to be acquired from a parent tract, the basic number of all such parcels or interests will be identical even though the parent ownership traverses more than one segment where intermittent parcels are to be acquired, such as a railroad right-of-way. Parent tracts in the same ownership but not deemed contiguous will be assigned different basic numbers. Each tract will be identified on the map and tabulated on a separate line in the tract register.

b. The tract number will indicate the interest in real property to be acquired, as follows:

(1) Fee. Tracts to be acquired in fee will be identified by the appropriate number. Alphabetical suffixes to fee tract numbers will not be used except for cemeteries and authorized subsurface tracts as provided in subparagraphs f and h below. Numerical suffixes in sequential order will be used, in lieu of alphabetical suffixes, to denote noncontiguous parcels.

(2) Easements. Tract numbers of all ownerships, or portions thereof, where easements are to be acquired or reserved in disposal actions, regardless of type, will be suffixed by the capital letter "E" (i.e., 100E), using the same basic number for fee tracts from the same owner, if any. Where more than one parcel is to be acquired by easement from an ownership, the tract numbers assigned to each parcel will contain numerical suffixes in sequence (i.e., 100E-1). In instances where more than one type of easement is acquired over the same easement area, or portion thereof, the same basic number, with the next numerical suffix will be assigned to the entire area over which the new and separate estate is to be acquired, including the overlap portion. However, if acquisition of a new and separate estate is authorized by a new (not amended) directive, a new basic number will be assigned.

(3) Permits and Licenses Other Than From Federal Agencies. Tract designations involving acquisition of interests in land by permit or license will contain the capital letter suffixes "P" and

“L”, respectively, regardless of whether or not acreage is involved. The use of a dash between the number and the letter suffix is not necessary.

(4) Leases. Lease tracts, including those comprising wholly leased installations, will be numbered in the same manner as fee tracts but will include the suffix “LE.” Each leased tract under continuous possession of the Government will retain its originally assigned tract number irrespective of changes of ownership or renewal of the lease contract. Where appropriate, the name of the owner will be changed to reflect the current lessor at the time of lease renewal. If parcels are to be acquired from the same owners in fee and by lease, the tracts will be given the same basic number with numerical suffixes in sequence with the leased tracts bearing the suffix “LE.” If a new and later directive authorizes the fee acquisition of the parcel acquired by lease, that parcel will be assigned a new basic number and the original tract and lease contract number will be stated in the “Remarks” column of the Tract Register. Where only joint use is acquired by lease, the area will be delineated by the symbol for interior property lines, the tract given a conventional tract number, and the area shown only in the “Remarks” column of the Tract Register. If, however, the lease provides for both exclusive and joint use, the areas will be mapped as parcels and assigned one basic tract number with numerical suffix. The exclusive use area must be shown with the conventional boundary symbol and the acreage shown in the Tract Register except for temporary acquisitions of less than ten years duration (see subparagraph 10 below). The joint use area will be mapped with the interior boundary symbol and the acreage shown only in the “Remarks” column of the Tract Register.

(5) Mixed Interests. In instances where more than one type of estate is to be acquired from a single ownership, the basic number will be identical for all estates acquired from that ownership, but will be followed by the suffix denoting the estate. For example, 100-1, 100-2, 100E-1, 100E-2, 100P-1 indicate that two fee parcels, two easement parcels, and one permit are to be acquired from the same contiguous ownership.

(6) Cemeteries. Tract numbers will be assigned to all cemeteries, regardless of area and number of graves and regardless of total or partial acquisition, and will be suffixed by the capital letter “C” (e. g., 100C-1). In cases where the underlying fee title to cemeteries, or burial plots, is identical to that of the surrounding land, or parent tract, and the cemetery is to be acquired, the basic number will be the same as that assigned to the parent tract, but will be followed by the suffix “C” to identify the cemetery area. If such a cemetery has no existing or established boundary, a sufficient area will be identified on the map, preferably rectangular or square, to include the graves. The Tract Register will show for the parent tract the acreage after excepting the cemetery tract and will show for the cemetery tract the acreage excepted from the parent tract. However, if the cemetery has definite boundaries and is separately owned by a cemetery or church association or others, the tract will be assigned its own tract number with the suffix “C” and the acreage stated in the Tract Register. An exception to the foregoing procedures will be made when only a part of a cemetery is acquired and it is definitely determined that no graves are located on the part to be acquired. In these cases the tract number will not be suffixed with capital letter “C” but will be treated as a normal tract and numbered in accordance with

paragraph 5-5 above.

(7) Government-owned Land and Interests Therein. Areas over which jurisdiction or right of use are acquired from other Federal government departments or agencies by Executive Orders, Public Land Orders, use permits or otherwise, or areas reassigned from one installation to another (within the same department), or transferred from military to civil account (or vice versa) within the Department of the Army will be treated as follows:

(a) Public land acquired under a single instrument will be considered as one tract even though the parcels are not contiguous. All such parcels will be assigned the same alphabetical tract designation. For purposes of identifying the various parcels that may comprise the total area acquired, each parcel shall be numbered in sequence on the map with the parcel number and acreage indicated in the "Remarks" column of the Tract Register; e. g., "Par. 1, 2.75Ac.," "Par. 2, 0.91Ac.," etc. Public lands acquired under successive instruments will be similarly designated, using the next alphabetical designation for each group of parcels. Amendments to basic documents are generally considered to be part of the original instrument. In certain instances it may be more practicable to regard them as separate instruments and designate new areas as additional tracts. Considerable latitude is allowed to district offices in this respect, and their determinations are usually acceptable. In any event, the map and other real estate systems and reports must record gross acquisition and subsequent disposal.

(b) Lands acquired under a single instrument, but containing several different estates, will be mapped and designated according to estates; that is, should a transfer or reassignment document contain some fee lands and some easement lands, each estate will be mapped and assigned a separate alphabetical designation. As in subparagraph (1) above, all fee parcels, even though noncontiguous, will be assigned the identical alphabetical designation (capital letter). All easement tracts will be designated by the next successive capital letter but each parcel will be suffixed with the Letter "E" (to denote easement) and a numeric designator (to denote parcel numbers). For example, a water line easement consisting of three parcels might be designated thus (assuming the capital letter "A" had previously been used): BE-1, BE-2, BE-3; while a sewer line comprising two parcels might be designated BE-4, BE-5. Other lesser interests will be treated in like manner. Since there is no tract register heading for public domain lands, such land statistics will be inserted in the "Transferred" column of the Tract Register. Statistics for lands held under use permits from other Federal agencies, including those involving public domain, will also be entered in the "Transferred column". Care should be taken that the total amount of each estate acquired is inserted on the appropriate line of the "Acquisition" block.

(c) Leased tracts are excepted from the above procedure and will, when acquired by transfer or reassignment, be mapped and designated as if they were part of the original acquisition.

(d) In instances where large parcels of Government-owned land acquired from the same agency appear on more than one segment of the project map, the total acreage involved will be recorded in the Tract Register of the first sheet on which the land appears. The tract designation



and the department or agency from which the lands were acquired will be shown in the Tract Register of each successive sheet depicting such land, but the "Acreage" column will be left blank and reference made under "Remarks" to the appropriate segment.

(8) Subsurface Estates. All interests of the surface owner in the subsurface normally will be acquired or subordinated in accordance with the approved mineral acquisition plan. Surface tract numbers and legal descriptions are to be used without change if the surface owner's interest in the minerals is uniform over the entire area. However, surface tract mapping problems arise whenever the surface owner's interest in the subsurface is variable within, or is not coterminous with, the surface tract limits. When completed title evidence shows such variation on the surface owner's mineral interest, it is generally desirable to re-map the surface tract, dividing the original tract into areas of identical estate held by the surface owner. The divided portions of the original surface tract are identified by adding a suffix letter -A, -B, -C, etc., to the original surface tract number, thus indicating the reason for deviating from normal rules of surface tract designation. Procedures for numbering of outstanding mineral tracts are prescribed in Chapter 7 of this manual.

(9) Relocations. Land, or interest in land, acquired by the Government outside the project for subsequent disposal or assignment, pursuant to the provisions of relocation contracts or other forms of agreement, will be mapped and the tracts will be numbered in accordance with the instructions contained in this manual. In order that lands that are acquired solely for relocation purposes may be readily identified on project maps, and distinguished from primary project lands, the exterior boundaries of such areas will be identified by the same conventional symbol utilized for interior property lines. Upon conveyance by the Government of such lands under the terms of the relocation agreement, the areas disposed of will be shown on project real estate maps by conventional disposal symbol, except where an easement or use permit has been reserved. In those cases, only the tract identifier (e.g. ⑩ ) is to be hachured. The procedures set forth are applicable to projects in the following categories:

- (a) New projects being initiated, or projects which may be authorized in the future.
- (b) Projects, or authorized additions thereto, currently in process of acquisition.
- (c) Additional acquisitions necessitating revisions.

(10) Temporary Acquisitions. Short-term acquisitions, such as leases, temporary easements, or licenses acquired for borrow areas, disposal areas, and quarry sites, will be shown on project maps, if appropriate. The tracts will be numbered in accordance with the applicable subparagraph above. The exterior boundary of all acquisitions of less than ten years duration will be identified by the same conventional symbol utilized for interior property lines. Brief explanations will be made in the tract register concerning the type and purpose of the acquisition. The duration of the temporary acquisition will be shown by entering the date of the acquisition and the date of termination (e.g., 4-1-2001 to 3-1-2002).

5-6. Severed Properties. Severed properties need not be shown on the preliminary maps but full information on residual areas must be available for acquisition planning, for use by the appraisers, and for other real estate actions. Therefore, geospatial representation of the residual portions must be captured and properly attributed in each Command's EGES database. However Real Property Inventory Requirements (RPIR) data elements will not be captured or stored in REMIS, or its replacement. Residual portions of properties severed by government acquisition will not be shown on project maps prepared subsequent to 23 February 1966. Since it is the purpose of the real estate maps to show the extent of the reservations, or the acquisition project, and to depict the properties or portions thereof that were acquired, the outside property lines and residual acreage of former owners serve no useful purposes insofar as historical records of government land acquisition programs are concerned. Residual property lines, acreage, etc., should be removed from all future maps, regardless of the date of map preparation. If residual property lines and related information must be shown on the map, these elements should be shown in a lighter shade or muted pattern to reduce their prominence.

5-7. Runway Airspace Surfaces (Fixed-Wing Aircraft). Specific standards and guidelines for the airspace surfaces for municipal airfields are in FAA Regulation 14 CFR 77, and for military airfields are in UFC 3-260-01 (*Airfield and Heliport Planning and Design*), and DoD Instruction Number 4165.57 (*Air Installations Compatible Use Zones*). Project maps for acquiring airspace rights over real property within approach-departure surfaces and transitional zone surfaces for airfields will depict the tracts to be acquired, and will be used to submit non-standard estates for approval. These maps and property data are essential for planning purposes, providing guidance for appraisers, and negotiators, and in advising the landowner concerning the severity of the rights to be acquired.

a. Some additional field land surveys may be required if the base commander cannot supply the required information. Contracts with commercial concerns for furnishing required mapping and other data are authorized. All surveys will conform to the criteria and accuracy as outlined in Chapter 12, Field Surveys.

b. In addition to depicting the tracts to be acquired, the project map will show the locations of the runway, clear zone, approach-departure surfaces, transitional surfaces, and where critical, the contours of the ground surface, and the contours of the clearance surfaces. The map will show pertinent topographic and cultural features, and the ground elevation with datum, and the airspace surface elevation with datum at each principal corner of each tract and at such intermediate boundary and interior points as may be critical. All existing buildings, roads, railroads, fences, property boundary, woods lines, above-ground power and communication lines, cemeteries, and recreational facilities will be mapped in accordance with topographic standards and practices.

c. Each major obstruction will be plotted in its true location, described (as house, barn, tree, pole, sign, etc.), with the elevations to the nearest foot, of the ground, top of obstruction,

and clearance surface at each location mapped. The mapping data will extend as far as obstructions exist and may be reasonably expected to be present in the foreseeable future.

d. In areas of critical concern, mapping will show ground contours at five-foot intervals extending 10,200 feet from the end of the runway and ten-foot intervals extending an additional 15,000 feet, total of 25,200 feet and within the mapped airspace surfaces.

5-8. Air Installation Compatible Use Zones (AICUZ). Specific guidelines are in DoD Instruction Number 4165.57 (*Air Installations Compatible Use Zones*). Geospatial data and associated project maps for acquisition shall depict (a) land areas upon which certain uses may obstruct airspace or be hazardous to aircraft operations, and (b) land areas that are exposed to health, safety or welfare hazards of aircraft operations. Delineation and classification of such areas is the responsibility of the requesting base, installation, or garrison but may fall to local supporting Districts including cadastral or GIS staff. Any geospatial data collected to support AICUZ delineations or acquisitions will comply with SDSFIE. Estate types for clear zones and accident potential zones will be determined by the Realty Specialist responsible for the AICUZ acquisition, who will provide information to the staff responsible for preparing the geospatial data and map products.

5-9. Restrictive Easements. When mapping tracts for acquisitions that involve the imposition of restrictions, the point of origin is to be accurately referenced to a property corner, section corner, or other readily identifiable point, with the direction and length of the radial line stated. For restrictive easements intended to promote safety within a specified distance from a critical point, it may prove to be convenient, especially in low cost areas, when describing the restricted area, to convert the arc to tangents, using not less than four tangents in a quarter circle. Restrictive easements may also be shown on the mapping with use of varying tones, shades or muted pattern to impart their prominence. This may be utilized for mitigation areas, off limit areas etc. where options for future planning or use are restricted.

5-10. Metadata.

a. Metadata Documentation. Metadata describes the content, quality, fitness for use, access instructions, and other characteristics about the geospatial data. All new cadastral and real estate geospatial data shall be documented in accordance with Executive Order 12906 and the ISO Standard 19115 Geographic Information - Metadata.

b. Metadata Use Constraint Section. A key component of the metadata is the use constraints section. This section should clearly indicate that the data were acquired, collected, or created for a specific purpose, and that any use beyond the intended purpose are at the sole risk of the user. The U.S. Government makes no guarantee as to the validity of the data for any other use beside that for which the data were intended.

## CHAPTER 6

### Project Map Details

6-1. Real Estate Project Map Borders. In general, only one type of hardcopy project map will be prepared for planning, acquisition, management, disposal, and final real estate historical files. The Real Estate Project Map (REPM) and REPM Continuation Sheet borders as presented in the USACE A/E/C CADD Mapping Standards will be used for these purposes. The REPM border will be used to map the first segment or the composite of the project, and the REPM Continuation Sheet border will be used to map succeeding segments. The requirement for preparation of a project map for lands acquired by condemnation by the United States for local interests with local funds, where the balance of the project will not be conveyed to the United States, is waived.

6-2. Sample Project Map. See the Real Estate Handbook for a sample project segment map.

6-3. Hardcopy and Digital Versions. Digital geospatial data must be created for all real estate land interests. However, the production and use of hardcopy maps is still necessary.

a. Hardcopy maps will follow the form defined in Chapter 5. Specific map elements are described in paragraph 6-4 below. Many of the items below are maintained within the REMIS database; summary items such as acreage amounts by estate type can be compiled from REMIS data.

b. Digital mapping data details can be found in the references provided in paragraph 4-2.

c. Existing project mapping in hardcopy form shall be converted to a digital geospatial form as time and budgets permit. As stated in Chapter 2 of this ER, Districts should include mapping costs in the budgeting process for new projects. Districts should consider the cost of converting from hardcopy to digital form as part of normal project budgeting process. Consideration should be given to converting individual sheets to digital form when working with them. Details regarding conversion of existing Real Estate project maps are provided in paragraph 6-5 below.

6-4. List of Items. Each project map will show the following, as applicable:

a. Type of map (Preliminary or Final).

b. Department and Using Service.

c. State, county (or parish), Engineer Division, Engineer District, Army Area, location relation to nearby towns or cities, and transportation facilities serving the project area. The towns or cities must also appear on the vicinity map. Where there are multiple segments,

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distances shown on each segment will be based on the location of the individual segment to the towns or cities.

d. In cases where projects are located in more than one county or more than one state, the space provided on sheet one will show all counties and states involved in the entire project. In addition, each continuation sheet will show the county or counties and state or states applicable to that particular sheet where it differs from the project as a whole.

e. Total acreage acquired, broken down by each type of estate, will be shown on the first sheet. See chapter 14 for details.

f. Total acreage sold, transferred, reassigned, or terminated, and breakdown by legal interests, will also be shown only on the first sheet. See Chapter 14 for details.

g. Legend, with applicable symbols or reference to same.

h. The section within the title block headed "Office, Chief of Engineers, Washington, DC 20314" is reserved for the installation or project number. This number will be based on the REMIS project number, which may have already been assigned from prior RE cadastral mapping. When a project number has already been assigned, use of the existing number is mandatory.

i. Date appearing in the title block will be the date of original preparation of the preliminary map and will not be changed after the initial approval of final real property acquisition lines.

j. Names and initials of personnel responsible for preparing, reviewing, and approving the map will be included in the title block.

k. "Revisions" block, indicating approved changes in sequential order. The last action to be reported in the revision block, upon validation of the final project acquisition, will be indicated by the words "Final Map," together with appropriate date. Since the date of preparation of the map in the title block is not to be changed, it is of particular importance that each significant revision to the map be noted and dated in the revision block. This information will not be removed from the map for any reason. In the event of authorized acquisition or disposal actions, the revision block will be kept current.

l. The date(s) of approval of the final real estate project map will be entered in the column entitled "Date Approved" located to the left of the revision block.

m. Acquisition authorizations for the entire project will be shown on the first sheet in the "Acquisition Authorization" block. Subsequent sheets will show only the authorizations applicable to that sheet. Congressional authorization for construction of an Army civil works project will also be shown in this block. Congressional approval for allocation of project funds

will not be shown. Amendments to military real estate directives that authorize only the expenditure of additional funds will not be shown.

n. North arrow will be indicated by conventional symbol and reference meridian (true, magnetic, or grid). Separate north arrows will be shown for each inset.

o. Scale of map will be shown graphically and in accordance with paragraph 5-3.

p. Real property acquisition lines; individual tract boundaries, with tract numbers; and pertinent subdivision lines, such as: township, range, and section lines; headright and land grant boundaries, etc., will be shown. For civil works projects where both fee title and flowage easement are acquired, the fee or interior acquisition line will be indicated by the same conventional symbol as that required for the exterior or reservation boundary, except that the weight of the line should be about midway between the weight of the tract boundary and that of the reservation boundary. In such cases, the legend on the project map will be appropriately modified to reflect the use of the additional acquisition line.

q. Guide acquisition lines for acquisition and management purposes will show pertinent elevations. These, with other pertinent elevations, will be shown and identified in a legend, such as:

(1) Navigation Only Projects. Existing ordinary high water; existing normal pool; new normal pool; new ordinary high water; guide acquisition lines for easement acquisition.

(2) Flood Control and Multiple Purpose Projects. Conservation pool; static full pool; guide acquisition lines for fee and easement acquisitions.

r. Predominant geographic, cultural, and cadastral features in or near the project area will be clearly indicated to assist in orienting the project area in relation to the surrounding territory. Use of imagery is encouraged.

s. Small areas difficult to map or to show tract outlines on the scale of the project map will be mapped at a larger scale as insets in any available space within the map border. Where space is limited or not available a continuation map will be created labeling it as "Segment 1A", "Segment 2A", etc.

t. A statement that the data utilized in the preparation of the map is in compliance with the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata.

u. A reference to the name and location of the digital file or files, which contain all of the necessary information to produce the project map.

v. Segment maps will match from sheet to sheet. Tracts and tract numbers will not be duplicated on adjoining sheets, except in the case of rights-of-way, Government-owned land, and other large ownerships which extend across several sheets. In this case, tract numbers will be indicated by the conventional symbol on the lowest numbered sheet on which the tract appears. The same basic tract number will be shown on adjoining sheets using a dashed circle or ellipse, in lieu of solid circle or ellipse, and the symbol shown in the legend.

w. An outline of the state or states involved, showing the approximate location of the project; a vicinity map drawn to scale, showing counties, principal towns, railroads, highways, streams, political subdivisions, and the location of the project in relation hereto will be included. This requirement is applicable to Sheet 1 on multi-sheet projects.

x. A segment index map of the entire project showing the location of each segment will be shown on each sheet of multiple sheet projects. The pertinent segment on the index will be shaded to correspond to the appropriate map sheet. The segment index map may be combined with the vicinity map required in subparagraph w above; however, in such cases the combined index must appear on each map sheet.

y. Bearings and distances of all exterior fee and easement boundaries, except where these boundaries follow subdivision lines of the public land surveys, will be shown. Bearings will be represented in IP Degree-Minute-Second format. Distances shall be based on IP unit of measurement. To avoid the potential for increased dimensioning time, errors, and confusion, the use of dual dimensioning is not recommended. For right-of-way (fee or perpetual easement) tracts for roads, railroads and utilities, the bearing, distances, and curve data may be shown along the centerline, in lieu of along the boundaries, with widths of the rights-of-way shown and at stations where there is a change in width. In cases of flowage easements where acquisition lines are defined by bearings and distances for descriptive reasons in lieu of following the guide contour, the bearings and distances will not be shown on the map. Bearings and distances for temporary easements, leases of short duration, and other lesser interests are not required to be shown on the maps. It is permissible to omit bearings and distance from the mapping if other source drawings (i.e., engineering drawings, monumentation or boundary drawings, surveys, plats, etc.) showing exterior bearings and distances are maintained and remain on file within the respective district real estate office. If this alternative method is utilized, notation will be included in the "Notes:" block within the final project map.

z. A tract register will be included in columnar form showing, with appropriate headings, the tract numbers, name of landowners, and acreages and estates to be acquired or that have been acquired in each tract. The heading will be limited to the words "Tract Register." Where more than one authorization or directive pertains to a segment, each tract or group of tracts will be referenced, on the exterior left side of the tract register, to the appropriate military land directive or civil works authorization (not those authorizing additional funds to satisfy deficiencies) by the use of brackets or on an additional column. The estate acquired for each tract will be shown by inserting the amount of the acreage in the appropriate estate column. The

map will reflect any portion transferred from the public domain and use permits involving land from any Federal agency. An additional column for remarks will be provided as the last column of the tract register. This column will be utilized for brief explanations of acquisition actions. When acquisition is accomplished for military installations, the column will include the date of the passing of title. This date will be either the date of the deed, the date of the filing of a declaration of taking, or the date of final judgment for tracts taken by straight condemnation. A separate column can be established to accommodate these data. Typical examples of other remarks are as follows:

(1) Previously acquired as Tract No. \_\_\_\_\_.

(2) Lease No. \_\_\_\_\_ dated \_\_\_\_\_ from (date) to (date). (Where the lease has been renewed, irrespective of the number of renewals, show the original lease number and date, the effective date of the original lease, the current lease with the notation "This area continuously under lease from [effective date of original lease].")

(3) PLO No. \_\_\_\_\_ dated \_\_\_\_\_.

(4) (type) easement from (date) to (date).

(5) Donation.

(6) Permit for (purpose) from (date).

(7) License for (purpose) dated \_\_\_\_\_ from (date) to (date).

(8) Reassigned from (project) by (Ltr., Ind., D.F.) dated \_\_\_\_\_ from (facility) to (facility).

(9) \_\_\_\_\_ Acres in \_\_\_\_\_ County, \_\_\_\_\_ Acres in \_\_\_\_\_ County. (For use where tracts are crossed by county lines.)

(10) Formerly acquired under Lease No. \_\_\_\_\_.

(11) Additional \_\_\_\_\_ acres included in Tract No. \_\_\_\_\_. (Applicable in cases of tract overlaps, caused by the creation of new tract(s) requiring additional interest(s) over all or portions of existing tract(s), plus new acquisition extending beyond the limits of the original tract. In this instance the appropriate acreage column of the tract register will show the net acreage not involved in overlap, and will not include any acreage already appearing on the tract register.)

aa. In cases where maps consist largely of easements that require explanation by remarks, and in order to reduce repetitive lettering in the "Remarks" column of the Tract Register, one of



the following procedures may be used:

(1) The column normally captioned "Easements" may be changed, where applicable, to "Perpetual Clearance Easement." In the event other types of easements appear on the same sheet, such as roads easements, power line easements, etc., they may be shown either by separate column (where justifiable) or be indicated by an asterisk and explained.

(2) Ditto marks may be used, if appropriate.

ab. A marginal index for the purpose of locating tracts in a project may be added when necessary by reason of a large number of tracts. The index will be shown in a separate column.

ac. Where tracts are crossed by county lines, the tract acreage to be acquired, or acquired, in each county will be indicated by remarks in the Tract Register. (See subparagraph z(9) above and paragraph 5-5.) In addition, a breakdown by county of the total project acreage acquired by each legal interest will be shown on the first sheet. The breakdown will be revised to show current statistics, as necessary, upon disposals and/or acquisitions. This requirement is applicable to civil works projects only. (Leased areas are not required to be shown by county breakdowns.)

ad. In cases of overlapping easements, and in order that the boundaries of each easement may be readily identified, that portion of the overlapping tract will be shown by dotted lines, rather than by conventional symbol. In some instances when this procedure cannot be followed because of the multiplicity of estates involved, new tracts and tract numbers will be established so that the extent of each tract will coincide with the estate, or estates, as approved.

ae. Acreage of each tract will be stated in the legal description and on the project map, generally, to two decimal places.

(1) In sectionalized areas, acreage will conform to the subdivisional surveys unless subsequent surveys certify a different acreage and such surveys are acceptable to appropriate county officials.

(2) Outside of sectionalized areas and wherever the boundaries are defined by metes and bounds, acreage will be determined to a degree of accuracy commensurate with the value of the land, the estate to be acquired, the size of the tract, and the accuracy of the boundaries. Recorded deed acreage will be used wherever possible.

(3) Acreage of lots and other small areas, not determined by survey, will be obtained by planimeter, calculation, digitizing, or other electronic means. Where the tract has an area of less than 0.01 acre the acreage may be stated in the deed description and tract register with additional decimal places for appropriate accuracy.

6-5. Conversion of Existing Maps. Converting existing maps will involve accurately referencing the features shown on the maps to their locations on the face of the earth (georeferencing) and creating a digital representation of the features. The digital representations must follow the SDSFIE geodatabase and in compliance with ER 1110-1-8156 . In order to develop georeferenced real estate tracts and site boundaries, District personnel will use the best GIS technical method to reduce geospatial error (vertical and horizontal) and maintain positional accuracy and precision given the reliability of the original data source and the spatial complexity of each tract or project. Horizontal accuracy is met when 90% of all measurable points fall within 1/30th of an inch for map scales of 1:20,000 or larger (example, map scales at 1:1,200 must have positional accuracy of +/- 3.33 feet). An official land field survey of a civil works project boundary and/or tract boundary is the primary source for georeferencing material to reduce spatial error. When an official survey is not present, other technical methods will be necessary such as digital scan of hard copies, heads-up-digitizing, and georeferencing (i.e., rubber sheeting). In cases where legal descriptions are available it may be better to use the Coordinate Geometry (COGO) method to create tract or project geospatial boundaries. When original tract/parcel documents are not adequate or available, it may be necessary to contact a title company to help establish real estate details such as ownership, boundaries, etc.

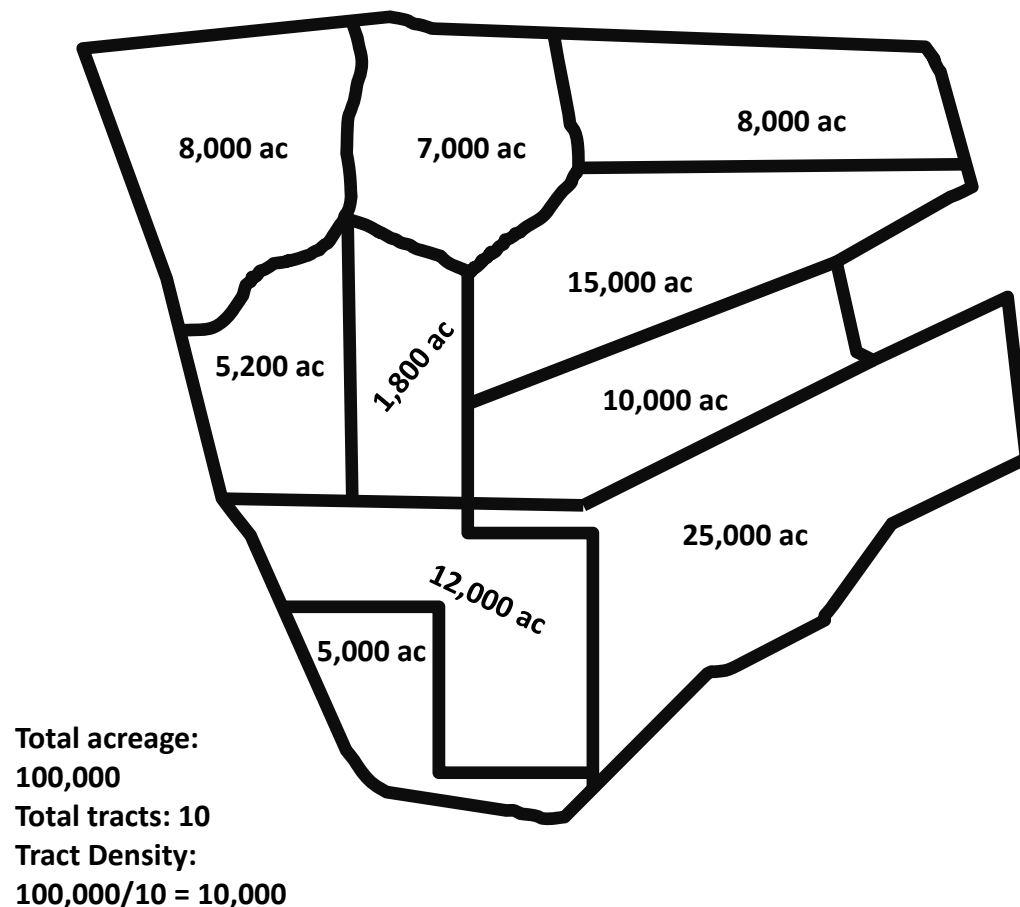


Figure 6-1: Spatial Complexity as illustrated by Tract Density

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The level of effort required to georeference and digitally capture tracts varies depending on the spatial complexity of the project site. Spatial complexity is based on the tract density, which is the number of tracts per project area in acres (see figure 6-1). This means that tracts are neither the same size in area and nor do the tracts take the same amount of time and effort to complete. For example, some individual tracts can be thousands of acres in size which require more time to georeference, than an individual tract only one acre in size.

Once existing maps have been converted to SDSFIE compliant geospatial data, the District must submit the data to the REMIS Geospatial system for data integrity validation and serving the data to REMIS, CorpsMap, and Army Mapper systems. Instructions for the REMIS Geospatial system are available through the Real Estate GIS and Mapping Subcop.

## CHAPTER 7

### Mapping Outstanding Minerals

7-1. Applicability. Where outstanding subsurface estates exist in a complex ownership or leasehold pattern that has little or no relation to the pattern of surface tracts, special mineral segment maps and tract descriptions will be required to accomplish the mineral acquisition. If the problem is particularly complex, it may affect real estate planning for certain projects to an extent that will justify assembly of preliminary mineral ownership or leasehold data and preparation of preliminary mineral maps of the index type. Generally, mineral mapping or surveys should not be undertaken until complete title evidence for surface tracts is available to show the nature, source, and extent of outstanding subsurface estates. When the pattern of mineral ownership or leasehold has been clearly established by investigation of data contained in titles to surface tracts, supplemental mineral surveys should be made to locate nonconforming mineral property boundaries within the segments and the preparation of mineral segment maps may be initiated.

7-2. Segment Layout and Tract Numbering. Mineral segment maps should conform, insofar as practicable, to the basic segment layout used for the surface tracts to permit maximum correlation of survey, but should be varied in area coverage or matching to preserve mineral tract outlines within the mineral segment. The rules applied to establishment of surface tracts; i. e., contiguous and identical ownership and estate to be acquired, are to be used. Tracts must also conform to the mineral estate owned, but in areas of “mixed” or “split” ownership of specific minerals, this rule must be applied with caution to avoid a patchwork pattern of subsurface tracts. Generally, in these areas it is preferable to give precedence to contiguity of ownership or leases of like minerals that will result in overlapping subsurface tracts. An example of this condition is a 500-acre property of coal only, within the limits of which the rights to oil and gas are divided into six separate ownerships. In this instance, a mineral tract number should be assigned to the coal property and six separate mineral tract numbers assigned to the oil and gas properties so as to avoid splitting the coal property into six possibly meaningless pieces of identical outstanding mineral interests. Also, in this same instance, if there are six separate oil and gas leases, all to the same lessee, one tract number would be assigned to cover all six leases. Each outstanding mineral tract will be assigned a new basic number in the segment series that does not duplicate surface tract numbers. The letter “M” will be added to the mineral tract to denote acquisition, and the letters “ME” to denote subordination. The letters “ML” will be added to the mineral lease tract number to denote extinguishment, and the letters “MLE” to denote subordination. Numerical suffixes will be assigned in instances of noncontiguous subsurface acquisitions and/or subordinations in identical ownership in the same manner required for surface tracts as stated in paragraph 5-5.

7-3. Legal Descriptions. Legal descriptions of surface tracts modified as to source of title, etc., may be utilized for subsurface tracts, provided the respective boundaries are coterminous. New descriptions will be required for subsurface tracts whose boundaries are not coterminous with

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surface tracts.

7-4. Tract Register of Subsurface Acquisition. Each mineral segment map will contain a “Tract Register of Subsurface Acquisition” which will show tract number, owner, acreage, brief description of the mineral estate to be acquired or subordinated, and an explanation in the “Remarks” column showing surface tracts, by number, under which the subsurface tract is wholly or partially located. Surface owners and/or surface tract numbers that abut the surface should be shown on the map.

7-5. Disposition of Mineral Maps. Mineral segment maps will be validated only to confirm acquisition statistics but will not be included with the validated historical assembly. Hard copies of such maps will be retained in the permanent realty records maintained in the office of records.

7-6. Geospatial Data. Geospatial data for all mineral tracts shown on mineral segment maps should be generated and maintained consistent with standards required for surface estate tract data and mapping. Geospatial data will conform to the requirements for geospatial data as defined in EM 1110-1-8156 and ER 1110-1-2909. In particular, data shall be compliant with SDSFIE or A/E/C CADD standards and shall have the requisite geospatial metadata.

## CHAPTER 8

### Preliminary Project Maps and Geospatial Data

8-1. Definition. Preliminary project maps, for the purpose of this manual, are defined as those on which all acquisition lines have been established, all tract information has been shown, and all other information required by Chapter 5 of this manual as may be applicable (except statistical summaries) have been entered on the appropriate lines of the Statistical and Data column. Acquisition lines/limits shall be established based on engineering requirements, and blocking out based on sound real estate practice, considering items such as access, the extent of severance damages and the creation of uneconomic remnants.

8-2. Review and Approval. Review and approval of preliminary project maps, and revisions thereto, are the responsibility of the district Chief of Real Estate, or an appropriate branch chief delegated this approval authority. Approval of the preliminary project maps shall constitute approval of the acquisition lines/limits. The chief will establish necessary quality control procedures to insure adequacy, accuracy, and uniform compliance with instructions in this manual.

8-3. Preliminary Geospatial Data. Geospatial data is considered preliminary until any specific acquisition is complete. Prior to acquisition, tract boundaries and project requirements are subject to change. Once the project has been fully acquired, data should be finalized and submitted to REMIS Geospatial for validation and publication to the Real Estate Community of Practice.

8-4. Distribution to Other Services. Copies of preliminary and revised preliminary project maps may be furnished appropriate installation commanders and local representatives of other services and agencies upon their request. It is recommended that the real estate geospatial data be furnished only after they have been finalized as official.

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## CHAPTER 9

### Mapping Provided For Non-Federal Sponsor Acquisition

#### 9-1. Mapping Provided for Local Sponsor Acquisition.

a. On flood control projects where the local sponsor is responsible for acquisition of Lands, Easements, Right-of-Ways, Relocations, and Disposal (LERRD), the sponsor will be provided maps depicting the exterior limits of all real estate interests to be acquired. If requested by the sponsor and agreed to in the Project Partnership Agreement (PPA), the performing District will also provide a copy of the geospatial data and associated metadata to the non-federal sponsor for their use or inclusion in their GIS. Geospatial data developed by USACE, or its contractors, will conform to the A/E/C CADD Standards and SDSFIE as appropriate. Translation or restructuring of the real estate geospatial data for the sponsor's GIS format is not required, unless specifically included in the signed PPA.

b. The hardcopy maps provided under this Chapter must clearly delineate each estate to be acquired in sufficient detail that they could be located in the field by a qualified land surveyor and contain the following minimum information or criteria:

(1) Utilize sufficient horizontal and/or vertical control to maintain the physical integrity of topological features.

(2) Sufficient size and scale wherein enough of the surrounding project area is shown that landownership patterns and sectional subdivision may be discerned.

(3) Political Subdivision (i.e., County/Parish/Township) and State identification.

(4) Where applicable, Sectional subdivision lines and notation (Section /Township /Range)

(5) Datum and coordinate system for azimuths/bearings/coordinates.

(6) All Right-of-Way lines must be defined by azimuth/bearing and distance, relationship to baseline or structure centerlines, topographic feature, or relationship to topographic feature. "Paper Centerlines or Baselines" also need to be tied to surveyed baselines/centerlines. Drawing should define the R/W in such manner as to allow survey personnel to flag or monument the traverse of the R/W limits on the ground, prior to construction of the project.

(7) Identify the intended use for areas within the overall R/W limits (i.e., levee, channel improvement, borrow area, disposal area, access, staging/storage/work area, etc.). Also the term or duration each separate area will be required in order to determine what interest needs to be acquired perpetually for future maintenance or only temporarily for construction (i.e., year.



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Temporary Construction Area/Borrow/Access/Disposal, Perpetual Channel Improvement/Levee/Disposal/Borrow/Access, etc.).

## CHAPTER 10

### Geospatial Data and Maps For Planning Purposes

#### 10-1. Use of Existing Sources.

a. To support Real Estate Planning, exiting data sources and maps shall be used to the extent possible. Each District has a Geospatial Coordinator whose responsibilities include data management. This person should be able to assist in locating existing data sources that can be used to prepare planning maps. CorpsMap, the USACE enterprise GIS, included data that can support RE planning. Proposed Real Estate tracts will be delineated in accordance with paragraph 5-4 of Chapter 5.

b. If satisfactory geospatial data is not readily available to support RE Planning, project maps, if available, may be used. If project maps are not available, other types of maps or preliminary planimetric maps may be used for advance planning to present the information required by ER 405-3-10 (*Planning - Military*) and ER 405-2-12 (*Real Estate Planning, Acquisition, Responsibilities, and Crediting Principles for Civil Works Projects*) for real estate design memoranda, real estate plans and real estate planning reports. Additional exhibits may be prepared from data or maps provided by local governments, private firms or utility companies, recorded plats, aerial mosaics, photographs, planimetric maps, river charts, etc.

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## CHAPTER 11

### Mapping By Contract

11-1. Regulatory Procedures. Districts may obtain project real estate mapping and legal descriptions by contract. Maps and descriptions procured by contract will be in accordance with the guidance contained in this manual. Contracts will be prepared and executed in accordance with appropriate regulations. Under some circumstances, real property mapping must be executed by a qualified A-E Contractor as required under the Brooks Act. See EFARS 36.601.

11-2. Digital Deliverables. All contract deliverables will be provided in an appropriate digital format. Digital deliverable must be in accordance with the A/E/C CADD Standards or the SDSFIE, as applicable. Delivery media should be specified as CD or DVD with a label indicating the installation or project title, RPSUID, name of the contractor, contract number, and 'Disk \_\_ of \_\_' to show the media sequence and total number of media.

11-3. Identification of Mapping Contractor. Each project hardcopy real estate map obtained by contract will contain the name of the contractor and the contract number in a convenient space on the map. This information should be shown as a footnote in substantially the following format:

“Mapping of the land depicted on this sheet was performed by (name and address of contractor) under Contract No. DA \_\_\_\_\_.”

11-4. Metadata. All deliverables should include digital geospatial metadata as described above in paragraph 5-10 of Chapter 5.

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## CHAPTER 12

### Field Surveys

12-1. Applicability. Project boundaries will be surveyed and monumented in accordance with policies set out in paragraph 12-4 below. The guidance in ER 1110-1-8156 (*Policies, Guidance, and Requirements for Geospatial Data and Systems*), and its implementing manual EM 1110-1-2909 (*Geospatial Data and Systems*), must be followed for disseminating and archiving survey data. Federal standards for reporting survey accuracy, geodetic control survey standards, and topographic survey standards are also published by the Federal Geographic Data Committee (FGDC), (FGDC "*Geospatial Positioning Accuracy Standards*"). Field surveys as well as legal descriptions shall be prepared under the direct supervision of either a Registered Land Surveyor or, where laws allow, a Professional Engineer in the State, Commonwealth or Territory in which the project is located. When surveying and mapping data exists and is available within the district that complies with the accuracy required by the project and is reflective of existing conditions, said data will be used to prevent duplication of field surveys. Field notes, descriptions, sketches, etc., developed during field surveys will be appropriately identified, preserved, and filed for future reference. Field surveys of interior property lines will be held to a minimum and will be restricted to the circumstances as authorized in paragraph 12-5 below. Survey data delivered shall be used to update geospatial real estate data in district EGES.

12-2. Accuracy of Surveys. The accuracy requirement of field surveys is determined by the characteristics of the project. The allowable error should be commensurate with such factors as the estate to be acquired, planned use of the land, and present or potential use of the abutting land remaining in private ownership. When applicable, the guide contours should be located with sufficient accuracy to preclude measurable errors in acreage calculations. Each survey must conform to the Minimum Technical Standards established by the State, Commonwealth or Territory in which it is conducted. These are however "Minimum" standards and do not preclude more stringent requirements as may be applicable, such as American Land Title Association (ALTA)/National Society of Professional Surveyors (NSPS) standards. Field survey procedures for vertical and horizontal data collection may include but is not limited to leveling, traverses, Global Navigation Satellite System (GNSS), triangulation, trigonometric leveling, etc. All surveys shall follow guidance in EM 1110-1-1003 (*NAVSTAR Global Positioning System Surveying*) and EM 1110-1-1005 (*Control and Topographic Surveying*).

12-3. Digital Survey Data. When conducting field surveys, COTS software tools that allow professional surveyors and GIS/CADD personnel to work together in an integrated system shall be utilized during data acquisition as well as production of deliverables. These types of software tools allow field collected survey measurements as well as adjusted values to be compiled and maintained in a digital environment. These digital environments may include but are not limited to levels, layers, database elements, Laser File Format (LAS), attribute tables or separate geospatial file, and will improve the accuracy of the GIS/CADD database. Such software tools are typically available as part of, or supplemental to, commercially available CADD and GIS

tools. Survey data captured and stored using these types of tools will follow the A/E/C CADD Standards SDSFIE, or other COTS readable format as required in the technical standards of a scope of work and will be documented with the appropriate geospatial metadata.

12-4. Exterior Boundaries. In all cases of fee acquisition, a survey must be made ahead of acquisition for the purpose of verifying both horizontal and/or vertical positioning of the boundary to confirm that it includes the guide taking line or contour. Accurate and identifiable exterior property lines are necessary to preclude duplicate acquisitions, identify encroachments, and to facilitate proper management of government lands. It is also necessary that an accurate boundary be established prior to acquisition of easements that preclude human habitation, improvements, or filling.

a. Military Projects. As a general policy, installation boundaries will be established by actual survey and the corners will be either permanently monumented or the existing natural monumentation will be identified. Actual field surveys of the boundaries of military projects shall be completed prior to acquisition. The customer should be advised to program and budget funds for this work as early as possible in order that the work may be accomplished in accordance with real estate planning requirements and installation mission requirements. Work will be performed only when funds are available for that purpose. It is important, especially for the smaller acquisitions, that the boundaries be marked to assure that any construction is confined to the acquired land and to assist in the location of perimeter fencing.

b. Civil Works Projects. As a general policy, civil project boundaries will be established by actual survey and the corners will be either permanently monumented or the existing natural or manmade monumentation will be identified. The need to perform actual surveys to locate and mark the extent of boundaries, including the line of severance between fee and flowage or other easement tracts, will depend upon local conditions and other factors. Where it is necessary to broaden the scope of surveys, or to make project-wide boundary surveys, estimates of costs, time, and manpower necessary to perform the work should be closely coordinated with the project manager and/or the project delivery team. A determination of whether or not a title search is required should be made and the results of said title search will be made available to the Registered Professional conducting the survey to address findings in final deliverables. Necessary funds should be programmed and budgeted as early as possible in order that the work may be accomplished in accordance with real estate planning requirements and project operational requirements. Where funds are made available, the field surveys will conform to the following criteria:

(1) Boundary Lines of Fee Acquisition. Where actual surveys are made for fee areas, permanent type survey markers will generally be installed, or existing natural or manmade monumentation identified at all angle points on reservation boundaries of fee-acquired land. These markers may be concrete monuments, iron pipes, angle irons, tee irons, or marks on objects not likely to be disturbed. Boundary markers established during a survey will conform to the Minimum Technical Standards established for the State, Commonwealth or Territory in

which the project resides unless otherwise indicated by the technical requirements of a scope of work. These are however "Minimum" standards and do not preclude more stringent requirements as may be applicable. (see Paragraph 12-2). Refer to EM 1110-1-1002 (*Survey Markers and Monumentation*) for more information on boundary markers and monuments. In those cases where ownerships are severed, severance lines will be established along tangents of reasonable length, except in those cases where the acquisition lines follow existing natural or other cadastral features having characteristics that clearly distinguish the land being acquired from the land left to the owner. Tangents for fee severance lines will be established with such degree of refinement that the boundary can be reestablished by metes and bounds, or by sectional subdivision lines, without reference to other data.

(2) Marking Boundary Lines for Flowage Easements. The general practice set forth in the preceding subparagraph concerning the marking of fee boundary lines will be applicable also to perpetual flowage easement areas where encroachments may reasonably be expected from private development of adjoining lands. Where it has been determined that upper limits of flowage easements are to be marked on the ground, location of the contour will be indicated by painting on trees, outcroppings, posts, etc. If no suitable fixed objects can be found on which to paint the elevation, painted stakes may be used. If at all possible, the contour should be marked at visible points and especially where it crosses property lines, roads, and other prominent landmarks, and the point where it heads out in streams. Since the contour for the upper limit of the taking has previously been located by traverse or other acceptable field survey methodology and tied to the property lines and property corners, this survey can be used to mark permanently the point where the contour crosses all tract boundaries and, where deemed appropriate, interior fence lines.

(3) Marking Other Easements, Leases, and Lesser Interests. Because of the various types of facilities, various interests being acquired by the government and the uses to which the facilities are put, definite procedures cannot be outlined here concerning the method of establishment of lines for the acquisition of these types. Accordingly, it will be the responsibility of the district to locate and mark the boundaries of such lands.

12-5. Interior Lines. Surveys of property lines not constituting project boundaries are authorized for the following purposes:

a. For Acquisition Purposes.

(1) When property lines cannot be established by the plotting of deeds, or by other means, to the satisfaction of both the government and the owner concerned.

(2) When, in the judgment of the district, actual ground location of property lines is necessary to determine the relationship of improvements, utilities, water sources, roads, etc., to the property or taking lines or to proposed project boundaries.



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(3) In cases of conflicting deed calls resulting in apparent “overlaps” or “vacant” areas, where it appears probable that a field survey would resolve property line disputes, thus avoiding the creation of counterclaims and resultant court actions to determine rightful ownerships.

(4) Where necessary to relocate property lines or when the owner otherwise refuses to convey title to the government.

(5) Where a title search has resulted in discovering possible interest in the lands by a third party.

b. For Management and Disposal Purposes.

(1) When, in the judgment of the district, surveys of interior lines are necessary in conjunction with the establishment of exterior lines to protect the interests of the government, such as investigations of alleged trespasses over real property controlled by the Department of the Army.

(2) To locate boundaries of areas authorized for outgrant or disposal, provided the boundaries of such areas do not coincide with property lines as they existed prior to acquisition by the government and provided the boundaries cannot be determined by office methods.

(3) To investigate a real estate damage claim.

## CHAPTER 13

### Legal Descriptions

#### 13-1. General.

a. It is imperative that adequate tract descriptions be prepared as sufficient title evidence is available to ascertain the owner's name, place of record, and source of title. Generally tract descriptions can be prepared as one of the first steps of the acquisition program. Descriptions will be prepared to meet the requirements of law for finding and properly identifying the specific tract of land to which title must be approved by a designated attorney or which may be the subject of condemnation action. The necessity for refinement and a high degree of accuracy in describing interior tracts is somewhat less than for exterior or fringe tracts. Accordingly, the recorded deed description may be used for acquisition of interior tracts provided they meet legal requirements and further provided that headings and format, as applicable, conform to instructions herein. In cases where apparent deficiencies or conflicts with adjoining property lines are identified in the recorded deed descriptions a corrective deed shall be recorded prior to acquisition and the corrected legal description shall be utilized in order to ensure clarity of title during acquisition. After all information has been compiled and acquisition lines and property boundaries have been established, the following procedures will be followed in preparing legal descriptions:

(1) Controlling calls along adjoining property lines to monumented deed corners shall be the primary information for describing real property.

(2) Directions and distances will be obtained from the most accurate survey data available. The most accurate data on the project boundary in most cases can be determined from the boundary monumentation survey prescribed in paragraph 12-4 above. If available, this survey data will be used in the tract descriptions. Meandering property lines having fixed or natural boundaries, such as streams, highways, railroads, etc., will be used and expressed in one approximate distance, giving the general direction of the entire course.

(3) When coordinates are utilized to define the geographic location of a deed corner the datum and unit of measure shall be identified.

(4) The heading of the description will be properly titled to show: tract number, name of owner, acreage, name and location of the project, and any other pertinent data.

(5) The general descriptive location of each tract will indicate the state, county, district or parish, or borough and all local identification that will fully describe the general location of the land.

(6) The point of beginning will be selected, preferably at a corner common to three or more

tracts, and be fully described or referenced to a point of commencement; which will be a permanent marker or object that can be located or recovered, if necessary. The description will normally progress in a clockwise direction, giving the directions and distances of the courses. The directions and distances will be in the dominant units of the State, Commonwealth or Territory that the project is located. (Example: Puerto Rico - where the historical and current unit of measure is metric (meters and hectares) The legal descriptions should also identify the record document of adjacent lands, together with a description on any markers and natural or cultural features that will assist in identifying the lands described. After the closing course has been described, the area will be shown in the dominant units of the State, Commonwealth or Territory that the project is located and be indicated as “more or less.” In states that require a statement as to the previous and last conveyance, deed references pertaining to the land contained within the described area will be clearly shown by indicating the name of the grantee and grantor, the date of deed, and the record book, page, office, and date in which the instrument is recorded. Where the land to be acquired is identical to the land as acquired by the vendor, a statement will be made that it is the intention of the description to include the same land as that described in a deed (or deeds) from the prior owner to present owner. Where less than the whole tract is to be acquired, substitute “a part of the same land” for “the same land.”

13-2. Rights-of-Way. Legal descriptions of easements/rights-of-way may be prepared from, and based upon, centerline or baseline data, rather than following the perimeter. The point of beginning should be well referenced to an established point outside the right-of-way. In describing rights-of way, the width of the right of way both left and right of a centerline or baseline, as well as station identification will be indicated in the description. The net overall length of the right-of-way will also be included in the description. In instances where real estate interests are required for right-of-way purposes, an acceptable description usually will be available from design work performed preparatory to proposed construction work. In such cases, full use will be made of these data.

13-3. Overlapping Estates. In cases where it is necessary to acquire an additional interest over an area where less than fee title is being acquired, the total tract area will be recited at the end of the description. However, in order to prevent duplication of areas of overlapping portions, an additional statement will be included at the end of the description substantially as shown in the following examples:

“... containing \_\_\_\_\_ [i.e., 4.50 acres ], more or less, of which \_\_\_\_\_ [i.e. 2.25 acres] is included in the description of Tract \_\_\_\_\_.”

or

“... containing \_\_\_\_\_ [i.e. 4.50 acres], more or less, all of which are included in the description of Tract \_\_\_\_\_.”

Perpetual easements should be described first and take precedence over temporary easements;

i.e., temporary always overlaps perpetual. Between perpetual easements, the “overlapper” may be determined by local conditions or choice, but should be uniform throughout the project.

13-4. Clearance Easements. Descriptions of clearance easements will include heights (above normal ground) of the clearance surfaces from which restrictions are imposed. Also, intervening and interior clearance data may be included in the description which will prove helpful to the government or to the landowner. Descriptions of approach zones, lines of sight, and masking areas will not be used for purposes of defining height restriction for clearance easements in options or condemnation assemblies. In those cases where the ground surface of clearance easement tracts is very irregular, and where there are borderline points in the interior of tracts, it may be necessary to include a topographic map from which maximum permissible heights can be readily calculated at any given point.

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## CHAPTER 14 Validation of Real Estate Geospatial Data and Maps

14-1. General. District real estate is responsible for establishing quality assurance/quality control processes to ensure that all of the real estate acquisition has been completed and to ensure the data is accurately maintained in the appropriate real estate management information system, such as REMIS, and on project maps.

a. Preliminary geospatial data will be considered final when the data have been validated against the acquisition files by the District Senior Review (DSR); in most cases the DSR will be the Real Property Accountable Officer (RPAO). The DSR will confirm that the data reflect the records and certify the data as final. Validation will take place through the REMIS Geospatial tools at the REMIS Geospatial site. Details on this process are available from the USACE Quality Management System.

b. Preliminary project maps for civil works projects will be reclassified as "Final" when all authorized lands for the project have been acquired, and all data and statistics on acquisition and disposal have been shown on the map and verified. Preliminary project maps for military installations will be reclassified as "Final" when the major portion of land for an installation has been acquired pursuant to authorizing directives, mapped, and verified. Both civil works and military project maps and geospatial data will be validated in accordance with the general real property validation procedures defined in ER 405-1-13 (*Validation Process and Historical Files*).

14-2. Project Map Statistical and Data Column. The following paragraphs describe the summary elements that will be shown on the validation maps in the Statistical and Data (S&D) column of the map. For installations or projects requiring multiple maps, the S&D column of the first sheet will summarize the entire set, and the S&D column on other sheets need not be completed. The data for the Statistical and Data column will be compiled or aggregated from the real property data maintained in REMIS.

a. Acquisition Block. The "Acquisition" block of the "Statistical and Data" column of the final project map is designed to accommodate all types of acquisitions. In particular, the "Acquisition" block is broken down into three major categories with the "Public Domain" and "Transfer" lines further broken down. The first item under "Public Domain" will include withdrawals for the entire installation. This will show lands withdrawn from the public domain by public land orders, Executive Orders, proclamations, and notations of rights-of-way on the public land records for use by a specific department. The second item under "Public Domain" will include use permits involving public domain. Use permits from other Federal agencies involving public domain land would also be reflected on this line. All other use permits from other Federal agencies will be reflected on the line so captioned. The "Transferred" line has been devised to reflect the estates of lands (fee, easement and/or lesser interests) transferred from other departments and agencies. Leases transferred will not be included in this line, but will be

shown in the line provided for all other leasehold acquisitions.

(1) Total Acres Acquired. Insert on this line the grand total of all land comprising the installation or project including the net area under jurisdiction as of 1 July 1940 for military installations and 1 January 1943 for Army civil works projects. Do not include in this land the acreage for lesser interests retained in the disposal of fee lands since they were previously acquired. Partial reacquisition of previously disposed or partially disposed lands should not be included in the calculation of Total Acres Acquired. Note such exclusion keyed to the "Total Acres Acquired" line.

(2) Various Interests Acquired. The total acreage of the various interests acquired will be shown opposite the appropriately designated lines. The statistics will include only the areas acquired since 1 July 1940 for military installations, and 1 January 1943 for civil works projects. The "Lesser Interests" line will be the total of all easements and other lesser interests broken down by types. Reserved easement acreages will be reported on a line captioned "Easements Reserved in Fee Disposal." Use permits reserved in a transfer to another Federal agency will be entered on the "Use Permit" line, with the reserved use permits separated from the other use permits and identified by "RES" printed on the left of the acreage.

(3) Additional Acquisition Data Required. In addition to the statistical data contained in the "Acquisition" block of the "Statistical and Data" column, a breakdown of the total area acquired by estates by counties, where more than one county is involved, is required for civil works projects. (See paragraph 6-4. z.(11)) This data will be shown in any convenient place on sheet 1 of the final map. The breakdown will be revised to reflect current statistics, as necessary, upon disposals and/or acquisitions. This requirement is not applicable to leased area.

b. Disposal Block. The "Disposal" block of the "Statistical and Data" column is a counterpart of the "Acquisition" block. The total disposal of the various estates as acquired will be entered on the appropriate lines. In the line captioned "Sold," the total area sold by the department or agency having jurisdiction will be shown. In the line "Reassigned", show the total area reassigned from one installation or project (within the same Department or Agency) to another, setting out the estate as required. Where more than one estate is involved, the total of each estate should be set out in brackets. The designation "Other" will be altered to suit the situation. For example, if accountability for lands declared surplus to the War Assets Administration (WAA) had been assumed by that agency, the word "Other" will be changed to "TO WAA" and total area, broken down by estates and/or interests, disposed of by this method, will be entered. If lands have been reported excess to the General Services Administration (GSA) (which ordinarily does not assume accountability), the word "Other" will be changed to "To GSA" and the total area so reported, broken down by estates and/or interests, will be entered. After the report of excess has been submitted to GSA, validation historical assemblies will be submitted only after disposition has been accomplished.

(1) Total Acres Disposed Of. Include on this line the grand total of all lands disposed of, with the exception of the acreage of those estates over which easements or other rights have been reserved. Partial reacquisition of previously disposed or partially disposed lands should be taken from the Total Acres Disposed of calculation. For example, if a 10 acre tract is disposed, then later 2 acres is reacquired, the ultimate Total Acres Disposed calculation would be 8 acres. Note such exclusion keyed to the "Total Acres Disposed Of" line.

14-3. Disposal Notations. Due to the numerous methods of disposal, including many disposal actions completed at the direction of the War Assets Administration (WAA) or its successor agency, the General Services Administration (GSA), the notations listed below, or a paraphrase thereof, are to be placed near the bottom margin of the final project map when applicable. When an installation is so large as to require more than one sheet, and a disposal action affects areas delineated on more than one sheet, sheet one should carry the appropriate notation indicating the gross acreage for that disposal action. Each succeeding sheet affected should cite the appropriate notation modified to indicate the amount of acreage shown as being disposed of by hachuring the area on that particular sheet. Where part of the acreage disposed of is also mapped on sheet one as well as other sheets, the notation on sheet one should cite the gross acreage and indicate parenthetically the net area applicable to that sheet. Where the entire disposal is on one sheet other than sheet one, the notation will appear on that sheet as well as on sheet one. If Sheet one does not have adequate space, a continuation sheet may be added for disposal notations.

a. When accountability has been assumed by either WAA or its designated disposal agency, indicate:

"Accountability assumed by (name of agency) for \_\_\_\_\_ acres on (date) ."

b. When acreage has been reported to GSA and that Administration has disposed of it, indicate:

"\_\_\_\_\_ acres reported excess on SF 118 to General Services Administration (date) who conveyed \_\_\_\_\_ acres to (recipient) by QCD dated \_\_\_\_\_." In instances where a conveyance is made by an agency other than GSA (after having been reported to GSA), the last portion of the note should read: "\_\_\_\_\_ acres conveyed by (Department) to (recipient) by QCD dated \_\_\_\_\_."

c. Where an owning agency sells land direct, the notation should read:

"\_\_\_\_\_ acres fee (or easement) conveyed to (name) by quitclaim deed dated \_\_\_\_\_ ."

In conveying an easement, care should be exercised that the estate taken originally was an easement estate only. Otherwise, an outgrant of an easement over lands originally acquired in fee would be recorded, which is not a disposal in the accepted sense.



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d. When fee-owned lands described in subparagraphs b and c above are disposed of subject to the reservation of an easement by the United States, the applicable notation will be amended by the addition of:

" . . . reserving to the U. S. (type of) easements over (number) acres."

The statistics for the fee disposal will be entered on the appropriate line of the disposal block, but will not be included in the "Total Acres Disposed Of" line. The term "Use Permit" will be used in lieu of "Easement" where lands are transferred to another Federal agency with retention of a lesser interest.

e. When lands taken by use permit, Executive Orders, public land orders, or the like are returned by an action of the using agency to the same Federal agency or military or civil account from which originally taken, indicate:

"        acres by use permit (or other instrument) relinquished to (name of agency) on (date) "

f. When lands taken by use permit, public land orders, etc., are returned to the Federal agency or military or civil account from which originally taken by virtue of a termination letter or revocation or acceptance of a relinquishment from the latter agency, or due to expiration of term, indicate:

"        acres by use permit (or appropriate instrument) re-transferred to (name of agency) on (date) ."

g. When lands are transferred to another Federal agency (military installation or civil works project), except when transferred for disposal by that agency or lands returned as outlined in subparagraph e and f above, indicate:

"        acres transferred to (name of agency) on (date) for (name of installation or project) ."

h. When leases, licenses, etc., are released by termination or expiration, indicate across the areas affected: "Terminated (date) ." The foregoing notation will be used except when such leases, licenses, etc., were declared to WAA, reported to GSA, transferred to another Federal agency (military or civil account), or sold.

i. When lands are reassigned to another installation or project, indicate:

"        acres reassigned to (name of installation or project) on (date) ."

The date used will be the effective date indicated in the memorandum or other document

authorizing the reassignment. If no effective date is cited, the date of the authorization will be the date of reassignment.

14-4. Hachuring.

a. The disposal symbol appearing in the "Legend" block of the "Statistical and Data" column (modified as described below, if necessary) will be delineated through each tract or area when disposal thereof is consummated. In instances where tracts are too small to clearly indicate disposal by hachuring, the tract symbol may be hachured. Where a number of disposal actions have been accomplished, use one of the following methods to differentiate:

(1) For military installation maps drawn prior to 1 November 1956 (that show the avigation easement symbol in the Legend), vary the width of the spacing between the hachure lines for each separate disposal action. Key each separate symbol to a matching symbol in a box to the left of the disposal notation for identification.

(2) For military installation maps drawn subsequent to November 1956 (that did not show the avigation easement symbol in the Legend), hachure the different areas affected without regard to direction of lines. The symbol denoting different disposals may be slanted left or right, downward, right to left, downward, or drawn parallel or vertical in order to achieve distinction between different disposal actions. Care should be exercised that the direction of the symbol lines chosen in each instance does not obscure tract boundaries or otherwise destroy the legibility of the acquisition delineation. Each separate symbol should be keyed to a matching one in a box to the left of the disposal notation for identification.

(3) For civil works project maps, use the method described in subparagraph b above except that where numerous minor disposals occur, such as conveyances of cottage sites, one symbol (directional line) may be used for a number of individual sales though the parcels are contiguous. In instances where the scale of the basic map is too small to properly identify the lots disposed of, it may be deemed advisable to use additional map sheets showing the entire areas of the cottage site subdivisions on a large scale. If the latter method is used, it will be necessary that the first sheet and each affected subsequent sheet carry a notation substantially as follows:

" (gross) acres, fee, (name of cottage site area) conveyed as individual lots. For details, see cottage site Drawing No. \_\_\_\_\_ (or Sheet No.) with disposal tabulation."

The title box of the cottage site drawings should carry the name of civil works project with the name of the cottage site area beneath in smaller lettering.

(4) If an easement or use permit is reserved over a portion of a disposed-of area, the hachure will be omitted from the retained area. If an easement or use permit is reserved over an entirely disposed of tract, only the tract symbol of the disposed-of tract will be hachured. (See Real Estate Handbook for a sample map).

14-5. Disposal Subsequent to Final Map. When a disposal action is consummated at any time subsequent to approval of the final maps, the map will be revised to reflect such action. Upon

approval, the date will be entered in the "Date Approved" column of the revised map.

14-6. Revised Validation. Final project maps that are subsequently revised to reflect acquisitions and/or disposals will be submitted as stated in paragraph 14-5. For military installations where several directives have been issued after the approval of the preliminary map, the acreage shown the Statistical and Data column will be only those of the validated areas of the installations notwithstanding the fact that the Tract Register indicates acreage of unvalidated tracts. Those tracts not validated should be noted by the statement "NOT FINAL-ACREAGE NOT INCLUDED IN STATISTICS" adjacent to the bracketed group of tracts and identifying directive(s) required by subparagraph 6-31z. If a separate column is used, a distinctive symbol will be placed to the left of the directive(s) not validated, keyed to a note in a convenient place elsewhere explaining which directives are not validated. It will include a statement that the acreage of the unvalidated tracts is not included in the statistics. The "FINAL" designation on such maps will be keyed to the above statement or note until all directives have been completed and all land acreage validated, at which time the statement, notes, and symbols will be removed.

14-7. Review and Approval. Final and revised final project maps will be validated concurrently with validation and review of the acquisition records. Approval of the acquisition or disposal files constitutes validation of the final map or revised final map.

14-8. Distribution to Other Services. Copies of project maps and digital data will be furnished to the appropriate installations or project offices. Copies may be furnished to local representatives of other services and agencies upon their request.

## CHAPTER 15

### Maintenance and Archiving of Project Maps and Data

15-1. Maintenance. Throughout the active lifecycle of a project or military installation, the real estate holdings may change through additional land acquisition, land disposal, outgrants, and other actions. As these actions occur, the geospatial record must be changed to reflect the current land status. Data changes and updates will be completed at the District level, submitted to the REMIS Geospatial site for validation, and made available to REMIS and GIS users through CorpsMap, and Army Mapper services.

15-2. Archiving. Upon validation of the real estate records and creation of any historical records or revised assembly, the project segment maps must be archived. The information can be electronically stored on digital media at two locations (i.e., on-site and off-site storage). Hard copies should be maintained for future reference at the district office or in an approved governmental records storage center from which they can be retrieved, if needed. Storage containers, boxes, folders, and digital media should be labeled as “HISTORICAL FILES. DO NOT DESTROY”. The digital files should be stored in a commonly utilized format that can be readily accessed from any workstation, server device, or removable drive (DVD, Tape, approved external hard drive). The format and media on which it is stored should be compatible and accessible to other USACE divisions or districts with minimal translation of data. Each installation may be provided copies of their archived project maps upon their request. The installation or project offices may be one of the backup storage locations.

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## CHAPTER 16

### Transfer of Projects

16-1. Modification of Project Map. Whenever the responsibility for acquisition of a project is transferred from one district to another district, the receiving office will not redraw the completed or partially completed maps. Nor will the receiving office re-create new digital geospatial data. Information shown on the right side of the map, such as division and district names, signatures, initials, dates, etc., that normally would not apply after transfer will not be removed from the map. In order to show which portion of the work on the map was performed by the receiving office, the following note should be inserted immediately below the district line: "To \_\_\_\_\_ District on \_\_\_\_\_." With this information and the dates in the "Revisions" block, it will be possible to ascertain the map work performed by each office. All files, digital or otherwise, will be transferred to the gaining district.

16-2. Transfer of Geospatial Data. Whenever the responsibility for acquisition of a project is transferred from one district to another district, or from one service to another service, the releasing district will provide the geospatial data and metadata files to the gaining district or service. The data will be submitted on digital media format (e.g., DVD) that the districts or releasing district and gaining service have agreed upon. The gaining district will create an archive copy of the data as describe in Chapter 15 of this ER. The releasing district will retain a copy of the data on digital media stored for a period of 3 years.

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