DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

CECI-A

ER 25-1-110

Regulation
No. 25-1-110

31 July 2013

# INFORMATON MANAGEMENT
# ENTERPRISE DATA MANAGEMENT POLICY
# CORPORATE INFORMATION

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Regulation
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Information Management
ENTERPRISE DATA MANAGEMENT POLICY
CORPORATE INFORMATION

1. Purpose. This regulation describes the policy and high-level procedures of the U.S. Army Corps of Engineers' (USACE) Enterprise Data Management Program (EDMP). It provides overarching guidance that informs decisions and actions regarding data, information, data stewardship, and information management throughout USACE. Supplemental circulars, bulletins, instructions, and/or other guidance will address in greater detail the procedures associated with the managing the full lifecycle of USACE data.

2. Applicability. This regulation applies to all Headquarters USACE activities, including Major Subordinate Commands, Districts, Laboratories and field operating activities and their functional areas of responsible. In accordance with mission requirements and directives producing data shared within and outside of USACE.

3. Distribution Statement. Approved for public release, distribution is unlimited.

4. References.

a. 44 United States Code (U.S.C.) 3516, Information Quality Act, 2001.

b. Public Law (P.L.) 104-106, Division E, Clinger-Cohen Act of 1996.

c. 44 U.S.C. 3501 et seq., The Paperwork Reduction Act of 1995, as amended.

d. 44 U.S.C. 3504, The Government Paperwork Elimination Act, 1998.

e. P.L. 100-503, The Computer Matching and Personal Privacy Act of 1988, as amended.

f. 5 U.S.C. 552a, Privacy Act of 1974, as amended.

g. 5 U.S.C. 522, Freedom of Information Act (FOIA).

h. Office of Management and Budget (OMB) Memorandum, M-10-06, Open Government Directive, 2009.

i. OMB Memorandum, M-06-02 Improving Public Access to and Dissemination of

Government Information and Using the Federal Enterprise Architecture Data Reference Model, 2005.

j. OMB Circular A-119, Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities, 1998.

k. 67 Federal Register 8452, February 22, 2002 "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies."

l. AR 25-1, Army Knowledge Management and Information Technology. All applicable references in Appendix A apply.

m. Department of Defense Directive (DODD) 8000.01, Management of the Department of Defense Information Enterprise, February 10, 2009.

n. USACE Data Standardization Procedural guidance and instructions for USACE data managers, September 2013.

o. DA-Pam 25-1-1, Information Technology Support and Services, Chapter 5, Army Net Centric Data Management Program (ANCDMP).

p. Headquarters Department of the Army (HQDA) Directive 2009-03, Army Data Management, October 30, 2009.

5. General and Background. Data assets throughout USACE include, but are not limited to, all data collected or derived by appropriated USACE funded programs, either directly by its employees or through contracts or grants; data shared within and outside of USACE. This EDMP encompasses the process of designing, managing, protecting, and disseminating USACE data assets that are collected, generated, maintained, aggregated, stored and distributed of within USACE while supporting business functions and goals.

a. Data are among the most valuable public assets that USACE manages and are an essential enabler of the USACE mission. The efficient and effective use of data has a direct impact on the ability of USACE staff to make informed decisions.

b. The EDMP is a component of the USACE Enterprise Architectural (CeA) Program and establishes the procedures, methods, and parameters for promoting exchangeable information and data goals throughout USACE. Influenced by Congress, the Administration, Department of Defense (DoD), Department of Army (DA), the ultimate goal of the EDMP is to create a trusted, quality data environment in USACE. Implementation of that goal includes:

(1) Ensuring that data are visible, available, trustworthy, and usable when needed and where needed to accelerate confident decision-making.

(2) Making data comprehensible through “metadata” tagging, enabling discovery by all users.

(3) Enabling access to data by the posting of data to shared spaces except when limited by sensitivity, security, policy, or regulations.

(4) Promoting and encouraging the proficiency of data management by facilitating the improvement of interoperability and data exchange, and by providing the means for data sharing, controlling redundancy, minimizing data handling,(i.e., enter once, use many), and improving data integrity.

c. The EDMP governs the Data Architecture segment of the Corps’ Enterprise Architecture (CeA). The EDMP is also the foundation of the Corps’ Enterprise Data Model (EDM). The EDM is an integral part of the CeA, providing the framework to support data requirements with a special focus on those that span multiple lines of businesses (LOBs), functional areas and systems. These data requirements are harmonized at the enterprise level through the collaboration of a data stewardship program. The EDMP is also the foundation for the development of data sharing standards, data storage standards, and term standards, directing USACE information systems, applications and reports.

d. The EDMP collects information about USACE data assets that are used to:

(1) Determine authoritative data sources (ADS) within USACE, minimize creation of duplicative data, identify data sharing opportunities, and determine appropriate data and rules to populate the Enterprise Data Warehouse (EDW). Efforts to employ re-usable enterprise data asset components can be effectively provided that USACE organizations understand and model their data in an application and technology independent manner.

(2) Establish re-usable data building blocks that foster the use of common information across the enterprise, agreed upon business terms across business areas, and blueprints to communicate information requirements to vendors and designers.

(3) Promote the protection and securing of USACE data.

6. Policy. It is the policy of USACE to.

a. Manage data as an enterprise resource that supports the range of mission and functional areas across the USACE.

b. Implement data management to provide visible, clear, concise, consistent, unambiguous, trusted, and easily accessible data to all authorized USACE personnel and appropriate external agencies, partners, and the public.

c. Promote data management in a manner that minimizes the cost and time required to transform, translate, or research data.

d. Improve the way USACE organizations use data by defining data structuring rules and standards consistent with ISO/IEC 11179 and the Army Data Standards Program, and coordinating data definitions and structures among organizational components.

e. Model, name, and define data and metadata consistently across and within all USACE programs. All data will have a standard set of metadata including, but not limited to information about information assurance, quality, sensitivity, and the authoritative source. This metadata shall be identified at the lowest level possible, wherever appropriate. Metadata must be in machine readable format. The USACE Engineering Manual for Metadata and Data Standardization will provide requirements and standards for documenting data with metadata.

f. Use applicable external data standards developed by standards bodies at Federal, national, and international levels before creating USACE data standards or using common commercial practices. This includes but is not limited to the reuse of federally mandated standards under Federal authoritative directives such as Executive Orders, Office of Management and Budget (OMB) Circulars, and Army and DoD Regulations.

g. Standardize and register enterprise metadata and business terms via the USACE Metadata Repository and Business Glossary. Provide USACE-wide access to metadata tools to enable data discovery and understanding, and to meet the requirements for data sharing and exchange among information systems and data assets throughout USACE.

h. Provide an Enterprise Data Model (EDM) in harmony with the framework specifications of the Corps' Enterprise Architecture (CeA) Program guidance, Office of Management and Budget (OMB) Federal Enterprise Architecture (FEA), the DoD Architecture Framework (DoDAF), and the DoD Net-Centric Data Strategy. The USACE EDM is a collection of knowledge about USACE data that documents data structures and the definitions of the data entities for the purpose of promoting integrity, quality, consistency and standardization of data used throughout the entire organization.

The EDM is a primary data architecture artifact providing a graphical depiction of the USACE data resource to include its attributes, relationships, and business rules.

i. Institutionalize the role of functional data stewards who will define, manage, control, and share data descriptions and data standards and represent the data requirements of their associated functional area. Data stewards will coordinate compliance to standards through their respective organizational authorities in collaboration with USACE data governance bodies.

j. Ensure that USACE data management policies and principles such as data discovery and application of data exchange standards are met by commercial-off-the-shelf (COTS) data sources or other sources external to USACE when justified by mission requirements, feasibility analysis, and a cost-benefits analysis.

k. Protect the data resource from deliberate, unintentional or unauthorized alteration, destruction and/or inappropriate disclosure or use in accordance with established USACE, Army, DoD, and Federal policies, regulations, and practices.

l. Facilitate the specification and implementation of standard data management services and conformance test requirements.

m. Develop written instructions and paradigms for the development, maintenance and modification in a supplemental document covering enterprise-wide USACE data standardization.

7. Procedures.

a. The EDMP will define, implement, disseminate, and maintain uniform instructions and procedures that:

(1) Implement the policy described in Paragraph 6, Policy.

(2) Identify requirements for effective USACE data management. Provide processes for collaboration, coordination, sharing, and dissemination of USACE enterprise data.

(3) Establish USACE standard logical and conceptual data naming conventions in harmony with current standards from the federal level down through DoD/DA established standards recognized and entered to the DISR. A level of uniform procedures to define and maintain all USACE data standards.

(4) Describe the detailed administrative relationships among the USACE Program Manager for Enterprise Data Management Program, the Command Data Administrator, the Automated Information Systems (AIS) Functional Proponents, the Functional Data Stewards, and the users of data.

(5) Develop requirements for methods and capabilities that permit rapid generation and manipulation of data definitions and data models.

(6) Provide guidance for users of the USACE data management tools including how to access and use metadata and terms.

(7) Provide education and assistance to staff on the principles, methods, and techniques to achieve a shared data environment.

(8) Develop and implement strategies and criteria for establishing, populating, and integrating data in the EDW.

(9) Identify the mechanism to structure, store, collect, and maintain metadata so that they:

(a) Are readily accessible to and understood by the Heads of USACE Divisions, Districts, Labs, and offices

(b) Can be made available to organizations proposing or developing USACE information systems and information exchanges

(c) Are protected in accordance with all applicable Federal laws, regulations, and policies related to information assurance, privacy, and security.

b. The EDMP will implement an USACE Authoritative data source process.

8. Objectives. Implement the EDMP in ways that enhance mission performance through acquisition, use, re-use, and sharing of data. Objectives of EDMP are to:

a. Support USACE operations and decision making with data that meets the need in terms of availability, accuracy, timeliness, integrity, quality, and security.

b. Structure information systems in ways that encourage horizontal, as well as vertical, sharing and exchange of data within USACE, with other Government Agencies, and private sector organizations to include universities.

c. Improve information interoperability and data exchange by providing the means for data sharing, controlling redundancy, minimizing data handling,(i.e., enter once, use many), and improving data integrity.

d. Recognize and promote the importance of data and information as valuable resources requiring management of their creation, use, storage, maintenance, preservation, and disposition.

e. Enable strategic information to be consistently and accurately derived from operational data.

f. Establish and maintain links between the Corps Enterprise Architecture and the USACE Enterprise Data Model.

g. Reduce the cost and time required to transform, translate, or research the meaning of differently named but otherwise identical conceptual, logical, and business data objects.

h. Provide enterprise solutions to data sharing and data dissemination through the continued execution implementation of the EDW.

9. Roles and Responsibilities.

a. Chief Information Officer (CIO) for USACE. The USACE CIO has overall responsibility for the USACE Enterprise Data Architecture including the management and coordination of the USACE Enterprise Data Management Program for the effective and efficient use of data in information systems and exchange of USACE data. The CIO shall: Issue and maintain USACE Enterprise Data Management policy and procedures in coordination with the appropriate USACE officials; represent USACE to other Government agencies; Present standards to maturing organizations and industry on matters pertaining to the development and adoption of data standards; Designate or assign an USACE Program Manager for the Enterprise Data Management Program to administer and manage the program on a day-to-day basis; Delegate such representation and authority to the USACE Program Manager for the Enterprise Data Management Program. Assumes the responsibilities of the Army Data Steward.

b. Executive Sponsor. Executive Sponsors are the Agency's selected program business lines of authority that report directly to the Commander or Deputy Commander of USACE. The Executive Sponsor is to be in partnership with the USACE CIO to judiciously and effectively manage the USACE Enterprise Data Management Program. Delegate decision-making authority pertaining to data requirements, data standardization, and data quality for their functional/subject area. Ensures adequate funding for Functional Data Managers to effectively develop and maintain their respective functional/subject area view of the USACE Enterprise Data Model and execute their responsibilities for the USACE Enterprise Data Management Program.

c. USACE Enterprise Data Management Program Manager. Responsible for the overall management and execution of the USACE Enterprise Data Management Program and for ensuring the technical correctness and consistency of resource management products. Develops and directs the implementation of USACE Enterprise Data management policies, standards, and supplemental guidance. Monitors USACE Enterprise Data Management policies and standards for compliancy. Reviews and monitors the methodology for the population and use of a data

warehouse. Monitors the population of the agency glossary tool to include ensuring that population is in harmony with Enterprise Data Management policy, practices and services. Assumes the responsibilities of the Primary Data Manager.

d. USACE Command Data Administrator. Chairs the Corps of Engineers Enterprise Architecture Council (EDAC). Maintains the USACE Enterprise Data Model (EDM) and ensures its harmony, where practical, with the Federal Enterprise Architecture Data and Information Reference Model, the DoD Architecture Framework, and the DoD Net-Centric Data Strategy. Establishes USACE EDM integration procedures and manages the integration of logical data models into the USACE EDM. Establishes best practices and new standards for developing logical and/or physical data models. Establishes and enforces procedures in developing and submitting data requirements as part of the Life Cycle Management of Information Systems (LCMIS). Establishes the criteria for the review of proposed USACE data standards and confirms their status prior to recording status changes in the USACE Metadata Repository. Arbitrates and resolves data related issues presented after a formal review. Presents unresolved issues for final arbitration and resolution.

e. Primary Data Manager. Appointed by the Army Data Steward. Mirrors the responsibilities of the Army Data Steward (excluding Army Data Board Voting). Performs the day to day functions of the Army Data Steward and ensuring the successful execution of the DA Strategic Data management Program to include the overall membership and responsibilities of the Army Data Council.

f. Functional Data Manager. Nominated by Executive Sponsors and appointed by the Primary Data Manager. Champions the use of the official set of enterprise data and metadata within their functional area. Works directly with the USACE Program Manager for the Enterprise Data Management Program and AIS Functional Proponents to review standards and business rules, and to establish and maintain USACE data standards in accordance with the USACE Enterprise Data Model, USACE Metadata Repository, and USACE Enterprise Data Management Policy and all its supplemental guidance. Promotes the implementation of best practices and new standards for developing logical and/or physical data models for the automation of business process and or reporting of their respective subject area or business line. Reviews and considers comments and recommendations submitted during formal reviews of USACE data standards. Reviews and provides comments and resolves issues on data standards submitted by other USACE Functional Data Stewards to determine their potential impact to the USACE enterprise data management initiative. Final authority on all data related topics pertaining to his or her subject area or business line. Coordinates decisions on his or her own subject area or business line with appropriate user communities. Reviews and adopts recommendations on updating or retiring data standards associated with own subject area or business line.

g. IT Project Managers. Represents the USACE Enterprise Data Management Program to Information Technology program managers, Divisions, Districts, Labs and offices. Supports the USACE Command Data Administrator to ensure that USACE data standardization procedures are enforced through modification and or design and reported upward. Assists in the implementation of enterprise data management policies and procedures. Providing guidance, instruction and understanding.

h. Division/District Data Stewards. Establishes and maintains Division/District data management in accordance with USACE policies, procedures, and supplemental guidelines. Partners with the USACE EDMP Manager and Army Data Steward in the development of policies, procedures, and guidelines for the USACE Enterprise Data Management Program.

i. Automated Information System (AIS) Functional Proponents. Responsible for the identification of data requirements to be satisfied by an information system. Under situations where an information system is to satisfy joint requirements in a community of practice or integrated line of business, the functional proponent is responsible for ensuring that all data are identified, reconciled, and defined. Provides documentation of the data requirements. Responsible for ensuring the establishment and enforcing the reuse of data, standards in information systems design, development, modification, and improvement efforts. Responsibilities include the capture of metrics on the use and quality of data standards in information system efforts. The development of data models supporting the establishment and final disposition controlling the reuse of data standards. Responsible for coordinating data requirements and standards with the appropriate Functional data stewards and Program Manager for the Enterprise Data Management Program, and reviewing and commenting on proposed data standards.

j. Enterprise Data Architecture Council (EDAC). The EDAC is comprised of Functional Data Stewards, AIS Functional Program Managers, representatives from functional program level Data Architecture Working Groups (DAWGS), and the Command Data Administrator. The chairperson of the EDAC is the USACE Command Data Administrator. The EDAC is a chartered group to provide a forum for seeking consensus on enterprise data standards, to resolve data resource management related issues, and to provide assistance for the implementation of EDMP. The EDAC also works as a coordination body for the entire collection of Data Architecture Working Groups.

k. Subject Matter Expert. Works directly with the AIS Functional Proponents and Functional Data Stewards to develop, review, modify, and/or establish data standards for subject areas or business lines within their purview, in accordance with the USACE Enterprise Data Model, USACE Metadata Repository, USACE Data Standardization Procedures, and this policy. Evaluates comments and recommendations presented during formal reviews of proposed data standards to determine impacts on existing and planned systems. Works directly with the other

Subject Matter Experts to resolve data standard issues and to implement USACE data standards, accepted business rules, and the Life Cycle approach for all business line data within their purview. Identifies and verifies business rules for subject areas or business lines within their purview. Works directly with the AIS Functional Proponents, Database Administrators, and other Subject Matter Experts to implement accepted business rules, best practices, data standards, quality control procedures, and security requirements for subject areas or business lines within their purview. Implements USACE data standards and incorporates the Life Cycle approach for all business line data within their purview. Assures the accuracy and quality of data definitions, data labels and metadata, including the specification of valid domain and data values. Performs data accuracy and quality assurance checks, and conducts recurring (periodic) data quality reviews to ensure compliance with established USACE data standards. Documents quality assurance reviews and communicates all data-related changes with the appropriate AIS Functional Proponents, Functional Data Stewards and Subject Matter Experts.

l. Database Administrator. Works directly with the Subject Matter Experts and AIS Functional Proponents to implement data standards, best practices, and quality control procedures for subject areas or business lines as directed. Updates and maintains data definitions for use in production environment. Ensures specifications for valid permissible value (data domain) and fully implements accepted business rules in a consistent manner. Implements data access and ensures that access is aligned with the security requirements specified by the Subject Matter Experts and AIS Functional Proponents.

10. Effective Date. This Policy is effective immediately.

11. Definitions.

a. Army Net-Centric Data Program. Establishes policy, guidance, and instruction about the set of data standards, business rules, and data models required to govern the definition, production, storage, ownership, and replication of data.

b. Authoritative Data Source (ADS). A data asset that is the single officially designated source authorized to provide a type or many types of information that is trusted, timely and secure. The information provided is visible, accessible, understandable and credible to information users. Trusted means that the information provider exercises management responsibility for appropriate practices, procedures, and processes to produce information that is within acceptable thresholds for quality, integrity and security. Timeliness connotes that the data received is current, and secure data connotes the provisions for access controls and rights protection are in place. Visible data means that it is designed in a way that it can be easily published and discovered. The data accessibility means mechanisms are in place allowing for authorized access. Understandable and credible data connote a common mechanism such as the Federal Enterprise Architecture (FEA) Data Reference Model (DRM) for describing and representing the data to convey consistent understanding of meaning. The ADS is further

defined as interoperable, which means that the data is characterized in a way conducive to exchanges and sharing via network or system interfaces.

c. Business Glossary. A repository and dissemination tool for USACE Business Terms.

d. Business Term. One or more words designating a concept.

e. Community of Practice. A community of practice (CoP) is a group of people who regularly interact to collectively learn, solve problems, build skills and competencies, and develop best practices around a shared concern, goal, mission, set of problems, or work practice. CoPs cut across formal organizational structures and increase individual and organizational agility and responsiveness by enabling faster learning, problem solving, and competence building; greater reach to expertise across the force; and quicker development and diffusion of best practices. CoP structures range from informal to formal and may also be referred to as structured professional forums, knowledge networks, or collaborative environments.

f. Conceptual Data. Metadata and/or data models that have been defined and elaborated at a very high level of abstraction.

g. Controlled Vocabulary. A list of terms that have been enumerated explicitly. This list is controlled by and is available from a controlled vocabulary registration authority. All terms in a controlled vocabulary must have an unambiguous, non-redundant definition.

h. Data. A representation of facts, concepts or instructions (structured, semi-structured, or unstructured) in a formalized manner suitable for communication, interpretation or processing by people or by machines.

i. Data Architecture. A framework comprised of formal data management and data standardization programs, a recognized community of data stewards representing the business lines across the enterprise, a metadata repository, governance, and an enterprise data model. The framework serves the purpose for organizing the interrelationships of data, (based on an organization's missions, functions, goals, objectives, and strategies), providing the basis for the incremental, ordered design and development of systems based on data modeling methods.

j. Data Asset. A collection of data, or facts, within a specific scope tied to a line of business or shared in common across business lines. It is singular, such as the human resource data, recreation data, or trust data.

k. Data Dictionary. For USACE, this is synonymous with Metadata Repository.

l. Data Element. A basic and generally smallest unit of information that has a meaning. In a data model, it is a property or characteristic that is common to some or all of the instances of a

data object. A data element generally corresponds to a field or column in a database file. (Synonymous with Data Attribute and Attribute).

m. Data Entity. See Data Object.

n. Data Model. A graphical and semantic representation that describes data objects, their data elements, and relationships or associations with other data objects.

o. Data Object. (Also called Data Entity) A representation of real or abstract things (people, objects, places, events, ideas, combinations of things, etc.) that are recognized as the same type because they share the same characteristics and can participate in the same relationships. It is also referred to as a data entity in relational data modeling.

p. Data Quality. The correctness, timeliness, accuracy, completeness, relevance, and accessibility that make data appropriate for use.

q. Data Requirement. A documented need or specification for data.

r. Data Resource. The total set of all data, automated or not, for an organization.

s. Data Management. The development and execution of architectures, policies, practices and procedures that properly manage the full data resource lifecycle needs of an enterprise. This is implemented as a USACE program function including development and coordination of the policies and plans for the identification, definition, collection, organization, correction, storage, protection, processing, communication and disposition of data and information in information systems.

t. Data Standard. Primarily a standard for metadata, it includes Data Objects, Data Entities, Data Assets, Data Elements, or Business Terms that have been subjected to the Data Standardization process where its specification have been deemed as authoritative and preferred for USACE. It is established in a format consisting of names, definitions, characteristics and representations. Data standards may also encompass authoritative data sources (ADSs), information exchange standards specifications (IESSs), enterprise identifiers (EIDs), and eXtensible Markup Language (XML) used to guide all data exchanges including those with legacy systems.

u. Data Standardization. The process of documenting, reviewing, and approving unique names, definitions, characteristics and representations of data according to established procedures and conventions.

v. Data Steward. The individual who is responsible for establishing and maintaining the quality, integrity, documentation, and preservation of the data asset.

w. Enterprise Data. A Data Object, Data Asset, or Data Element that has a scope higher than a single area of interest, system, or community; is involved in significant data exchanges, and/or has significant importance to the organization.

x. Enterprise Data Model. A data model that consists of an integrated view of the data objects that are common across USACE.

y. Enterprise Data Warehouse. The USACE-wide collection of data used to support strategic decision making, enterprise reporting, and general business intelligence. The warehouse is the central collection and integration point that allows information to be analyzed, evaluated, and interpreted for business intelligence. It is the official source of data for data marts within USACE and delivers a common view of enterprise data.

z. Functional Area. A classification of various functional aspects of an organization. A functional area (e.g., human resources) is comprised of one or more functional activities (e.g., recruitment), each of which consists of one or more functional processes (e.g. interviews candidate).

aa. Information. Data with context; the meaning that a human assigns to data by means of the known conventions used in their representation.

bb. Information Resource. All resources and activities employed in the acquisition, development, collection, processing, integration, transmission, dissemination, media replication, distribution, use, retention, storage, retrieval, maintenance, access, disposal, security, and management of information. Information resources include doctrine, policy, data, equipment, and software applications and related personnel, services, facilities, and organizations. (Source: AR 25-1).

cc. Information System (IS). Set of information resources organized for the collection, storage, processing, maintenance, use, sharing, dissemination, disposition, display, or transmission of information. Includes AIS applications, enclaves, outsourced IT-based processes, and platform IT interconnections. (Source: AR 25-2, AR 25-1).

dd. Interoperability. The capability for one system, and/or its components, to efficiently and effectively exchange information, data, and logic with one or more systems. Interoperability may also extend to the ability to synchronize and share business processes, functions, and services.

ee. Life Cycle Management (LCM). A management approach which provides a structured, sequential process for planning and control of an information resource from inception to

ee. Life Cycle Management (LCM). A management approach which provides a structured, sequential process for planning and control of an information resource from inception to replacement or termination.

ff. Logical Data. Metadata and/or data models that have been defined and elaborated at a moderate level of abstraction. (See also Conceptual Data).

gg. Metadata. A description of the characteristics of an organization's data. This includes descriptions of any type of data, including structured data such as database tables, unstructured data in documents, videos, media, and maps, data assets, enterprise architecture, logical and conceptual data. Metadata is a direct concern of the USACE Enterprise Data Model, USACE Metadata Repository and Business Glossary, and is managed as part of the Data Management Program.

hh. Metadata Repository. A specialized type of database or file containing metadata and supporting the activities and functions of the USACE Data Management Program; a repository of information describing the characteristics of data used to design, monitor, document, protect, and control data in information systems and databases; an application of a metadata repository system.

ii. Term. See Business Term.

jj. Vocabulary Control. The process of organizing a list of terms (a) to indicate which of two or more synonymous terms is authorized for use; (b) to distinguish between homographs; and (c) to indicate hierarchical and associative relationships among terms in the context of a controlled vocabulary or subject heading list. (See also controlled vocabulary.)

FOR THE COMMANDER:

Cheryl L. Partee

2 Appendixes
(See Table of Contents)

CHERYL L. PARTEE
Chief of Staff

# Appendix A

## USACE Data Standardization Process

Section I General Information.

A-1. Introduction. This appendix describes a standardized method to be used throughout USACE in the consistent documentation and standardization of data. The process described by this appendix is a methodology in the development and adoption of USACE-wide data standardization. Figure 1 illustrates the five major phases of data standardization.

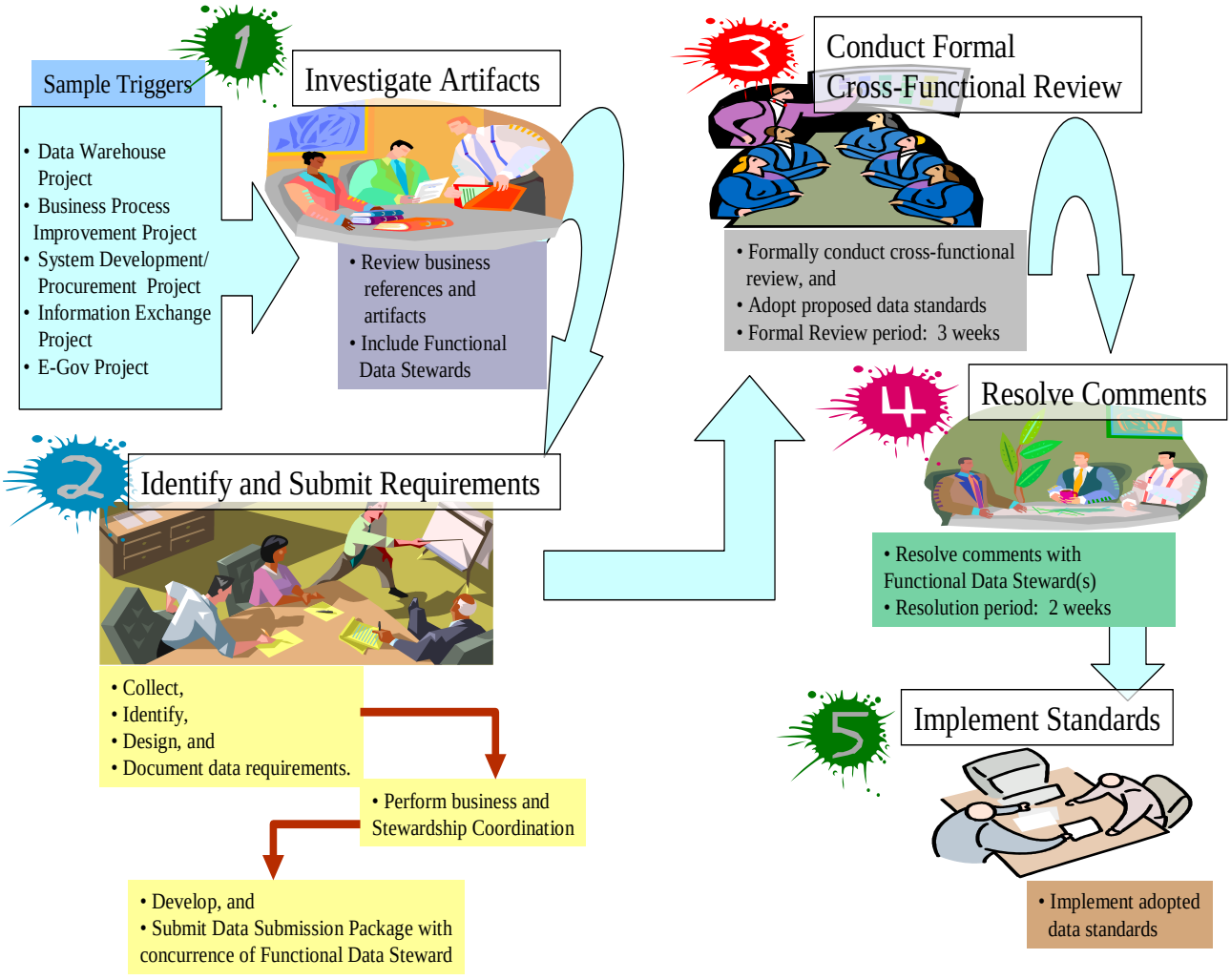


Figure 1 Five Phases of USACE Data Element Standardization

Key roles and responsibilities of individuals associated with data standardization are detailed in Section II. Data element concepts are detailed in Section III. Process steps that are needed to accomplish these five phases are detailed in a supplemental document, USACE Data Standardization Procedural Guidance and Instruction. The supplemental

Document is constructed in a specific order to explain in detail the five phases with graphical representation. The appendices of the supplemental document also provide Metadata Definitions and an Authorized Representation Terms.

A-2. Purpose.

a. This appendix presents a defined, workable process that can be easily and consistently applied across USACE organizations for adopting and/or developing, implementing, and maintaining data standards for the purposes of information sharing and exchange and for the establishment of a common, USACE vocabulary. As such, the procedures for developing, approving, implementing, and maintaining USACE data standards and terms are discussed in this Document.

b. These procedures are in compliance with the Department of Defense (DoD)/Army Data Management Strategy and are necessary to support the USACE Data Resource Management program. The basic outcome of the implementation and use of these procedures will significantly improve the ability of USACE to share data, both within and among USACE organizations and with external partners.

A-3. Context.

a. The adoption and/or development of data standards are a key component in the implementation of USACE's overall Data Resource Management framework. This framework, shown in Figure 2, provides the basis for the coordination of the entire Data Resource Management Program.

b. The framework is founded on four components which are critical to the rest of the framework. They are: Data Standardization and Business Context; Information Exchange and Information Sharing and associated Agreements; Physical System Synchronization and Implementation Support; and Transport Mechanisms.

c. The framework is held together with a variety of enterprise-wide "bands" that are critical in achieving performance objectives for data management, including governance policies, transition plans, security and records management, and integration with the Corps Enterprise Architecture (CeA).

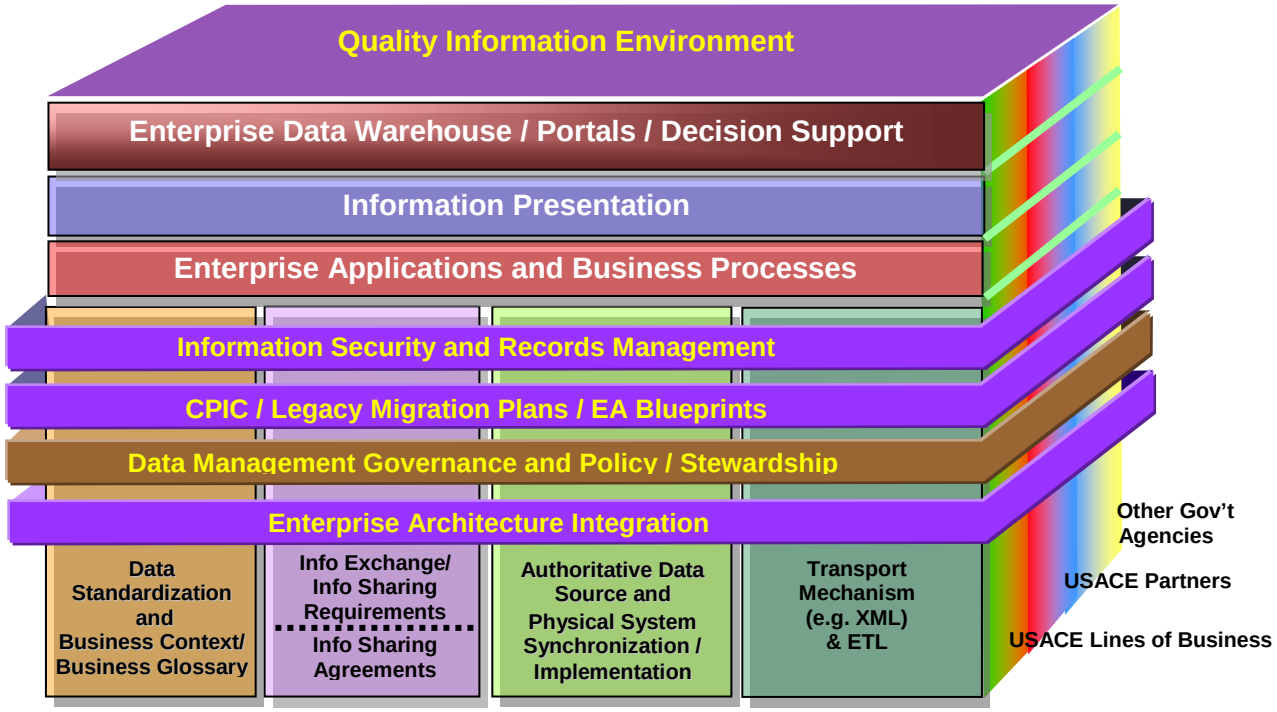


Figure 2 – The USACE Data Resource Management Framework

d. The data standardization procedures are primarily focused on the first component shown on the left of Figure 2, Data Standardization and Business Context. However, the implementation of these procedures has an effect on the success of the other three primary components as well. For example, the successful implementation of data standards throughout the organization is important to the success of determining information exchange and information sharing requirements and is the subject of formal or informal information sharing agreements. Data standards are also critical in the activities of the Physical System Synchronization and Implementation Support component, especially in the development of reusable data products and in data engineering support. Finally, the development of data standards will have a penetrating impact on the development of standardized Transport Mechanisms, such as Extensible Markup Language (XML) artifacts and other interoperability mechanisms.

e. Also depicted in Figure 2 are the enterprise platforms that are supported by all four of the primary components. These include the successful operations of the enterprise applications and business processes, information presentation, and the Enterprise Data Warehouse, Portals, and Decision Support capabilities. The latter are especially effected by the overall quality of the data throughout the organization.

A-4. Applicability and Scope.

a. These procedures apply to all USACE Divisions, Districts, Labs and offices. These procedures also apply to information systems components of USACE Automated Information System (AIS) development, modification, and integration efforts.

b. These procedures apply to geospatial and non-geospatial data as well as data in Commercial Off-The-Shelf (COTS) packages.

c. The scope of USACE data standardization includes the data requirements for all USACE lines of business.

d. To maximize data sharing across the USACE, data standardized in accordance with these procedures and migration systems data must be registered and designated as the official standard in a USACE Data Repository. The USACE Data Repository is an authoritative source for tracking the life cycle of USACE data standards and is the mechanism to be used in the formal data standardization process. It will also be an artifact for the identification and registration of Army Authoritative Data Sources.

e. The USACE Data Repository is equipped to store unclassified data standards only. A separate document is dedicated to describe the guidelines and mechanisms for working and storing classified data standards.

A-5. Objectives. The general objective of USACE data standardization is the promulgation of data standards throughout USACE in support of information systems design and development, interoperability, data sharing, system integration and business process improvement. Specific objectives of data standardization are to:

a. Facilitate interoperability among separate USACE agencies and lines of business by reducing the requirements to translate and transform data.

b. Promote data sharing.

c. Control data redundancy.

d. Use applicable international, national, and Federal data standards where appropriate.

e. Reduce data handling costs.

f. Improve data integrity and accuracy.

g. Reduce cost and time to develop, implement, and maintain information systems.

h. Provide for the uniform description and representation of data.

i. Document established data standards in a single USACE Data Repository.

j. Develop and maintain a USACE Enterprise Data Model (USACE EDM) that depicts the USACE's information requirements.

k. Provide accurate data standards that will guide data extraction, transformation, loading and dissemination though the USACE Enterprise Data Warehouse (EDW).

A-6. Benefits. There are a number of benefits to be gained in the development of USACE data standards or the adoption of external data standards, among them are:

a. A common data vocabulary that will enable USACE organizations to increase their ability to exchange and share information.

b. The support of integrated operations among lines of business, communities of practice, and the facilitation of decision making. Standard data will promote integrated operations between the Organization and its organizational components. Standard data will facilitate interoperability among communities of practice in support of business operations. Standard data will increase the quality of information that decision makers can trust.

c. The management and control of data redundancy, contribute to minimizing data processing and storage costs, and improve data integrity.

d. The simplification of developing data descriptions and other metadata for data due to the application of a data methodology.

e. The increased opportunities for data standards to be used, not only in automated information systems, but also in manual information systems, forms, publications, reports, records, and messages.

A-7. Approach. The basic approach to data standardization outlined in this document is to:

a. Use these procedures to identify and then specify information requirements and information sharing requirements.

b. Research and use established data standards whenever possible.

c. Develop data standards by designing them according to the naming and definition structure detailed in this document.

d. Coordinate data standards with other USACE organizations and with other federal, state, and local agencies and groups where appropriate.

e. Have proposed standard data elements reviewed through the formalized review and establishment process detailed in this document.

f. Implement data standards within information systems and information exchange packages.

A-8. Strategy. The criteria and rules for standardization of data and associated semantics, format, and permissible value sets throughout USACE are addressed in this document. Data Resource Management and Standardization is intended to:

a. Identify existing external standard data elements or develop standard data elements that satisfy USACE and agency mission needs and that support operational business activities requiring the collection, storage, and exchange of data.

b. Document existing external standard data elements or develop standard data elements through data modeling efforts and the development and refinement of the USACE Enterprise Data Model (EDM).

c. Increase awareness of the value of managing USACE's data resources.

d. Provide guidance for the uniform description and representation of data.

e. Provide, wherever practical, a single management standard that:

(1) Implements USACE's data element standardization program.

(2) Fosters full participation of data stewards, communities of practice, system owners, and communities involved with information exchange.

f. Aggressively migrate to a managed data environment required by USACE policy while preserving, to the extent possible, current investments in data.

g. Support the development of common data requirements and formats to eliminate data definition redundancies and discrepancies.

h. Minimize the cost and time expended in transforming, translating, or researching the meaning of related data elements. These are not limited to, but may include, differently named but otherwise identical data elements or similarly named data elements with differences in definition or values.

i. Improve the integrity and usage of data through data structuring rules and standards prescribed in this document and by coordinating data element definitions among USACE agencies, and with external partners.

j. Document standard data, their definitions, and other attributes in a central USACE Data Repository.

A-9. Exceptions to Procedures. Exceptions to the procedures established in this guidance document will be considered on a case by case basis. Possible exceptions will be validated by the appropriate Functional Data Steward and the USACE Command Data Administrator. The USACE Command Data Administrator in coordination with the Data Advisory Committee (DAC) will provide a resolution and present it to the DAC for final approval.

Section II. Key Roles and Responsibilities of Data Standardization.

A-10. Purpose. The expansion of the USACE Enterprise Data Model (EDM) and development of USACE data standards through data modeling within a subject area or community of practice require participation across many different USACE communities. The key participants and their roles and responsibilities in the USACE data standardization process are described in this chapter. The responsibilities for the development and management of an organization-wide Enterprise Data Management Program can be found in Chapters 1-3.

The Data Resource Management and Standardization Program is an integral part of the USACE Enterprise Architecture work. Figure 3 shows graphically the key roles and responsibilities.

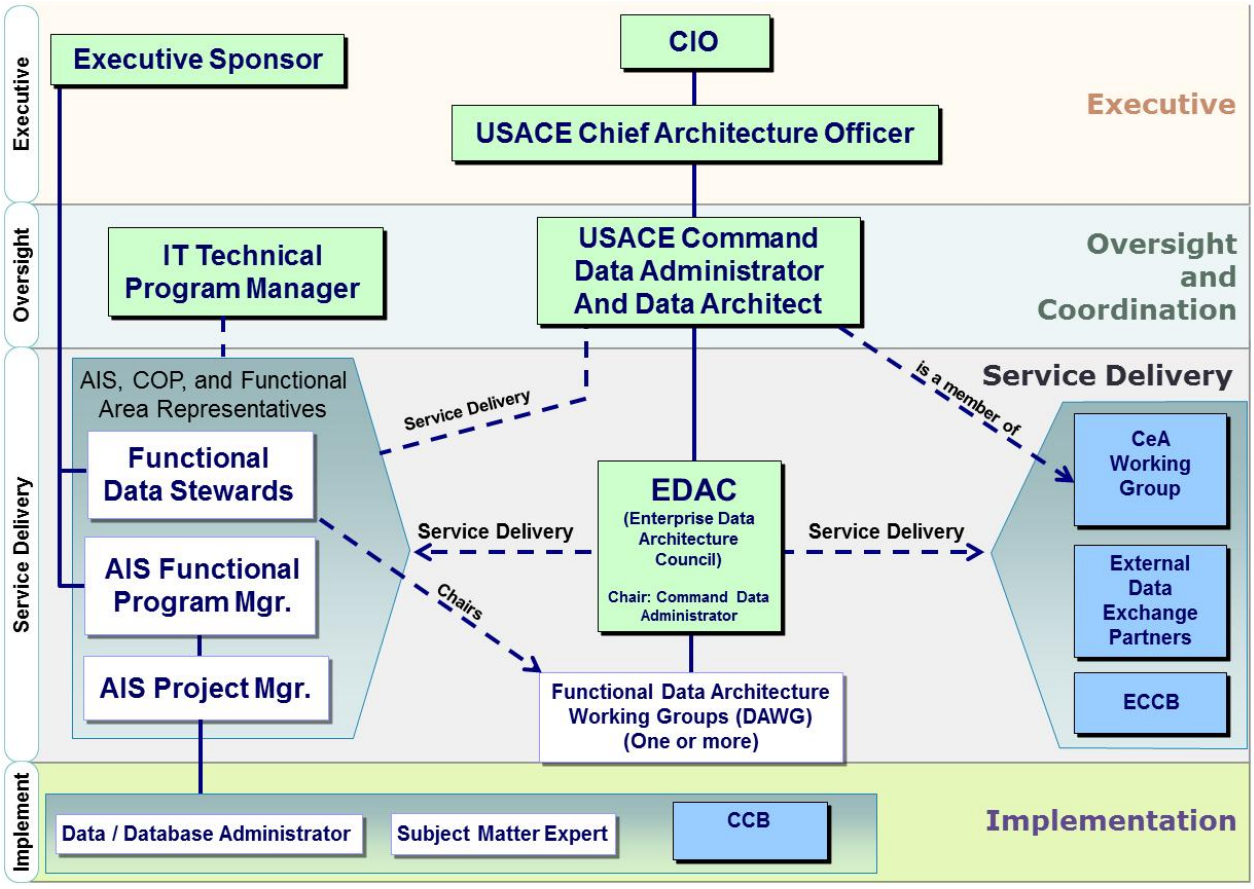


Figure 3 – Key Roles and Relationships

A-11. Key Roles and Responsibilities Defined.

a. USACE Executive Sponsor:

(1) Designates Functional Data Stewards for the functional/subject areas within their jurisdictional control or authority.

(2) Ensures adequate and timely funding for Functional Data Stewards to effectively develop and maintain their respective functional/subject areas of the USACE Enterprise Data Model.

(3) Oversees and executes management responsibilities in support of the USACE Data Resource Management Program, including concurrence with decisions by the Functional Data Stewards.

b. USACE Command Data Administrator and Data Architect:

(1) Chairs the Enterprise Data Architecture Council (EDAC).

(2) Develops and directs the implementation of USACE enterprise data management policies and standards.

(3) Monitors and tests Division / District / Lab and office data resource management policies and standards for compliance.

(4) Maintains the USACE Enterprise Data Model and ensures its harmony, where practical, with the Federal Enterprise Architecture Data and Information Reference Model (FEA-DRM).

(5) Establishes USACE Enterprise Data Model integration procedures and manages the integration of logical data models into the USACE Enterprise Data Model.

(6) Establishes best practices and new standards for developing logical and/or physical data models.

(7) Establishes and enforces procedures to be used by the Functional Data Stewards in developing and submitting data requirements for their subject areas or business lines.

(8) Establishes the criteria for the review of proposed USACE data standards and confirms their status prior to recording status changes in the USACE Data Repository.

(9) Arbitrates and resolves data-related issues presented after a formal review.

(10) Promotes the identification and protection of sensitive data associated with all USACE business lines that are designated "For Government Use Only," "Proprietary," or subject to the Privacy Act and/or applicable security classifications.

(11) Serves as the functional proponent for the USACE Data Repository.

(12) Maintains the USACE Data Repository and ensures its availability and continuous operation.

(13) Conducts periodic assessments of USACE data standards contained in the USACE Data Repository and recommends retirement of data standards that are no longer of practical use to any business line.

(14) Develops and implements USACE Authoritative Data Source policy and procedures and ensures their coordination and harmony with the Army Authoritative Data Source program.

(15) Provides guidance to Functional Data Stewards, AIS Functional Program Managers, and AIS Project Managers, and any other Division/District/Lab Data Architects on existing and pending policies, rules, regulations, and laws affecting the management of government data and information.

c. Functional Data Steward:

(1) Works directly with the USACE Command Data Administrator, AIS Functional Program Managers, and AIS Functional Program Managers to review data standards, authoritative data sources, and business rules; and establish USACE data standards in accordance with the USACE Enterprise Data Model, USACE Data Repository, and USACE Data Standardization Document.

(2) Promotes the implementation of best practices and new standards for developing logical and/or physical data models for own subject area or business line.

(3) Works closely with the AIS Functional Program Managers, and AIS Project Managers, and any Division/District/Lab/Office Data Architects to coordinate and integrate all data requirements.

(4) Reviews and considers comments and recommendations submitted during formal reviews of USACE data standards.

(5) Reviews and provides comments on data standards submitted by other Functional Data Stewards to determine their potential impact.

(6) Resolves issues on data standards associated with own subject area or business line with appropriate AIS Functional Program Managers, AIS Project Managers, any Division/District/Lab/Office Data Architects and other Functional Data Stewards.

(7) Identifies and describes the attributes needed for the protection and proper release of sensitive data associated with own business line that is designated "For Government Use Only," "Proprietary," or subject to the Privacy Act and/or applicable security classifications.

(8) Reviews and adopts recommendations on updating or retiring data standards associated with own subject area or business line.

(9) Final authority on all issues pertaining to own subject areas or business lines. Coordinates decisions on own subject areas or business lines with appropriate user communities.

(10) Identifies candidates for authoritative data sources and submits them through the data standardization procedures. Reviews proposed authoritative data sources proposed by other Functional Data Stewards.

(11) Participates as a member of the Enterprise Data Architecture Council (EDAC).

(12) May chair a Functional Data Architecture Working Group (DAWG). For example, the Real Estate Data Architecture Working Group (RE-DAWG).

d. AIS Functional Program Manager:

(1) Facilitates the timely development, review, modification, and/or establishment of USACE data standards and business rules with the USACE Command Data Administrator, Functional Data Stewards, Business Data Stewards and other USACE Division/District/Lab/Office Data Architects, in accordance with the USACE Enterprise Data Model, USACE Data Repository, and USACE Data Standardization Document.

(2) Facilitates the identification and leveraging of component data standards as candidates for adoption as USACE data standards.

(3) Implements best practices and standards for developing logical and/or physical data models for Component subject areas or business lines.

(4) Coordinates and collaborates with others to integrate all data requirements for Component subject areas or business lines.

(5) Works closely with the Component Business Data Stewards to review comments and recommendations presented during formal reviews of cross-Component data standards.

(6) Facilitates the timely review of USACE data standards to determine their potential impact on Component subject areas or business lines.

(7) Works directly with the Functional Data Stewards and Component Business Data Stewards to resolve data standard issues.

(8) Promotes the identification and protection of sensitive data associated with all Component subject areas or business lines that are designated "For Government Use Only," "Proprietary," or subject to the Privacy Act and/or applicable security classifications.

(9) Promotes implementation of USACE data standards within the Component and ensures that standards are included in private sector contracts.

(10) Makes recommendations on updating or retiring standards for the Component subject areas or business lines.

(11) Coordinates the timely performance of data accuracy and quality assurance checks, formal reviews, and information exchange relevant to USACE data standards.

e. AIS Project Manager:

(1) Works directly with the Division/District/Lab/Office Data Architect, Subject Matter Experts, and other Component Business Data Stewards to develop, modify, and/or review USACE data standards for Component subject areas or business lines, in accordance with the USACE Enterprise Data Model, USACE Data Repository, and USACE Data Standardization Document.

(2) Implements best practices and standards for developing logical and/or physical data models for Component subject areas or business lines.

(3) Reviews USACE data standards to determine their potential impact on Component subject areas or business lines.

(4) Reviews and evaluates comments and recommendations presented during formal reviews of USACE data standards within the Component and the Organization.

(5) Works directly with the Division/District/Lab/Office Data Architect, Subject Matter Experts, and other Business Data Stewards to resolve issues relevant to USACE data standards.

(6) Identifies sensitive data associated with Component subject areas or business lines to ensure the appropriate designation, i.e., "For Government Use Only," "Proprietary," or subject to the Privacy Act and/or applicable security classifications.

(7) Coordinates and promotes implementation of USACE data standards, accepted business rules, and the Life Cycle approach for all Component business line data.

(8) Updates and maintains appropriate data standards for the Component’s identified subject areas or business lines.

(9) Identifies data quality metrics and coordinates data accuracy and quality assurance checks, formal reviews, and information exchange relevant to USACE data standards with the Division/District/Lab/Office Data Architect, Subject Matter Experts, and other Business Data Stewards.

(10) Works directly with other Business Data Stewards, Database Administrators, and Subject Matter Experts to implement accepted business rules, best practices, data standards,

quality control procedures, and security requirements for Component subject areas or business lines.

f. Subject Matter Expert:

(1) Works directly with the Functional Data Steward, AIS Functional Program Manager, and AIS Project Manager to develop, review, and establish data standards for own subject areas or business lines, in accordance with the USACE Enterprise Data Model, USACE Data Repository, and USACE Data Standardization Document.

(2) Analyzes business requirements and/or logical/physical data models to ensure secure and appropriate interfaces and connections among Component systems, applications, and databases.

(3) Evaluates comments and recommendations presented during formal reviews of proposed data standards within the Component to determine impacts to existing and proposed systems.

(4) Works directly with the Functional Data Stewards, AIS Functional Program Manager, AIS Project Manager, and other Subject Matter Experts to resolve data standard issues and to implement USACE data standards, accepted business rules, and the Life Cycle approach for all Component business line data.

(5) Suggests classification of sensitive data and regulatory authorities associated with Component subject areas or business lines that are designated "For Government Use Only," "Proprietary," or subject to the Privacy Act and/or applicable security classifications.

(6) Identifies and verifies business rules for Component subject areas or business lines.

(7) Works directly with the AIS Functional Data Steward, AIS Project Manager, Database Administrators, and other Subject Matter Experts to implement accepted business rules, best practices, data standards, quality control procedures, and security requirements for Component subject areas or business lines.

(8) Implements USACE data standards and incorporates the Life Cycle approach for all Component business line data.

(9) Assures the accuracy and quality of data definitions, data labels and metadata, including the specification of valid domain and data values.

(10) Performs data accuracy and quality assurance checks, and conducts recurring (periodic) data quality reviews to ensure compliance with established USACE and Component data standards.

(11) Documents quality assurance reviews and communicates all data-related changes with the appropriate Business Data Stewards and Subject Matter Experts.

g. Data / Database Administrator:

(1) Develops and implements logical and/or physical data models within the Component's data resource configuration.

(2) Loads the approved data into the data resource as outlined in the logical and/or physical data model.

(3) Designs, develops, and implements appropriate interfaces and connections among Component systems, applications, and databases, including the creation of database views, referential integrity constraints, and primary/secondary keys as outlined in the logical and/or physical data models.

(4) Works directly with the Subject Matter Experts, AIS Functional Program Managers, and AIS Project Managers, to implement data standards, best practices, quality control procedures, and security requirements for Component subject areas or business lines as directed.

(5) Updates and maintains data definitions for use in production environment.

(6) Ensures specifications for valid domain and data values and fully implements accepted business rules in a consistent manner.

(7) Implements data access and ensures that access is aligned with the security requirements specified by the Subject Matter Experts and AIS Project Manager.

(8) Tunes the data resource to achieve maximum performance, and ensures the day-to-day care, functionality, and utility of the data resource.

Section III Data Standardization Concepts.

A-12. Purpose. The basic concepts of data standardization in this chapter support lifecycle phases of standard data.

A-13. Basic Concepts of Data Standardization.

a. Data Standardization:

(1) Data standardization is the process of identifying and defining data requirements using metadata to document a format that conforms to a set of common structures and definitions, and subjecting the data requirement to a process of validation, review, and establishment.

(2) At its very root, data standardization deals with understanding the semantics of data. Semantics refers to the actual business meaning and business context for an individual item of data. Semantics also refers to specific information about data. For example, semantics about the

data element FACILITY TYPE CODE will include information about its actual meaning or definition, its field length, the type of data that it contains (such as character data or numeric data) and it's set of permissible values. To truly understand data, its semantics must be understood. Therefore, data standardization deals with a set of procedures for determining and documenting the semantic meaning of data through the collection of metadata in a common, structured format. The structured and consistent information about data that collectively provide the semantic meaning of data is commonly called metadata. Reference (b) in Appendix B (ISO IEC 11179-1:2004 (E), Information Technology—Specification and standardization of data elements, Part 1: Framework for the specification and standardization of data elements, 2004) contains a section (B.1) on metadata and data elements.

(3) The approach to achieving data standards for USACE begins with the premise that metadata are a very valuable set of Organization-level data that need to be defined, created, reported, updated, and maintained in a non-redundant, efficient manner. This approach requires the existence of a structured database of metadata frequently called a data dictionary, metadata repository, data repository, or data registry.

b. Data Standardization Component Framework**.**

The USACE is consistent with major federal government efforts to define a common framework or reference model to be used in describing data standards. The Federal Enterprise Architecture Enterprise Data Model (FEA DRM) has been defined by the Office of Management and Budget (OMB) as a means to provide a common, consistent way of categorizing and describing data to facilitate data sharing and integration. The concept of capturing and describing data is also described in the standard developed by the International Standardization Organization (ISO)/International Electro technical Commission (IEC) 11179 entitled 'Information Technology - Specification and Standardization of Data Elements'. Figure 2 of the USACE Data Resource Management Framework depicts USACE's overall framework for the implementation of the ISO/IEC 11179 standard and the FEA DRM guidance. Figure 4 shows USACE's basic structure for naming and designing a standard data element. The definitions of each part of this structure are described in this chapter.

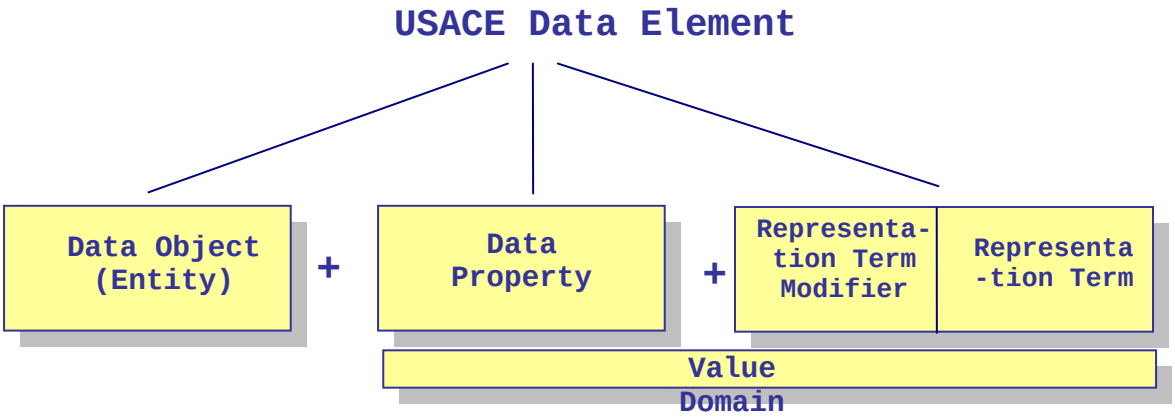


Figure 4 - USACE Data Element Description

c. Data Object. (Also commonly referred to as a Data Entity, Data Concept, or Object Class):

(1) A Data Object is a representation of real or abstract things (people, objects, places, events, ideas, combinations of things, etc.) that are recognized as the same type because they share the same characteristics and can participate in the same relationships. Practical examples of Data Objects that have already been defined by USACE include PERSON, INCIDENT, FIRE-EVENT, RECREATION-FACILITY, FUND-ACCOUNT, TRUST-BENEFICIARY, and ORGANIZATION.

(2) Each Data Object that has been identified and standardized must have a minimum set of metadata to help describe the semantic meaning of the Data Object.

d. Data Property (Data Element or Data Attribute):

(1) A Data Property is a property or characteristic that is common to some or all of the instances of a Data Object. A Data Property represents the use of a domain in the context of a Data Object. A Data Property is considered to be the specific part of data element that distinguishes it from other data elements within the same Data Object. In traditional terminology, Data Properties are often referred to as *data elements*. In the context of the USACE Data Element, the Data Property is a part of a Data Element. What completes the Data Element is the addition of the Data Object name as the first part of a data element name, and the Representation Term at the end of the Data Element name.

(2) Data elements are the smallest, indivisible piece of data that are classified under Data Objects. Examples of data elements include (fully named with Data Object, Data Property, and Representation Term):

PERSON FIRST NAME
PERSON MIDDLE NAME
PERSON LAST NAME

INCIDENT START CALENDAR DATE
INCIDENT END CALENDAR DATE
INCIDENT IDENTIFICATION NUMBER
INCIDENT LOCATION NAME

FIRE-EVENT START CALENDAR DATE
FIRE-EVENT BURNED ACRES QUANTITY

(3) Each of these pieces of data has a similar naming structure that begins with a common word or phrase. In the examples shown above, the common word in the first group is PERSON, in the second group it is INCIDENT, and in the third group is FIRE-EVENT. These common words relate directly to the Data Object that these Data Properties help to describe.

(4) Data Properties, when combined with the Data Object and Data Representation, are the basic units of knowledge for which data standards are developed. The procedures described in this Document are primarily concerned with the proper naming, defining, and structuring of a combination of Data Object, Data Property, and Data Representation.

(5) A Data Property typically, but not always, represents an individual data item that is collected and processed by an application system. In system terminology, these are often called "data elements," "columns," "fields," or "attributes".

(6) Each Data Property that has been identified and standardized must have a minimum set of metadata to help describe the semantic meaning of the Data Property.

e. Data Representation:

(1) The bottom concept, Data Representation, describes how data is represented to its users and to the organization. Data representation includes such information as the type of data represented (such as character, numeric, and date), how the data is formatted (date might be in the format of YYYY/MM/DD, where Y = year, M= Month, and D = Day), and points to specific lists of permissible values for the data.

(2) Basic Data Representation is tied to a list of common words (also referred to as the authorized representation terms), such as NAME, CODE, DATE, AMOUNT, VOLUME, COORDINATE, QUANTITY etc. These words are commonly referred to as *representation terms*. These words also have a specific set of metadata characteristics that help describe their basic meaning. The authorized representation terms are provided in the supplemental document, USACE Data Standardization Procedural guidance and instructions.

(3) Using the same example as in the Data Property list from above, notice that each of these names end with common words:

PERSON FIRST NAME
PERSON MIDDLE NAME
PERSON LAST NAME
INCIDENT START CALENDAR DATE
INCIDENT END CALENDAR DATE
INCIDENT IDENTIFICATION NUMBER
INCIDENT LOCATION NAME

FIRE-EVENT START CALENDAR DATE
FIRE-EVENT BURNED ACRES QUANTITY

f. Value Domain:

(1) A Value Domain is the representation of a set of permissible (or valid) values for a data property or a data property with the data representation. A Value Domain is part of the Data

Representation and provides a means to describe the set of valid or permissible values related to a data property.

(2) An example for a Value Domain includes the set of valid or permissible values for PERSON-GENDER-CODE:

| Code: | Meaning: |
|---|---|
| F | Female |
| M | Male |
| U | Not Known |
| N | Not Specified |

In this set, the codes correspond to a specific meaning. So for the value domain for PERSON-GENDER-CODE, there is a set of four possible codes, each with a specific meaning.

(3) Some Data Properties have lengthy lists of permissible values. For example, the value domain for the data element COUNTRY-CODE has an extensive list of permissible values that identify each of the countries of the world.

(4) For some concepts, such as STATE, there are several different sets of Value Domains. Some systems identify each state with an abbreviation, and some others do so with a numeric code. In such a case, it is best to standardize on a single set of permissible values if possible.

(5) In many cases, a value domain does not have a practical list that can be enumerated. In these cases, the value domain simply describes the range of possible values or the type of values that can be described. For example, the value domain for the data element PERSON LAST NAME has the possible list of all the last names of people living and/or deceased depending on the context. It would be impossible to create such a list. So the value domain would simply indicate a maximum length and allowable character set of last name values that are described by this data element.

g. Logical Data Models:

(1) All USACE data standards are based on an Entity Relationship Diagram (ERD) modeling approach for the description of data needs. The ERD approach brings discipline to the description of data requirements.

(2) The logical data models developed using this approach must be in at least third normal form (3NF) to support the standardization of data. Data normalization is a technique used during data modeling to ensure there is only one way to know a fact or piece of information for the purpose to control and eliminate data redundancies. 3NF refers to an entity that is in second normal form and in which every non-key attribute is only dependent on the primary key. Refer to FIPS PUB 184, or The Institute of Electrical and Electronics Engineers (IEEE) publication IEEE 1320.2-1998 for detailed information on developing a logical data model.

(3) Logical data models are created to support data requirements for USACE systems, functional areas, and USACE organizational components. As logical data models are fully attributed, normalized, and validated by business data stewards, subject matter experts (SMEs) and system proponents, the models and supporting metadata are submitted for the review, concurrence, and integration phases of data standardization.

(4) Logical data models submitted for review must be based on a version of the USACE Enterprise Data Model **(**USACE EDM) that is no more than one release old from the time of submission. The USACE EDM is an integration of logical data models across multiple functional areas throughout the USACE. The USACE EDM is published quarterly by the USACE Command Data Administrator. It consists of a graphical representation of the data based on the Integration Definition for Information Modeling (IDEF1X) standard from reference (i) in Appendix F. Detailed metadata descriptions are found in the USACE Data Repository. Logical data models consist of the following components listed in "a" through "e":

a) Data Objects (Data Entities)

b) Data Elements

c) Data Representation (Representation Terms)

d) Value Domains (To include those with or without a list of Permissible Values)

e) Relationships

h. USACE Enterprise Data Model (USACE EDM):

(1) The USACE EDM is a fully attributed conceptual data model that contains a depiction of the data standards in various stages of the life cycle process for USACE. The stages of the life cycle for data standards are further explained in section 3.3 of this document. The USACE EDM is comprised of multiple pictorial views that contain data objects, data properties and relationships. The USACE EDM is maintained in the USACE Data Repository and published in the USACE Enterprise Architecture Repository (DEAR). Data models from a variety of sources are used to develop this model, including data models from community of practice that are added to the USACE EDM in the form of proposed data standards submitted by Functional Data Stewards. The USACE EDM represents an integrated view of all standardized data requirements for USACE lines of business.

(2) The primary division of the views within the USACE EDM is by subject areas of a business line, and by Information Class. For example, the USACE EDM contains a data model diagram organized by subject areas for the business lines of FACILITY MANAGEMENT, FINANCIAL MANAGEMENT, WILDLAND FIRE MANAGEMENT, LAW ENFORCEMENT, RECREATION, GEOSPATIAL, TRUST, RECORDS MANAGEMENT and DATA RESOURCE MANAGEMENT. Additional USACE EDM views can refer to specific subject areas such as PERSON and ORGANIZATION.

(3) These data models may be further broken down into many small diagram views, such as RECREATION-RESERVATIONS, LAW-ENFORCEMENT-OFFENSE, and TRUST-LAND.

(4) Regular published reports are produced from the USACE EDM that contains listings of data objects, data properties, definitions, and all associated metadata.

(5) For the development of new systems, the modification of existing systems, the integration of systems, or the migration of systems, the USACE EDM provides the single source of information about data standards that are to be used in these efforts. Use of the USACE EDM ensures that future systems have the greatest chance for improved interoperability and data integration.

i. Relationships:

(1) Relationships are associations between two data objects or between instances of the same data object. They typically describe a specific rule about the business and help to put data semantics into a clear and concise context. An example of a relationship appears in Figure 5, taken from the Law Enforcement business line model. This is an IDEF1X logical model showing three data objects, INCIDENT, INCIDENT-OFFENSE, and VICTIM-PERSON. They are represented by the boxes. There are two lines connecting the three data objects. One runs between INCIDENT and INCIDENT OFFENSE. The second line runs between INCIDENT and VICTIM-PERSON. Each of these lines represents a specific relationship between a pair of data objects. Identifying each line is a verb phrase that helps to specify a specific business statement about these two data objects.

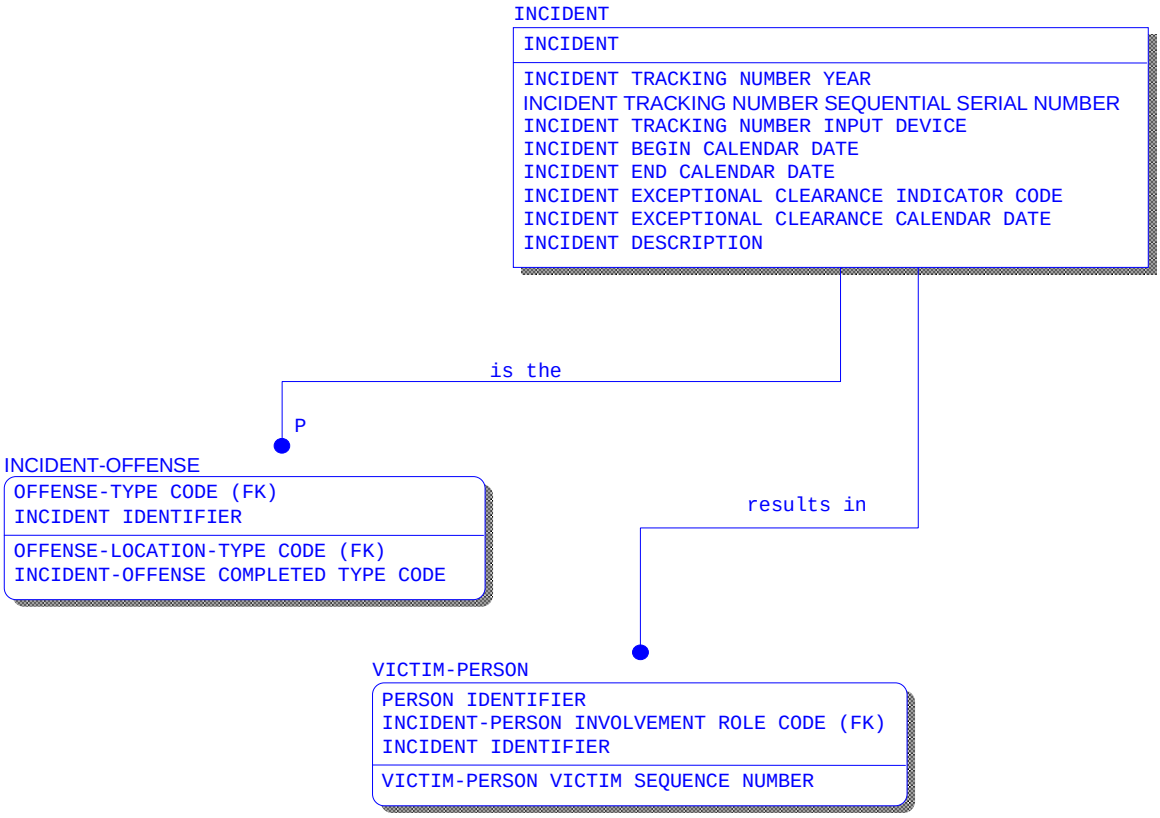


Figure 5 - Example Data Objects with relationships in a Data Model

(2) The line between the INCIDENT data object and the INCIDENT OFFENSE data object is labeled “is the result of” and the line between the INCIDENT data object and the VICTIM-PERSON data object is labeled “results in”.

(3) The power of these relationships is that they can be read like business statements. In this example, the two business statements would are “Each INCIDENT results in zero, one, or more VICTIM-PERSONs.;” and “Each INCIDENT is the result of one or more INCIDENT-OFFENSE.”

(4) Building logical data models, with specific relationships, adds a considerable amount of semantic meaning to data. It also makes it easier to validate data to ensure that one instance of data can be effectively compared and analyzed against a similar piece of data.

A-14. Data Standards Life Cycle. A primary feature of the standardization process is the phased approach to the maturity of a data standard. Data standards evolve through the following standardization phases as depicted in Figure 6. Data elements are assigned a corresponding "registration status" in the data repository.

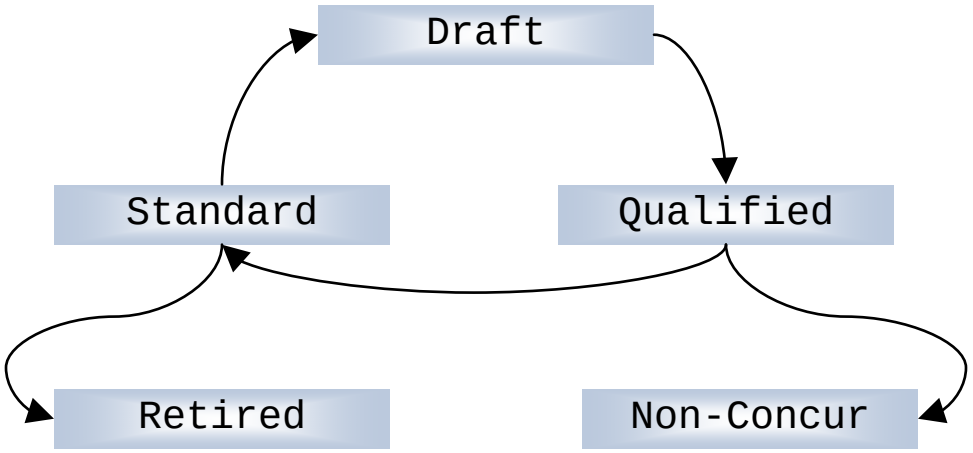


Figure 6 – Data Standards Life Cycle

a. Draft Phase. Data elements (entities and/or attributes) that have been documented in the USACE Data Repository for which metadata attributes may not yet be complete or reviewed by either a Business Data Steward or a Functional Data Steward. This indicates that the originator has not yet released a data element for formal data standardization. Draft data elements include both new data requirements and modifications to existing data standards. They may also include documented metadata about data elements that exist in legacy systems and in data exchange packages.

b. Qualified Phase. Only Data elements in this phase of the life cycle are qualified for formal cross-functional review. In this phase the USACE Command Data Administrator confirms the completeness of required metadata for the data elements (entities and/or attributes), and the Functional Data Steward confirms that all quality requirements are met.

c. Non-Concur Phase. Data items that have not passed the formal cross-functional review process fall into this phase. These items stay in the repository for historical and possible reuse when new data element requirements are created.

d. Standard Phase. Data elements (entities and/or attributes) have reached the standard phase upon completion of a formal cross-functional review sponsored by the appropriate principal data standard steward and facilitated by the USACE Command Data Administrator. As the official USACE data standards, these data elements are preferred for use in information exchange and in new or updated applications. These data elements have been coordinated among all the USACE business community that uses or creates instances of the data associated with the data objects and properties and there is general agreement as to its future use and adoption.

e. Retired Phase. Data elements (entities and/or attributes) that were formerly established, but are no longer recommended for use or are no longer needed to support the information needs of USACE are subject to retirement. The USACE Command Data Administrator periodically provides recommendation to the Functional Data Stewards on retirement of data standards that have not been used. The Functional Data Steward coordinates the recommendation with all appropriate business data stewards and Division/District/Lab/Office Data Architects before officially retiring data elements.

# Appendix B

## Data Standardization References

B-1. International Standards Organization (ISO)/International Electrotechnical Commission (IEC) 11179-1:2004(E), Information Technology—Specification and standardization of data elements, Part 1: Framework for the specification and standardization of data elements, 2004.

B-2. International Standards Organization (ISO)/International Electrotechnical Commission (IEC) 11179-2:2005(E), Information Technology—Specification and standardization of data elements, Part 2: Classification for data elements, 2005.

B-3. Federal Information Processing Standards (FIPS) PUB 183, "Integration Definition for Function Modeling (IDEF0)," December 21, 1993.

B-4. Federal Information Processing Standards (FIPS) PUB 184, "Specifications for Integration Definition for Information Modeling (IDEF1X)," December 21, 1993.

B-5. Federal Enterprise Architecture (FEA), The Data and Information Reference Model (DRM), Draft Version 1.0; Volume 1 – DRM Overview, February 2004.

B-6. The Government Paperwork Elimination Act (44 U.S.C. 3501-3504).

B-7. The Computer Matching and Personal Privacy Act of 1988 (P.L. 100-503), as amended, the Privacy Act of 1974, as amended (5 U.S.C. 552a (1995 and Supp. IV 1998).

B-8. Freedom of Information Act (FOIA) of 1966, as amended (5 U.S.C. 522).

B-9. Federal Participation in the Development and Use of Voluntary Consensus Standards and in conformity Assessment Activities (OMB Circular A-119).

B-10. International Standards Organization (ISO), International Electrotechnical Commission (IEC) 1087-2, Terminology work – vocabulary – Part 2: Computational aids in terminology.

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