

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Request Review of Draft Real Estate/GIS Database Design

1. The U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS, is investigating GIS-assisted approaches for meeting the spatial data management and analysis demands of the Corps' real estate activities. This study is being funded through the HQUSACE-sponsored Geospatial Technology Research and Development Program. The work unit is entitled "GIS-Assisted Spatial Data Management for Corps of Engineers Real Estate Activities." An interim product of the work unit is a real estate/GIS database design. This database design was developed based on research of existing database designs and from input from a variety of real estate, planning, operations, and information management personnel at U.S. Army Corps of Engineer Field, District, Division, and Headquarters Offices.
2. We would appreciate your review of this draft design, especially the six Spatial Data Standards for Facilities Infrastructure and Environment (SDS-FIE) tables included in the attached PDF file. This database design will be incorporated into the SDS-FIE 2.0 version. A brief summary of the development of the real estate/GIS database design is also included in the attached file. Please distribute this to pertinent individuals within your organization. Please provide comments by responding to this email not later than 28 Jul 00.
3. The POCs at ERDC are Dr. M. Rose Kress (kressr@wes.army.mil; 601.634.3665 voice) and Ms. Linda Peyman Dove (peymanl@wes.army.mil; 601.634.2267 voice). If you have any questions please give us a call.
4. Thank you for your input.

Encl

LINDA PEYMAN DOVE
M. ROSE KRESS, PhD

CEERD-EN-C

SUBJECT: Request Review of Draft Real Estate/GIS Database Design

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SUBJECT: Request Review of Draft Real Estate/GIS Database Design

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Draft Real Estate/GIS Database Design

The US Army Engineer Research and Development Center (ERDC), Vicksburg, MS is funded through the HQUSACE sponsored Geospatial Technology Research and Development Program to investigate GIS-assisted approaches for meeting the spatial data management and analysis demands of the Corp's real estate activities. The work unit is entitled "GIS-Assisted Spatial Data Management for Corps of Engineers Real Estate Activities". An interim product from this work unit is a real estate/GIS database design. This design was developed based on research of existing database designs and input from a wide variety of Real Estate, Planning, Operations, and Information Management personnel at US Army Corps of Engineer Field, District, Division, and Headquarters Offices.

Figure 1 shows that there are five components of the Real Estate/GIS database design. The organizational needs of Real Estate and the other Business program within the Corps strongly influenced the database design. The database is composed of graphic and tabular data, with attached reference files. The database design is packaged under the Spatial Data Standards for Facilities Infrastructure and Environment (SDS-FIE). The SDS-FIE was developed by the CADD/GIS Technology Center for Facilities Infrastructure and Environment and provides a standard for GIS implementations at Army Corps of Engineers Civil Works activities, DoD Air Force, Army, and Navy installations, and state and local governments. Each of the five database design components is described below.

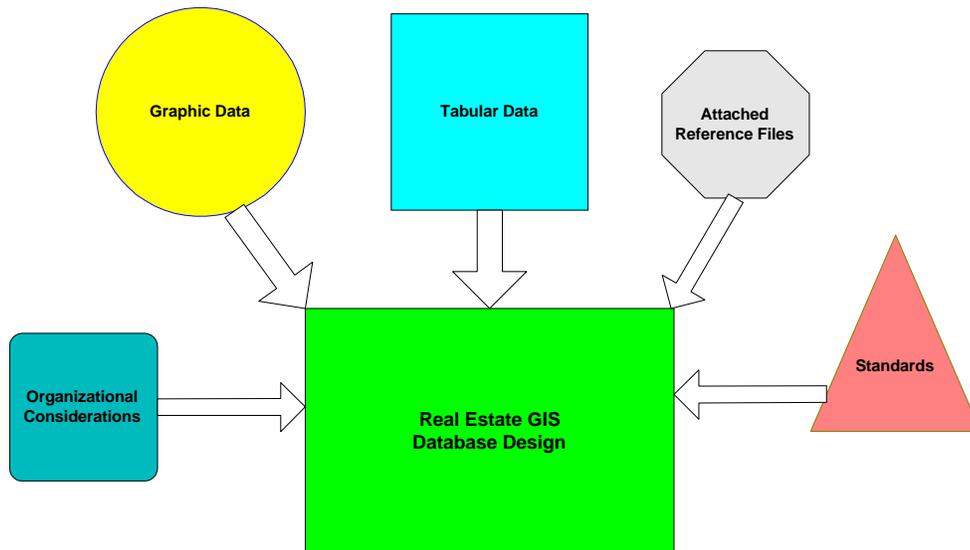


Figure 1. Five Components of the Real Estate/GIS Database Design.

Organizational Considerations

The initial organizational consideration in the database design involved the assessment of the real estate activities and business programs that utilize geospatial real estate data. The needs were assessed at each level of the Corps, from the field offices to headquarters. The primary geospatial real estate data found to be fundamental to real estate activities and the business programs in the Corps include:

- Fee acquisitions
- Less-than-fee acquisitions
- Outgrants
- Encroachments
- Disposals
- Mineral rights

Another organizational consideration was the need to assess existing real estate databases and determine what data should be used in the real estate/GIS database design. The Real Estate Management Information System (REMIS) is the primary existing nonspatial database used by the Real Estate Division. Selected data from REMIS have been incorporated into the real estate/GIS database tables. A limited number of REMIS attributes provide for a standalone database design that is robust and meets the needs of the majority of the users. However, the relational database capabilities of the real estate/GIS database design provide a flexible design strategy, in that it can be linked to other databases, such as a greater REMIS database or existing environmental or cultural databases.

Graphic Data

It was necessary to determine the graphic files needed to address the organizational needs of Real Estate Division and the business programs in the Corps. The following outlines the design strategy to address these needs. There are seven proposed graphic files.

1. Fee tract file - includes all tract boundaries for all land obtained in fee acquisitions. Fee acquisitions are lands that the COE has purchased. Figure 2 provides an example of all tracts at Lake of the Pines in the Fort Worth District.

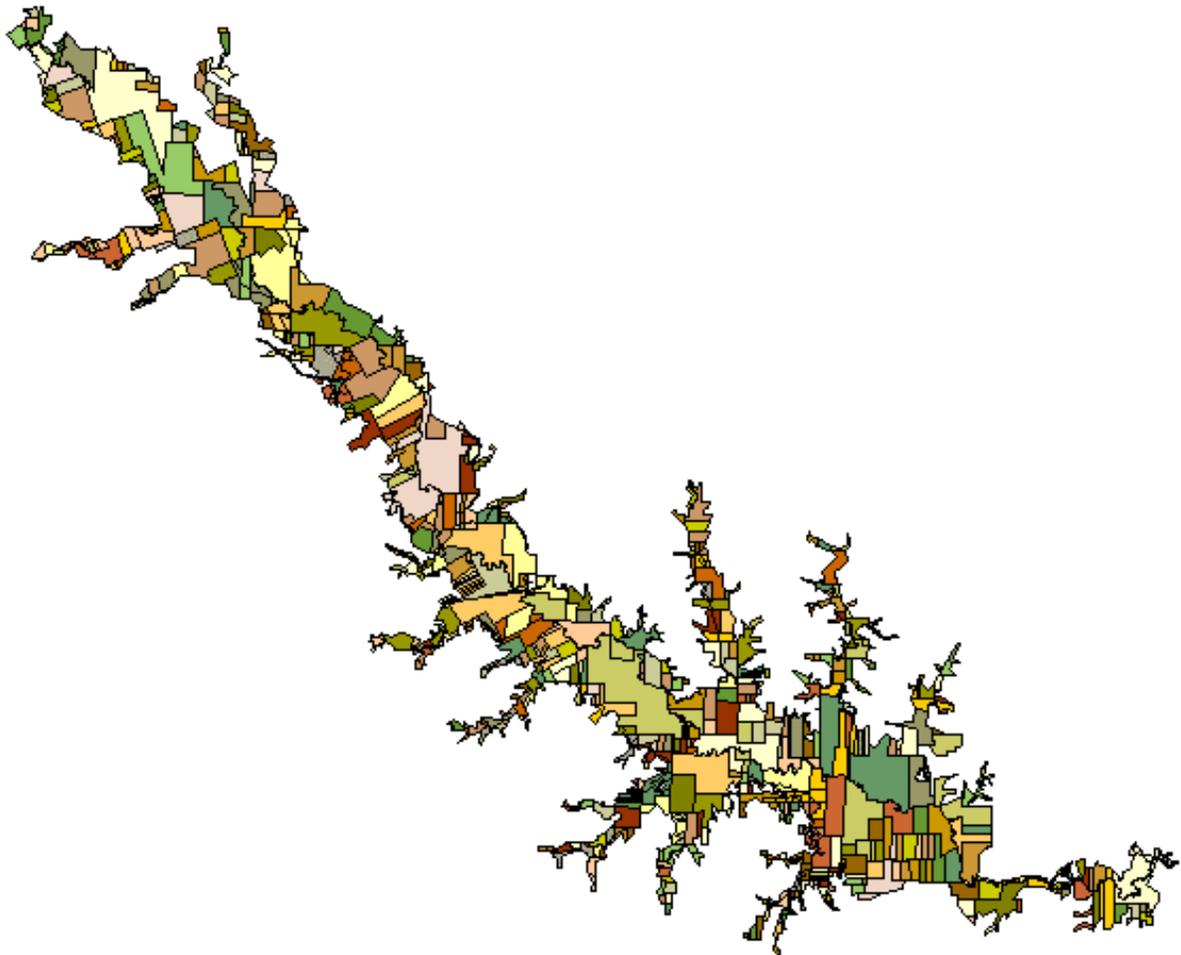


Figure 2. Tract file for Lake of the Pines, Ft Worth District.

2. Less-than-fee tract file - includes all tract boundaries for all land obtained in less-than-fee acquisitions. In less-than-fee acquisitions, the COE does not buy the land but purchases the right to use the land. Examples of less-than-fee acquisition are easements, leases, and permits.
3. Outgrant file - includes the outside boundary or point location of all outgrants. An outgrant is where the COE owns the land and leases it to another party. Examples of outgrants include easements, licenses, and permits.
4. Encroachment file - includes the outside boundary or point location of all encroachments. An encroachment involves the unintentional use of COE land by a party.
5. Disposal file - includes the outside boundary of all disposed land. Disposed land includes land the COE sells or transfers to another party.
6. Mineral rights file - includes the mineral rights for tracts owned by COE.
7. Fee Boundary File - includes the outside boundary of all land obtained in fee acquisition. Figure 3 provides an example of a fee boundary file at Lake of the Pines in the Fort Worth District.

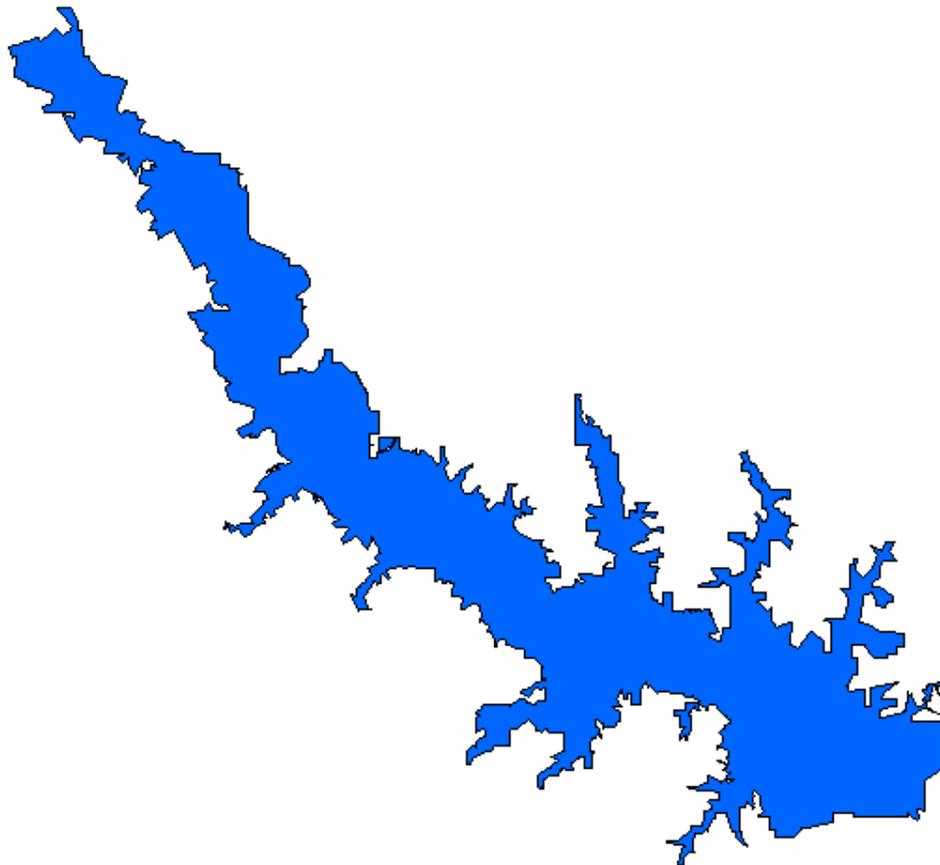


Figure 3. Fee boundary file for Lake of the Pines, Ft. Worth District

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Review Draft of Real Estate/GIS Database Design

Linda Peyman Dove (phone: 601-634-2267; email: peymanl@wes.army.mil)

Tabular Data

A primary table was developed for each graphic file. The tables were designed to be robust and to provide the necessary information for the vast majority of users. This allows for a standalone database design. Nevertheless, if users need to link to other existing databases, the relational database design capabilities allow links to other existing databases.

The Spatial Data Standards for Facilities Infrastructure and Environment (SDS-FIE), developed by the CADD/GIS Technology Center, is used in this real estate/GIS database design. The SDS-FIE Data Model presents information by entity set, entity class, entity type, attribute tables, and domain tables. For the real estate/GIS database design, all tables are under the entity set name "cadastre" and the entity class name "real estate". The proposed attributes to describe the fee tract file, less-than-fee tract file, outgrant file, encroachment file, disposal file, and fee boundary file are shown in Tables 1-6. The table to describe the mineral rights file is not yet complete. It will be completed in the coming year. At the top of each table is the entity set name, entity class name, entity type, table name, and the table definition. In the lower part of the table are the attribute names proposed to describe the graphic data file. The attribute data type, character length, domain table, and definition are also listed. Each table is presented below. Attributes listed in blue are links to other files, while attributes listed in green are attributes obtained from the REMIS database and represent the stand alone high attribute values needed by most users. The attributes listed in black are those that must be input or are computer-generated attributes.

Attached Reference Files

Since there are various reference files, such as documents, photos, and images, that are commonly used, it is necessary to provide a means of viewing them in a digital format. The "media_id" attribute, which is found in all the tables, provides this capability. The reference documents must be converted to a digital format, through scanning or other means.

Table 1. Attributes in Fee Tract File

ENTITY SET NAME cadastre

ENTITY CLASS NAME cadastre_real_estate

ENTITY TYPE fee_tract_area

TABLE NAME cdrelfr

TABLE DEFINITION This table contains information about fee tract acquisitions

ATTRIBUTE NAME	DATA TYPE	CHAR LENGTH	DOMAIN TABLE	DEFINITION
Datalink	I			Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field.
tract_id	C	30		Primary Key. A unique, user defined identifier for each record or instance of an entity.
map_id	I			Foreign Key. Used to link the record to the appropriate map.
Project_id	C	20		Foreign Key. Used to link the record to the applicable PROJECT record.
instln_id	C	20		Foreign Key. Used to link the record to the applicable INSTALLATION record.
meta_id	C	20		Foreign Key. Used to link the record to the applicable feature level metadata record(s).
Media_id	C	20		Foreign Key. Used to link the record to associated multimedia records that reference data Such as imagery, video, audio, and scanned documents.
Acquist_id	C	30		Foreign Key. Used to link the record to the applicable Fee Boundary record.
tract_no	C	16		Tract number
acq_est_d	C	16	d_acqest	Type of acquisition
acqrd_date	I			The date the tract was acquired. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915).
rp_purp_d	C	16	d_prpurp	Project purpose
Remarks	C	240		General comments
legal_area	R			Size of area as computed from legal data
Lgarea_u_d	C	16	d_uom	The unit of measure for area.
Narrative	C	240		General narrative
gis_area	R			Size of area as computed from GIS
garea_u_d	C	16	d_uom	The unit of measure for area.

Table 2. Attributes in Less-Than-Fee Tract File

ENTITY SET NAME cadastre

ENTITY CLASS NAME cadastre_real_estate

ENTITY TYPE less_than_fee_tract_area

TABLE NAME cdrelltf

TABLE DEFINITION This table contains information about less_than_fee_tract acquisitions

ATTRIBUTE NAME	DATA TYPE	CHAR LENGTH	DOMAIN TABLE	DEFINITION
Datalink	I			Graphic Key. A system-generated integer that is used to link the record to Graphic entities. Do not populate this field.
lfract_id	C	30		Primary Key. A unique, user defined identifier for each record or instance of an entity.
map_id	I			Foreign Key. Used to link the record to the appropriate map.
project_id	C	20		Foreign Key. Used to link the record to the applicable PROJECT record.
instln_id	C	20		Foreign Key. Used to link the record to the applicable INSTALLATION record.
meta_id	C	20		Foreign Key. Used to link the record to the applicable feature level metadata record(s).
media_id	C	20		Foreign Key. Used to link the record to associated multimedia records that reference Data such as imagery, video, audio, scanned documents, drawings.
tract_no	C	16		Tract number
acq_est_d	C	16	d_acqest	Type of acquisition
Easement_d	C	16	d_easmnt	Type of easement
expir_date	I			Date less-than-fee estate expires. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915).
acqrd_date	I			The date the tract was acquired. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915).
rp_purp_d	C	16	d_prpurp	Project purpose
Remarks	C	240		General comments
legal_area	R			Size of area as computed from legal data.
lgarea_u_d	C	16	d_uom	The unit of measure for area.
Narrative	C	240		General narrative
gis_area	R			Size of area as computed from GIS
garea_u_d	C	16	d_uom	The unit of measure for area.

Table 3. Attributes in Outgrant File

ENTITY SET NAME cadastre

ENTITY CLASS NAME cadastre_real_estate

ENTITY TYPE outgrant_site

TABLE NAME cdrelout

TABLE DEFINITION This table contains information about outgrants

ATTRIBUTE NAME	DATA TYPE	CHAR LENGTH	DOMAIN TABLE	DEFINITION
Datalink				Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field.
Outgrnt_id	C	30		Primary Key. A unique, user defined identifier for each record or instance of an entity.
map_id	I			Foreign Key. Used to link the record to the appropriate map.
project_id	C	20		Foreign Key. Used to link the record to the applicable PROJECT record.
instln_id	C	20		Foreign Key. Used to link the record to the applicable INSTALLATION record.
meta_id	C	20		Foreign Key. Used to link the record to the applicable feature level metadata record(s).
media_id	C	20		Foreign Key. Used to link the record to associated multimedia Records that reference data such as imagery, video, audio, Scanned documents, drawings, and other digital media.
contract_no	C	22		Contract number for the outgrant.
Purpose_d	C	16	D_ogtpur	Purpose of outgrant
type_d	C	16	D_ogttyp	Type of outgrant
row_type_d	C	16	D_ogtrow	Type of row
Status	C	16		Status of outgrant
effect_dat	I			Date outgrant effective
expir_dat	I			Date outgrant expires
schin_date	I			Date inspection is scheduled to take place
actin_date	I			Date inspection actually took place
lstin_date	I			Previous inspection actual date
comp_ind_d	C	16	D_boolean	Indicates if the grantee is in compliance
Inspector	C	20		Who inspected property
Grantee_no	C	9		Unique number of grantee
grnte_name	C	60		Grantee name
Remarks	C	240		General comments
legal_area	R			Size of area as computed from legal data
lgarea_u_d	C	16	D_uom	The unit of measure for area.
Narrative	C	240		General narrative
gis_area	R			Size of area as computed from GIS
garea_u_d	C	16	D_uom	The unit of measure for area.
coord_x	D			The x component of individual coordinate point.
coord_y	D			The y component of individual coordinate point.
coord_z	D			The z component of individual coordinate point.
Perim	D			The distance around the boundary of the area, zone, or subject item in linear units.
perim_u_d	C	16	D_uom	The unit of measure for length.
user_flag	C	20		An operator defined work area. This attribute can be used by the operator for user defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

Table 4. Attributes in Encroachment File

ENTITY SET NAME cadastre

ENTITY CLASS cadastre_real_estate

ENTITY TYPE encroachment_site

TABLE NAME cdrelenc

TABLE DEFINITION This table contains information about encroachments.

ATTRIBUTE NAME	DATA TYPE	CHAR LENGTH	DOMAIN TABLE	DEFINITION
Datalink	I			Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field.
Enchr_id	C	30		Primary Key. A unique, user defined identifier for each record or instance of an entity.
map_id	I			Foreign Key. Used to link the record to the appropriate map.
Project_id	C	20		Foreign Key. Used to link the record to the applicable PROJECT record.
Instln_id	C	20		Foreign Key. Used to link the record to the applicable INSTALLATION record.
Meta_id	C	20		Foreign Key. Used to link the record to the applicable feature level metadata record(s).
Media_id	C	20		Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings.
Coord_id	C	20		Foreign Key. Used to link the record to the appropriate point coordinate record(s).
facil_id	C	20		Foreign Key. Used to link the record to the Facility Record.
Address_id	C	20		Foreign Key. Used to link the record to the subject item's address.
poc_id	C	20		Foreign Key. Used to link the interest in the property to an individual.
wi_code	C	6		Work item code
enc_itm_no	R			Encroachment item number
Encroachno	C	9		Unique identifier for encroacher
rpt_by_cat	C	16		Who reported the encroachment
type_cat_d	C	16	D_tycat	Type of encroachment
revr_ind_d	C	16	D_boolean	No or null indicates encroacher is encroaching on COE land; yes indicates COE is the encroacher
Finalres_d	C	16	D_finres	How resolution was resolved
Reptd_date	I			Date encroachment reported. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915).
res_date	I			Resolution date. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915).
Remarks	C	240		General comments
Legal_area	R			Size of area as computed from legal data
Lgarea_u_d	C	16	D_uom	The unit of measure for area.
Narrative	C	240		General narrative
gis_area	R			Size of area as computed from GIS
Garea_u_d	C	16	D_uom	The unit of measure for area.
Coord_x	D			The x component of individual coordinate point.
Coord_y	D			The y component of individual coordinate point.
Coord_z	D			The z component of individual coordinate point.
Perim	D			The distance around the boundary of the area, zone, or subject item in linear units.
Perim_u_d	C	16	D_uom	The unit of measure for length.
User_flag	C	20		An operator defined work area. This attribute can be used by the operator for user defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

Table 5. Attributes in Disposal File

ENTITY SET NAME cadastre

ENTITY CLASS NAME cadastre_real_estate

ENTITY TYPE property_disposal_area

TABLE NAME cdreldsp

TABLE DEFINITION This table contains information about disposals.

ATTRIBUTE NAME	DATA TYPE	CHAR LENGTH	DOMAIN TABLE	DEFINITION
Datalink	I			Graphic Key. A system-generated integer that is used To link the record to graphic entities. Do not populate this field.
dispacq_id	C	30		Primary Key. A unique, user defined identifier for each record or instance of an entity.
map_id	I			Foreign Key. Used to link the record to the appropriate map.
project_id	C	20		Foreign Key. Used to link the record to the applicable PROJECT record.
instln_id	C	20		Foreign Key. Used to link the record to the applicable INSTALLATION record.
meta_id	C	20		Foreign Key. Used to link the record to the applicable feature level metadata record(s).
media_id	C	20		Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other media
disp_ind_d	C	16	d_disind	Type of disposal
record_d	C	16	d_rectyp	Indicates type of property being disposed (20 for Land; 30 for Buildings; 40 for Structures and other Facilities)
displ_date	I			Date of disposal. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915).
Remarks	C	240		General comments
legal_area	R			Size of area as computed from legal data
lgarea_u_d	C	16	d_uom	The unit of measure for area.
Narrative	C	240		General narrative
gis_area	R			Size of area as computed from GIS
garea_u_d	C	16	d_uom	The unit of measure for area.

Table 6. Attributes in Fee Boundary File

ENTITY SET NAME cadastre

ENTITY CLASS NAME cadastre_real_estate

ENTITY TYPE fee_acquisition_area

TABLE NAME cdrelacq

TABLE DEFINITION This table contains information about fee acquisition boundaries.

ATTRIBUTE NAME	DATA TYPE	CHAR LENGTH	DOMAIN TABLE	DEFINITION
Datalink	I			Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field.
Acquist_id	C	30		Primary Key. A unique, user defined identifier for each record or instance of an entity.
Map_id	I			Foreign Key. Used to link the record to the appropriate map.
Project_id	C	20		Foreign Key. Used to link the record to the applicable PROJECT.
Instln_id	C	20		Foreign Key. Used to link the record to the applicable INSTALLATION record.
Meta_id	C	20		Foreign Key. Used to link the record to the applicable feature level metadata record(s).
Media_id	C	20		Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other digital media.
Remarks	C	240		General comments
Narrative	C	240		General narrative

Table 7. Domain Tables in Real Estate/GIS Tables

d_ogtpur

ENCR. RES.
 RIGHT-OF-WAY
 RECR, MAJ COMM
 STORAGE
 RECR, MAJ PVT
 AGRICULTURE
 EDUCATION
 FISH-WILDLIFE
 GRAZING
 HOUSING
 INDUST, PVT MFG
 NATIONAL GUARD
 RECR, MIN COMM
 RECR, PUB PARK
 RECR, QUASI-PUB
 OTHER

d_ogtrow

ROAD/BOAT RAMPS/PARKING
 ELECTRIC
 TELEPHONE/TELEGRAPH
 ROADS/HIGHWAYS
 POWERLINES
 SEWERLINES
 RAILROADS
 OIL/GAS PIPELINES
 STORM DRAINAGE
 WATERLINE/STRUCTURES
 TV CABLE
 OTHER

d_ogttyp

OIL AND GAS LEASE
 LEASE
 LTR OF CONSENT
 LICENSE
 PERMIT
 RIGHT OF ENTRY
 EASEMENT

d_acqest_

F - FEE
 LE - LEASE
 LI - LICENSE
 E - EASEMENT
 PD - PUBLIC DOMAIN
 P - PERMIT
 UP - USE PERMIT
 LP - LETTER PERMIT
 FR - FRANCHISE
 M - MINERAL LEASE
 MF - MINERAL FEES
 MS - MINERAL SUBORDINATION

d_easmnt

FLOWAGE-PERMANENT
 FLOWAGE-OCCASIONAL
 RAILROAD
 UTILITY/PIPELINE
 BORROW
 TEMPORARY WORK AREA
 TEMPORARY EXPLORATION
 RESTRICTIVE
 FLOOD PROTECTIONS LEVEE
 DRAINAGE DITCH
 ROAD
 CHANNEL IMPROVEMENT

d_prpurp

NAVIGATIONAL
 FLOOD CONTROL
 FLOOD CONT & HYDRO
 FLOOD CONT, HYD, REC
 MILITARY INSTALL
 MITIGATION
 FISH & WILDLIFE
 OTHER
 FLD CTRL, WTR SPLY
 REC WATER SUPPLY
 SHORE PROTECTION
 RECREATION

d_disind

G - CONVEYED
 T - TRANSFERRED
 N - NEGOTIATED
 C - COMPETITIVE
 E - EXCHANGE
 A - AUCTION
 L - LOST

d_finres

ACQUISITION
 BNDRY LN AGREE
 DISPOSAL
 EXCHANGE
 INVALID
 OUTGRANT
 REMOVAL

d_tycat

ELECTRIC LINE BOAT RAMP
 FOOT BRIDGE BBQ PIT
 GARAGE BORROW PIT
 GAS LINE DECK
 PATIO DIKE
 POLE DWELLING
 TELEPHONE LINE DRAINAGE DITCH
 WATER LINE ELECTRIC LIGHT
 PORCH DUCK BLIND
 SHED DREDGING
 FENCE DRIVE
 RETAINING WALL
 ROAD
 SEWER LINE
 SEPTIC TANK
 WALKWAY/PATH
 ANIMAL PEN
 BOAT DOCK

d_rectyp

0 - OTHER
 20 - LAND
 30 - BUILDINGS
 40 - STRUCTURES AND OTHER FACILITIES