Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) 3.0 Implementation Guidance
USACE SDSFIE Implementation Plan

1. Introduction

The Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) is the Department of Defense (DoD) spatial data standard for installation and civil works missions. This standard, recognized as an enterprise standard across the entire DoD business mission area, is managed by the Defense Installations Spatial Data Infrastructure Group (DISDIG). The standard was recently reengineered (version 3.0) to better align with DoD business needs. DoD Installation Geospatial Information and Services (IGI&S) Guidance Memorandum of April 2009 mandates that all IGI&S data conform to the most current version of the standard. SDSFIE 3.0 is a broad standard that covers business mission areas across the installations and environment (I&E) domain. This document establishes implementation guidance for the SDSFIE for USACE civil works mission areas. A list of definitions can be found in Appendix A.

2. Scope

This SDSFIE 3.0 Migration Guidance document is the USACE's official guidance for implementing the SDSFIE version 3. This document aligns with the guidelines outlined in the DISDIG’s Guidance for the Adaptation of SDSFIE 3.0.

3. References

DISDIG Guidance for the Adaptation of SDSFIE 3.0, 11 May 2011

DISDIG Strategy for the Development and Implementation of SDSFIE 3.0, October 2009


4. Roles and Responsibilities

- **USACE HQ Geospatial Coordinator**
  - Obtain approval of the USACE Adaptation from the DISDIG
  - Communicate implementation goals and objectives with USACE Divisions and Districts.
  - Develop policy and guidance for the implementation of the USACE Adaptation
  - Develop and maintain SDSFIE training materials for use by USACE Divisions
  - Make the USACE Adaptation available to users
  - Report conversion progress to USACE leadership and the DISDI Program
  - Provide SDSFIE Gold change requests to the DISDIG
  - Review USACE Adaptation change requests from the Data Standards Project Delivery Team (PDT) and accept or reject change requests in a timely manner
• Coordinate Data Standards PDT USACE Adaptation change requests with appropriate headquarters proponents for approval
• Approve USACE Adaptations

4.1. **Data Standards Program Development Team**
The Data Standards PDT is a representative group of individuals representing each division and meets as necessary. The working group discusses issues relating to all aspects of data standards including USACE SDSFIE Adaptation change requests, conversion tools change requests and issues, changes to the physical data model by individual users, and Adaptations created for use by a group of users. The Data Standards PDT also receives and discusses suggestions for improving training or incorporating new SDSFIE 3.x Gold requirements into the USACE HQ Adaptation.

• Convene as frequently as necessary
• Establish subgroups as necessary to focus on a specific business area of the model
• Record decisions and make records available to USACE GIS Community of Practice (CoP)
• Present working group recommendations to USACE GIS CoP
• Review changes made to USACE physical data models and evaluate the need to alter the USACE Adaptation
• Adhere to the Adaptation rules when developing new versions of the USACE Adaptation.

4.2. **USACE Divisions**
• Identify representatives to participate in the Data Standards PDT
• Develop a plan to implement the SDSFIE 3.x USACE Adaptation
• Provide an implementation plan to the USACE HQ Geospatial Coordinator
• Implement data conversion plan and report progress to the HQ Geospatial Coordinator
• Gather District feedback on the conversion process and submit it to the Data Standards PDT for resolution

4.3. **USACE Districts**
• Provide feedback on the USACE Adaptation and conversion process to the Division
• Convert data in accordance with Division’s implementation plan
• Adhere to USACE Adaptation physical implementation rules when incorporating district specific requirements into the physical data model
• Make converted data accessible to CorpsMap

5. **USACE Adaptation Rules**
USACE is required to develop a single component Headquarters (HQ) level Adaptation. The USACE HQ Adaptation will serve as the basis for all other USACE organization Adaptations. The USACE HQ Adaptation will adhere to all relevant SDSFIE policy and guidance, including the DISDIG Guidance.
for the Adaptation of SDSFIE 3.0. When establishing the initial SDSFIE 3.0 USACE HQ Adaptation and subsequent versions, USACE will, in addition to following relevant DoD guidance will abide by the USACE Adaptation Rules listed below.

Any USACE Organization can create a subordinate Adaptation to the USACE HQ Adaptation. Subordinate Adaptations will adhere to all relevant SDSFIE policy and guidance, including the DISDIG Guidance for the Adaptation of SDSFIE 3.0. The USACE HQ Adaptation must be used as the basis for a USACE Organization subordinate Adaptation. The person or group responsible for developing a subordinate Adaptation will submit the Adaptation to the USACE Data Standards PDT along with supporting documentation for review and approval. Supporting documentation should include drivers, justifications, related business systems or processes and a maintenance plan.

- The USACE HQ Adaptation will be a direct descendant of SDSFIE Gold.
- All Division, District, and subject area Adaptations shall be descendents of the USACE HQ Adaptation.
- The removal of feature types (profiling) from SDSFIE Gold is acceptable.
- The addition of feature types (extending) is acceptable only if they are not duplicative in name or definition with existing feature types in SDSFIE Gold. There must be a valid and documented reason for adding a feature type. Ensure that the following types of supporting documentation/business justifications exists for each and every extension of the SDSFIE Gold LDM (as appropriate):
  a) Cite specific laws, policy, or regulations which are driving the format of I&E spatial data elements being adapted.
  b) Cite specific business systems or processes used as a basis for extensions.
  c) Cite specific guidance or mechanisms to be used to maintain the Adaptation schema at the Implementation Level Organizations (ILO) level.
- The USACE HQ Adaptation will not contain requirements that are specific to a single district. Data Standards PDT members will closely review requirements that are specific to a group of districts or divisions to determine whether or not they belong in the USACE HQ Adaptation.
- Features having multiple geometries are allowable so long as these multiple geometries are identified as permissible in the SDSFIE Gold Standard. The naming convention must employ the use of the original feature name followed by an underscore and “P” for point, “L” for line, and “A” for area/polygon.
- The removal of the foundation SDSFIE attributes (i.e. sdsMetadataID, sdsID, sdsFeatureName, sdsFeatureDescription, and the model defined primary key (IDPK)) (profiling) from SDSFIE Gold is not acceptable.
- The addition of attributes (extending) is allowable. Added attributes must not be duplicative in name or definition with an existing attribute. There should be a valid and documented reason for adding an attribute. Ensure that the following types of supporting documentation/business justifications exists for each and every extension of the SDSFIE Gold LDM (as appropriate):
a) Cite specific laws, policy, or regulations which are driving the format of I&E spatial data elements being adapted.

b) Cite specific business systems or processes used as a basis for extensions.

c) Cite specific guidance or mechanisms to be used to maintain the Adaptation schema at the Implementation Level Organizations (ILO) level.

The data proponent for this attribute must be identified and documented and they must explain how they will be able to maintain this data in this feature type. The USACE Adaptation will not contain attribute requirements that are specific to a single district. Data Standards PDT members will closely review attribute requirements that are specific to a group of districts or divisions to determine whether or not they belong in the USACE Adaptation.

- Altering existing enumerations by profiling out values is permissible. However, if you wish to add new values to an enumeration, this requires a change request and is not permissible in an adaptation.
- Aliasing is allowable, but reasons behind doing so should be valid and documented.
- Adding subclasses is permissible. Reasons for adding subclasses should be valid and documented.
- All Adaptations must be created and registered with the SDSFIE Repository (this is managed by the SDSFIE Adaptor Tool on the SDSFIE website) before they can be used for Generation or Migration.
- An Adaptation must be reviewed, approved, and registered according to guidelines determined by the DISDIG and IGI&S community governance bodies. These governance bodies shall adjudicate all Adaptation rule interpretations, and shall consider rule changes as part of the SDSFIE change management process.
- Approved and registered Adaptations shall be considered part of the SDSFIE, and subject to DISDIG governance.
- Each new Release of the SDSFIE shall cascade downward to require a review of all SDSFIE Adaptations from the Prior Release.

6. **Adapting the USACE HQ Adaptation**

USACE organizations or subject matter experts may wish to create an Adaptation to the USACE HQ Adaptation. These Adaptations must be a direct descendant of the USACE HQ Adaptation and must undergo review and approval by the data standards PDT, USACE Geospatial Coordinator, and Headquarters proponents. Approved Adaptations will be accessible by all USACE users.

7. **Adaptation Process**

7.1. **Create the Adaptation.** All Adaptations are created from a parent Adaptation, be it a District creating an Adaptation from the USACE HQ Adaptation or a district creating an Adaptation from a Division Level Adaptation. The initial creation step involves selection of the Parent Adaptation (which must be approved), and the clicking of `<Create>` from the Adaptation Toolbar on SDSFIE.org. Initial creation permits “profiling” the Parent
Adaptation (removing features from the parent Adaptation).

7.2. **Extend the USACE Adaptation.** Additional feature types may be added into the Adaptation from other sources, including certain Prior Release Feature Types, as well as user defined Feature Types.

7.3. **Simple Feature Type modification.** Once all required Feature Types have been included in the Adaptation, the mode of the Adaptation tool changes to Adapting Feature Types.

7.4. **Full Feature Type Adaptation.** This permits full modification of attributes within the FeatureType, including ‘custom’ addition of a new attribute.

7.5. **Submit the Adaptation for Approval.** Required before the Adaptation can be uploaded to the SDSFIE repository on the SDSFIE website and fielded.

8. **USACE Adaptation Physical Implementation Rules**
USACE districts and divisions are required to use the SDSFIE 3.x USACE Adaptation as the basis for their physical data model (pdm). USACE users may make changes to the physical implementation of the SDSFIE 3.x USACE Adaptation provided they adhere to all relevant SDSFIE policy and guidance, including the rules described in this document. The intent of allowing flexibility in physical implementation is to meet local unique requirements for specific feature types, attributes or subclasses.

All changes made by users to the physical implementation of the USACE HQ Adaptation to create a district or division physical data model will be documented and will be considered for inclusion in the next version of the USACE HQ Adaptation.

8.1. **Feature Types**
Removing feature types from the physical implementation of the SDSFIE 3.x USACE Adaptation is acceptable if it is not applicable at a district or division. Adding feature types is permissible if they are not duplicative in name or definition with an existing feature type in SDSFIE 3.x Gold or the USACE Adaptation. If a user chooses to implement an additional geometry for an existing feature type, an abbreviation of the geometry will be added to the end of the feature type name. For example, the default geometry for the feature type Bridge is area. If a user wants to create a bridge point, they should name it Bridge_P. Bridge line should be named Bridge_L.

Feature type renaming is discouraged. Users are allowed to create views or aliases where necessary.

8.2. **Attributes**
The USACE prohibits removing attributes from the physical implementation of the SDSFIE 3.x USACE Adaptation. Adding an attribute is acceptable if it meets the following criteria:
- It is not duplicative in name or definition with an existing attribute in SDSFIE 3.x Gold or the USACE Adaptation.
- It is not duplicative in name or definition with an existing attribute in a business system (with the exception of foreign keys).

The USACE prohibits users from altering the definitions of existing attributes in the physical implementation of the SDSFIE 3.x USACE Adaptation.

The creation of subtypes is allowable, but only in feature types that do not already have a subtype.

8.3. **Subclasses**

The use of subclasses is allowable in the physical implementation of the SDSFIE 3.x USACE Adaptation. However, users may not create a subclass as a way to avoid subtypes. Users must retain all the attributes of the parent feature type, and if a user adds attributes to the subtype, they must meet the criteria described above. Subclass names will consist of the parent feature type name followed by a single keyword using Camel Case. A subclass name cannot exceed a length of 29 characters. For example, an acceptable subclass of SpecialStatusSpecies is SpecialStatusSpeciesEagle.

8.4. **Tracking Physical Data Model Changes**

Changes made by users to the physical implementation of the USACE Adaptation or a subordinate adaptation will be documented by the USACE HQ Geospatial Coordinator. Documented changes, to include the definitions of added feature types and attributes will be considered by the USACE HQ Geospatial Coordinator for incorporation into future versions of the USACE Adaptation or SDSFIE Gold.

9. **Change Management**

This document will be reviewed annually by the data standards PDT and updated as needed. Please provide all comments, issues, and suggestions to the USACE Geospatial Coordinator.

**Appendix A. Definitions**

**Adaptation:** Adaptations are formalized alterations to the Logical Data Model (LDM) resulting in a data schema which is tailored to the particular business requirements of an implementing organization/service. An Adaptation consists of a specific Profile and all the Extensions required to meet specific user requirements.

**Data Proponent:** An organization or staff element that has primary responsibility for material or subject matter expertise or charged with accomplishment of one or more functions. Data proponents are responsible for ensuring functional area policies and guidelines reflect requirements, business processes, and policies as established by USACE.
Data Standards Project Delivery Team (PDT): A sub-group of the USACE GIS CoP that focuses on geospatial data standards. The Data Standards PDT is a representative group of individuals from each division and meets as necessary. The working group discusses issues relating to all aspects of data standards including USACE SDSFIE Adaptation change requests, conversion tools change requests and issues, changes to the physical data model by individual users, and Adaptations created for use by a group of users. The Data Standards PDT also receives and discusses suggestions for improving training or incorporating new SDSFIE 3.x Gold requirements into the USACE HQ Adaptation.

Enumeration – Numeric values that are allowed in an attribute field of a feature type or in a non-spatial attribute table. Enumerations serve as a mechanism for enforcing data integrity. Enumerations were known as domain values in prior releases.

Extension: The addition of a new element (e.g. Feature Type or attributes) to the SDSFIE 3.0 LDM provided that element does not conflict with the definitions of elements already defined by higher authority (i.e. SDSFIE 3.0 Gold).

Feature Type: The table where geospatial data is stored. Feature types are sometimes called feature classes and in prior releases they were known as an entity types.

Foundation Attributes: Mandatory attributes that appear in all SDSFIE 3.0 Gold feature types.

Logical Data Model (LDM): A structured logical representation of business requirements validated and approved by business representatives which contains entities and relationships of importance within an organized framework, and business textual definitions and examples. The LDM is the basis of physical database design.

Physical Data Model (PDM): The representation of a data design typically derived from a logical data model that takes into account the character and constraints of a given database management system; includes all the database artifacts required to create relationships between tables or achieve performance goals, such as indexes, constraint definitions, linking tables, partitioned tables or clusters.

Profile: The selective removal of SDSFIE 3.x Gold elements, subject to any higher authority mandatory restrictions directing the removal of optional elements from SDSFIE Gold, to create an Adaptation.

Subclass: A new feature type that is derived from an existing feature type in SDSFIE 3.x Gold or SDSFIE USACE Adaptation. Subclasses maintain the same structure as the parent feature type.
**Subtype:** An ESRI construct that allows users to store similar features in a single feature class and to symbolize them according to an attribute domain. The attribute domain is required by ESRI to be a long integer.