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STANDARD PRACTICE FOR STANDARD LINEAR FORMAT (SLF) FOR DIGITAL CARTOGRAPHIC FEATURE DATA

AMSC N/A

AREA MCGT

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FOREWORD

DEPARTMENT OF DEFENSE

1. This Military Standard is approved for use by the Defense Mapping Agency, Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, Defense Mapping Agency, ATTN: ATIS, Mail Stop A-10, 8613 Lee Highway, Fairfax, VA 22031-2137 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

3. Each of the DMA's MC&G products represents a specialized view of the same real world. To this extent, at least, the products may be seen as different aspects of one product--a representation of the Earth. The differences between products are in the selection and portrayal of real-world features to reflect the theme (the intended use) of each product. Increasingly, these products are digital (i.e., in a form suitable for computer processing), at least at some stage in their production. Many are released to the customer in digital form.

4. The recognition of the interrelationship among products and the opportunities to maximize the effectiveness of DMA's personnel and technical resources by sharing data among computer systems and across product lines was a driver for the development of standard formats to facilitate data sharing. Moreover, DMA recognized a need for a portable, flexible, and efficient data structure for exchange and off-line storage of cartographic data.

5. Standard Linear Format (SLF) provides a standard format for digital cartographic feature data. It is designed for portability between computer systems, and is sufficiently flexible to accommodate various products at different stages in their production, and to support the unique requirements of many current and future products. The SLF is to become the common exchange format between production subsystems producing DMA digital cartographic feature products, excluding graphic plotters which require formats for processing efficiency. The SLF data structure is described in 4.1.

6. In a digital data base, the position of a cartographic feature is described numerically, with reference to some coordinate system, as a point (a single coordinate, with no dimension), a line (two or more coordinates with one dimension), or an area

(three or more coordinates delineating the boundary of a two-dimensional feature). Various methods have been employed for storing this coordinate information, particularly for areal features. The polygon data structure method represents areal features by a single coordinate string delimiting the entire feature. Although this traditional structure may be appropriate for some products (and may be the only structure possible for some systems), it does not adequately represent abutting areal features. This is true because the coordinate strings delineating the features are independent, making it impossible to ensure that the features abut precisely, with no overlap or gaps.

7. The chain-node data structure (also called link-node or segment-node) used in SLF solves this problem with abutting features by representing the common boundary between two areal features with one coordinate string, called a segment, which is shared by both features.

8. Portability (i.e., the ease of exchange between many different computer systems) is ensured by using Federal Information Processing Standards (FIPS), American National Standards Institute (ANSI) standard tapes, tape labels and the American Standard Code for Information Interchange (ASCII) character set, and by the selection of a physical block size which ensures whole-word transfers on computers of all common word lengths (8, 12, 16, 24, 32, 36, 48, and 60 bits).

9. Flexibility (i.e., the accommodation of different digital products at different stages of their production) is ensured in several ways:

a. SLF supports different coordinate systems, both geographic and Cartesian, with either two or three dimensions, using a variety of units and precisions of measurement.

b. SLF provides for the storage of descriptive information at the data set level. Not all fields are used for all SLF data types or for all products, but are provided to accommodate those that need them. SLF is structured to allow addition of new fields while retaining compatibility with earlier instances of SLF data files.

c. A variable-length feature header record is provided for product-specific descriptive information at the feature level. As it is product-specific, the length and contents of the Feature Header are defined in product-specific appendices, rather than by the SLF document.

d. Product-specific appendices are provided to describe the constraints imposed on the use of SLF for specific products. These appendices ensure that data sets stored in SLF are consistent with the requirements of the product specifications. These appendices are also intended to ensure that SLF is uniformly implemented for the products.

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1. PURPOSE

1.1 This document defines the Standard Linear Format (SLF) as used by the Modernization Production System (MPS) of the Defense Mapping Agency (DMA) Digital Production System (DPS).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are needed to meet the requirements specified in sections 3, 4, and 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all requirements documents cited in sections 3, 4, and 5 of this standard, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the current Department of Defense Index of Specifications and Standards (DODISS) and the supplement thereto, cited in the solicitation (see 5.2).

STANDARDS
FEDERAL

Federal Information Processing Standards Publications:

FIPS Pub 1-2 Code for Information Interchange, Its Representations, Subsets, and Extensions

(Copies of Federal Information Processing Standards (FIPS) are available to Department of Defense activities from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Others must request copies of FIPS from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161-2171).

SPECIFICATIONS
MILITARY

MIL-T-89304 Military Specification for Tactical Terrain Analysis Data Base (TTADB)

MIL-P-89305 Military Specifications for Planning Terrain Analysis Data Base (PTADB)

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094).

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

a. Product Specifications

SPEXDLMS2 PS/1CD/200 PS/1CE/200 PS/1CF/200 PS/1CG/200	Defense Mapping Agency Product Specifications for Digital Landmass System (DLMS) Data Base Defense Mapping Agency Aerospace Center and amendments
SPECXVOD PS/4GD/100	Defense Mapping Agency Specifications for Vertical Obstruction Data (VOD), Defense Mapping Agency Aerospace Center

(Copies of the above publications are available from the Defense Mapping Agency, ATTN: ATIS, ST A-10, 8613 Lee Highway, Fairfax, VA 22031-2137.

b. Modernization Production System (MPS) documents:

DMA-CCMP DMA Consolidated Configuration Management Plan (formerly DPS-SCM)

DMA-CCP Configuration Change Procedures (formerly DPS-SCM)

c. MARK 85 System Documents:

EIF15034 MARK 85 to Production Centers Interface Control Document.

(Copies of the above publications are available from the Defense Mapping Agency, ATTN: AT, ST D-80, 4600 Sangamore Rd, Bethesda, MD 20816-5003)

d. Defense Intelligence Agency

DIAM 65-5	Mapping, Charting and Geodesy Support System Data Elements and Related Features
DIAM 65-18	Geopolitical Elements and related Files
DIAM 65-19	Standard Security Markings Manual

(Copies of the above publications are available from the Defense Intelligence Agency, ATTN: DT-1A (C6-824), Washington, DC 20340-6161.)

2.3 Non-Government publications. The following document(s) form(s) a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 5.2).

American National Standards Institute Publications:

ANSI X3.4-1986	Code of Information Interchange
ANSI X3.27-1978	Magnetic Tape Labels and File Structure for Information Interchange
ANSI X3.39-1973	Recorded Magnetic Tape for Information Interchange (1600 CPI, PE)
ANSI X3.40-1973	Unrecorded Magnetic Tape for Information Interchange (9-track 200 and 800 CPI, NRZI, and 1600 CPI, PE)
ANSI X3.54-1976	Recorded Magnetic Tape for Information Interchange (6250 CPI, Group-Coded Recording)

(Application for copies should be addressed to American National Standard Institute, 1430 Broadway, New York, NY. 10018.

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes

precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

a. Areal feature - An areal feature is defined as a segment or series of segments consisting of delta coordinates referenced to the data set origin and defined by specific attributes.

b. Attribute - The categorized name of the MC&G representation of the physical and conceptual characteristics and/or properties of earth's objects and entities which are required by a Feature.

c. Chain-node - A data structure characterized by data in which one or more links are related to one or more features. The beginning and end points of each link are identified by node identifiers either explicitly or implicitly. (Also link-node or segment-node).

d. Feature - The MC&G representation of a physical (e.g., Bridge) or conceptual (e.g., Equator) object or entity of the real world which has one or more sets of coordinates required by a MC&G product.

e. Linear feature - A linear feature is defined as a segment or series of segments consisting of delta coordinates referenced to the data set origin and defined by specific attributes.

f. Node - The start and/or stop point of a segment. Each segment intersection (e.g., linear and area features) mandates a node. A point feature on any segment mandates a node. However, they are not required to be considered coincident features.

g. Point feature - An object whose location can be described by a single set of coordinates.

4. GENERAL REQUIREMENTS

4.1 SLF data structure. SLF may be thought of as two overlaying data structures: Spatial and Cartographic. The spatial structure associates cartographic features with their exact geometric placement. The cartographic structure acts as the

link between the spatial structure and the attributes of the real world. The cartographic structure is represented by map features. There are three basic map features: point, linear and area. Each cartographic feature contains an attribute list and pointers to chain(s) representing the spatial description of the feature.

4.2 Chain-node structure. Integral to SLF is the chain-node structure which requires that a segment (or chain) is stored only once, regardless of the number of features of which it is a part. This structure avoids the overlap and gap problems inherent in prior planimetric data structures (e.g., the polygon method). The chain-node data structure eliminates double storage of common boundaries, simplifies updates and correction, and is responsive to thinning and generalization algorithms. This concept is described in more detail in APPENDIX O - Implementing Interim Terrain Data (ITD) in 2-D SLF.

5. DETAIL REQURIEMENTS

5.1 File Characteristics.

The physical media and file structure conforms to the following Federal Information Processing Standards (FIPS) and related American National Standards Institute (ANSI) standards:

Unrecorded Tape	- ANSI X3.40-1973
Recorded Tape	- ANSI X3.54-1976 6250 fpi (Preferred)
	- ANSI X3.39-1973 1600 fpi PE
Tape Labels	- ANSI X3.27-1978
Character Set	- FIPS PUB 1-2 (ANSI X3.4-1986) ASCII All alphabetic characters are upper case.

5.2 Record Formats.

FIGURES 1 through 3 illustrate the physical and logical record structure. All data values are stored as 7-bit ASCII characters written in 8-bit bytes.

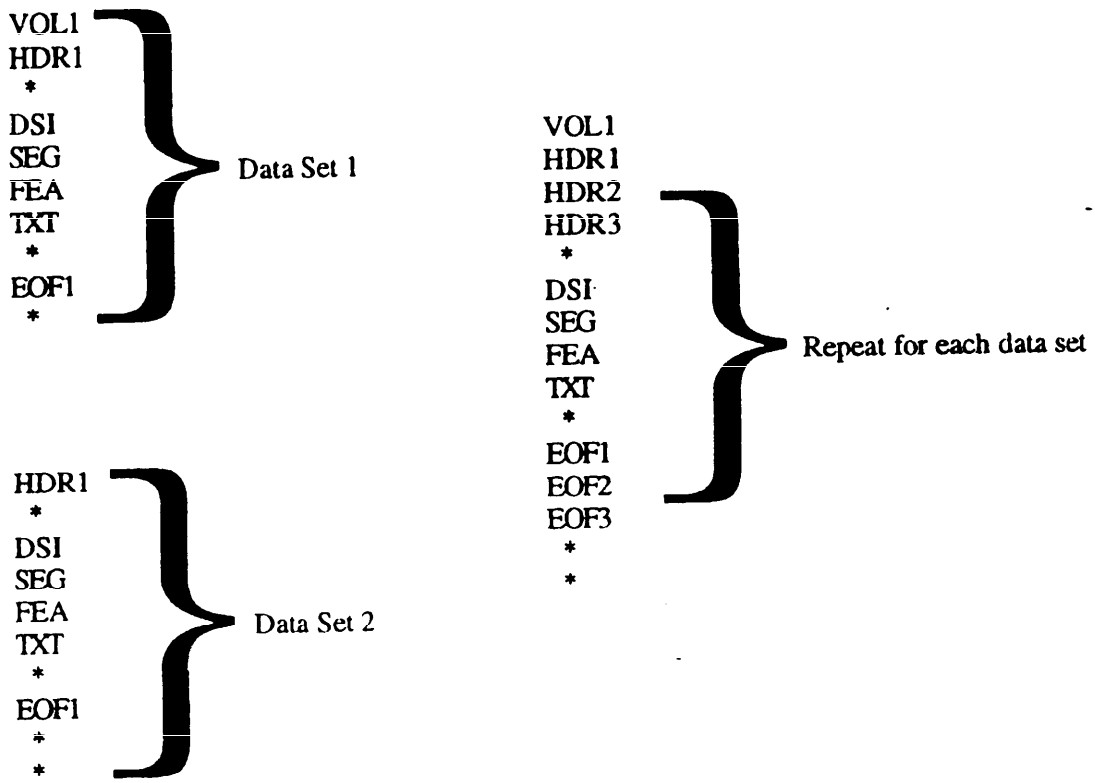
a. Tape Label Records

The tape label records and tape file structure conform to ANSI X3.27-1978 level one labels. The VOL1, HDR1 and EOF1 label

records are those generated by the computer systems which created the tape file. Tapes may contain one or more data set files (a multifile, single volume tape). Each data set is enclosed by a HDR/EOF label set. Currently, there is no provision for processing multi-reel volumes. Examples of tape file structures are shown in FIGURE 1.

b. Data Set Physical Blocks.

The physical data blocks are fixed at 1,980 bytes (characters) in length. Each begins with an 8-byte physical block header which consists of a 3-character sentinel that identifies the type of logical record data contained in the block (DSI, SEG, FEA or TXT), followed by a 5-digit number indicating the physical block sequence for that data type. This number starts at one for each different data type. The remaining 1,972 bytes (9 through 1,980) contain the logical record data as specified in 5.3 through 5.6 below. Unused bytes remaining at the end of the last physical block of each type are filled with ASCII DEL characters (octal 177). FIGURE 2 illustrates the relationship between physical blocks and logical records.



Note: It is allowable to write additional standard labels, but a system ignores and bypasses any additional labels it does not process.

FIGURE 1. Examples of tape file structure.

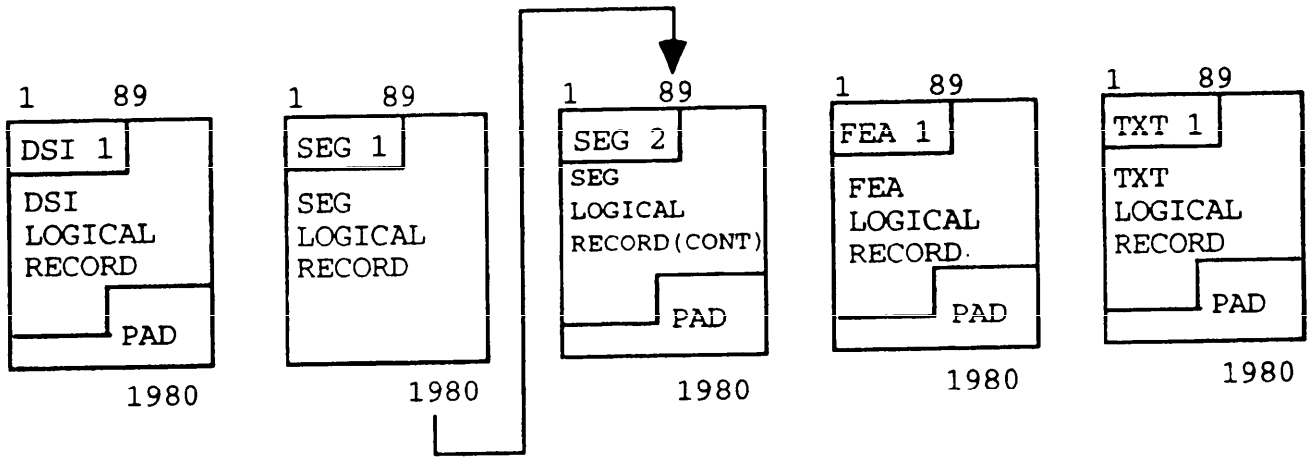


FIGURE 2. Example of physical and logical records.

There are four types of physical blocks. Within a data set, these block types are **not** separated by ANSI labels or file marks. It is **required** that they be on tape in the order listed below within each data set:

- All Data Set Identifier (DSI) blocks
- All Segment (SEG) blocks
- All Feature (FEA) blocks
- All Text (TXT) blocks, if any

c. Data Set Logical Records

There are three required logical records (DSI, SEG and FEA) and a fourth optional logical record (TXT) in each data set. Each logical record may be viewed as one continuous string of characters, fitted into bytes 9 through 1,980 of as many physical blocks as are needed to contain that logical record.

Each logical record may span more than one physical block, and data fields may be split between physical blocks. For example, the SEG logical record starts at byte 9 of the first SEG physical block (which contains the block header "*SEGbbbb1*" in the first 8 bytes). If that logical record requires more than 1,972 bytes, it will fill the first physical block through byte 1,980, then continue at byte 9 of the second SEG physical block (which

contains "*SEGbbbb*2" in the first 8 bytes). The SEG logical record would continue, filling bytes 9 through 1,980 of each succeeding SEG physical block, until it is exhausted. A physical block may contain only one type of logical record.

Sections 5.3 through 5.6 describe the contents of the logical records. The data items within each record are stored in the order listed. Field lengths are given in bytes (characters). FIGURE 3 shows the structure of the logical records.

d. Data Fields

All alphabetic characters are upper case except for the feature header within the FEA and TXT record. All alphanumeric fields are left justified, with trailing spaces, if needed, to fill the field. All numeric fields are right justified, with either leading zeros or leading spaces to fill the field. Negative numbers have a minus sign (-) immediately preceding the first digit. (For example, "-00123" and "-123" are acceptable, but not "-*bb*123".) Unsigned numbers are assumed positive. Unused data fields within the logical data records are filled with ASCII spaces (octal 040).

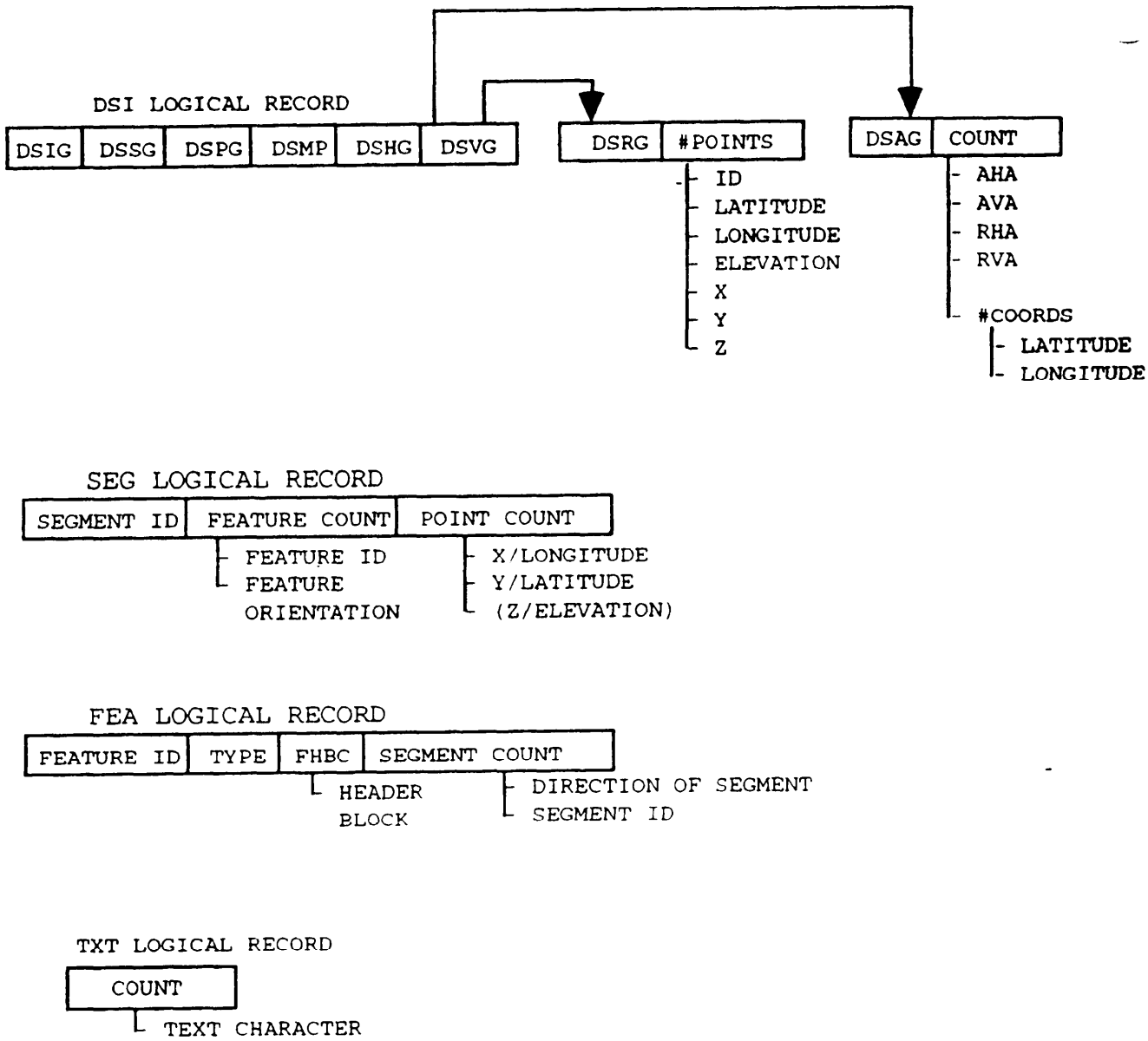


FIGURE 3. SLF logical record structure.

Geographic values in units of degrees (D), minutes (M), and seconds (S) which are carried to fractions of a second have an **implied** decimal point between the whole seconds and the fractional part. The hemisphere (H) is either north (N), south (S), east (E) or west (W). All other numeric values are integers (whole numbers) unless explicitly specified otherwise.

5.3 Data Set Identifier (DSI) Record.

The DSI record contains common descriptive information for the entire data set. It appears at the beginning of the data set and consists of one or more physical blocks, and the information within it applies only to the associated data set. The DSI record is divided into several groups as follows:

a. Data Set Identification Group (DSIG) -- Always present, uniquely identifies this particular data set

b. Data Set Security Group (DSSG) -- Always present, provides security classification, handling, and release information

c. Data Set Parameter Group (DSPG) -- Always present, provides parameters to interpret coordinates contained in the SEG record

d. Data Set Map Projection Group (DSMP) -- Always present

e. Data Set History Group (DSHG) -- Always present, provides information on data collection methods, source dates, and accuracies for the entire data set

f. Data Set Variable Field Address Group (DSVG) -- Always present, indicates the first character position of optional, variable-length groups. Address positions are numbered 1 through 1,980 for the first DSI physical block, 1,981 through 3,960 for the second DSI physical block, etc.

g. Data Set Registration Points Groups (DSRG) -- Optional, variable-length group. This group may be omitted if not required within the context of the particular data set.

h. Data Set Accuracy Group (DSAG) -- Optional, variable-length group. This group may be omitted if not required for the particular data set. The group allows for partitioning of the data set into subregions with different accuracies. It is not used if one accuracy applies to the entire data set.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
		Data Set Identification Group
DSIG	4	Data Set Identification Group (DSIG)
Product Type	5	DMA series designator, or product type and level
Data Set ID	20	Name of this data set; e.g., unique data set reference number
Edition	3	Edition number of the data set (1 through 999)
Compilation Date	4	Date this data set was compiled (YYMM)
Maintenance Date	4	Date this data set was updated/revised (YYMM)
SLF Version Date	6	Date of the SLF version which applies to this data set (YYMMDD). For the original (830516) version, may be spaces
DMAFF Version Date	6	Date of DMAFF version which applies to feature headers in this data set (YYMMDD). Spaces if DMAFF is not applicable
DSIG Reserve	28	For future use
		Data Set Security Group
DSSG	4	Data Set Security Group (DSSG)
Security Classification	1	Security classification code: "T" = TOP SECRET "S" = SECRET "C" = CONFIDENTIAL "F" = For Official Use Only (Caveat) "R" = Restricted (NATO Definition) "U" = Unclassified

Security Release	2	Security control and release code, for DoD use only. See DIAM 65-19. Blanks are acceptable as specified in the appendices

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
		Data Set Security Group - Continued
Downgrading/ Declassification Date	6	Declassify on: DDMMYY (date) or "OADR" (Originating Agency's Determination Required). Blanks are acceptable as specified in the appendices
Security Handling	21	Security handling description, for DoD use only
DSSG Reserve	40	For future use
		Data Set Parameter Group
DSPG	4	Data Set Parameter Group (DSPG)
Data Type	3	"GEO" for geographic coordinate data, "DIG" for digitized graphic data (TABLE coordinates), "MAP" for map projection coordinates. See Glossary for expanded definitions
Horizontal Units of Measure	3	Measuring system for the horizontal coordinates in this data set; e.g., "IN" for inches, "UM" for micrometers, "SEC" for geographic seconds. (See APPENDIX C.)
Horizontal Resolution Units	5	Number of units of measure which constitute the least count of the horizontal coordinate system; e.g., "0.004", "80.0", etc. The decimal point is required
Geodetic Datum	3	The reference system code for horizontal positions in this data set. (See APPENDIX B.)
Ellipsoid	3	The ellipsoid to which the horizontal datum is referenced. (See APPENDIX E.)

Vertical Units of Measure	3	Measuring systems for the vertical coordinates (if any) in this data set. (See APPENDIX C.) If this field contains spaces, the SEG record will contain coordinate pairs (X, Y) rather than triplets (X, Y, Z)

Data Set Parameter Group - Continued

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Vertical Resolution Units	5	Number of units of measure which constitute the least count of the vertical coordinates system; e.g., "0.1", "1.0", etc. The decimal point is required. If fathoms and feet (FF) are used, the digit to the right of the decimal indicates feet
Vertical Reference System	4	The vertical reference system code for elevations in this data set. (See APPENDIX B.)
Sounding Datum	4	The code for the designation of a plane to which soundings are referenced
Latitude of Origin	9	DDMMSSSSH, Latitude to which all geographic delta coordinates in the data set are referenced
Longitude of Origin	10	DDDMMSSSSH, Longitude as above
X Coordinate of Origin	10	False origin X-value of projection in same units and resolution as Horizontal Units of Measure and Horizontal Resolution Units
Y Coordinate of Origin	10	False origin Y-value of projection in same units and resolution as Horizontal Units of Measure and Horizontal Resolution Units

Data Set Parameter Group - Continued.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Z Coordinate of Origin	10	Evaluation or depth value from which all Z-values in the segment records are measured (in same units and resolution as Vertical Units of Measure and Vertical Resolution Units)
Latitude of SW Corner	9	Southernmost latitude of data set, DDMMSSSSH
Longitude of SW Corner	10	Westernmost longitude of data set, DDDMMSSSSH
Latitude of NE Corner	9	Northernmost latitude of data set, DDMMSSSSH
Longitude of NE Corner	10	Easternmost longitude of data set, DDDMMSSSSH
Total Number of Features	6	Total number of features in this data set
Number of Point Features	6	Total number of point features this data set
Number of Linear Features	6	Total number of linear features in this data set
Number of Areal Features	6	Total number of areal features this data set
Total Number of Segments	6	Total number of segments contained in the SEG records of this data set
DSPG Reserve	40	For future use

Data Set Map Projection Group

This group is only required in a "MAP" type data set. It may be used in a "DIG" data set to capture parameters for later use, and may be retained in a "GEO" data set for historical information. If not required, the Projection code, Projection Parameters, and Scale may be spaces.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
DSMP	4	Data Set Map Projection (DSMP)
Projection	2	Code identifying the map projection of this data set. Blank for geographic coordinates. (See APPENDIX A.)
Projection Parameter 1	10	See APPENDIX A.
Projection Parameter 2	10	See APPENDIX A.
Projection Parameter 3	10	See APPENDIX A.
Projection Parameter 4	10	See APPENDIX A.
Scale	9	Scale reciprocal of X, Y digitized data or map projection coordinates
DSMP Reserve	40	For future use
	Data Set History Group	
DSHG	4	Data Set History Group (DSHG)
Edition Code	3	First two digits are recompilation count, the third is revision count
Project	15	DMA project specification stock Specification number (e.g., "SPECXDLMS2")
Specification Date	4	Product specification data (YYMM). Indicates date of change/amendment to specification to reflect the version used to produce this data set

Data Set History Group - Continued.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Specification Amendment Number	3	Amendment number (001-999) to the project specification
Producer	8	Country, agency, and branch which produced this data set (CCAAABBB); e.g., "US090078". The first two characters (left justified) indicate the producing nation and are from the DIAM 65-18, Geopolitical Elements and Related Files. The last 6 characters are to be used at the discretion of the producer and may be blank, e.g., US090078, unless otherwise specified by the appendices
Digitizing System	10	System on which this data set was primarily digitized; e.g., "AGDS", etc.
Processing System	10	Last system which processed (transforming, reformatting, etc.) this data set; e.g., "SPERRY", "CPS". Blank for raw data
Grid System	2	Code identifying grid system of the data set. Blank for geographic coordinates. (See APPENDIX D.)
Absolute Horizontal Accuracy	4	Circular error (90%) of horizontal position with respect to specified datum
Absolute Vertical Accuracy	4	Linear error (90%) of vertical position with respect to specified datum

Relative Horizontal Accuracy	4	Circular error (90%) of horizontal position excluding any error in datum. The error in position of one object with respect to another
Relative Vertical Accuracy	4	Linear error (90%) of vertical position excluding any error in datum. The error in position of one object with respect to another
Height Accuracy	4	Linear error (90%) of feature height measurement. Absolute accuracy of heights (above ground level), in whole meters
Data Generalization	1	"0" for raw data. "1" for thinned data (enter explanation in text record)
North Match/Merge Number	1	Number of times this data set has merged with the adjacent data to the north side
East Match/Merge Number	1	East side
South Match/Merge Number	1	South side
West Match/Merge Number	1	West side
North Match/Merge Date	4	YYMM (year/month)
East Match/Merge Date	4	YYMM (year/month)
South Match/Merge Date	4	YYMM (year/month)
West Match/Merge Date	4	YYMM (year/month)

needed to meet the requirements specified in sections 4, and 5

Year & Month of Earliest Source	4	Numeric year and month of earliest source material (YYMM). May be spaces if not required by product specification
Year & Month of Latest Source	4	Numeric year and month of latest earliest source source material (YYMM). May be spaces if not required by product specification
Data Collection Code	1	Numeric code indicating data collection criteria as specified in product specification (0-9). May be spaces if not required by product specification
Data Collection Criteria	3	Numeric data collection criteria as specified in product specification (0-999). May be spaces if not required by product specification
Data Conversion Code	3	Numeric code indicating data conversion as specified in product specification (0-999). May be spaces if not required
DSHG Reserve	25	For future use

Data Set Variable Field Address Group

DSVG	4	Data Set Variable Group (DSVG)
Registration Points Address	5	First character position of the Registration Points Group (if one exists).Spaces if the group does not exist
Accuracy Subset Address	5	First character position of the Accuracy Subset Group (if one exists). Spaces if the group does not exist
DSVG Reserve	40	For future use

Data Set Registration Points Group

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
DSRG	4	Data Set Registration Group (DSRG)
Number of Registration Points	3	Number of registration or diagnostic points which follow

NOTE: The following 51-byte subrecord repeats for each registration or diagnostic point. The number of occurrences is the Number of Registration Points, above.

Data Set Registration Points Group

Point ID	6	Point identification number
Latitude	9	DDMMSSSSH, Latitude of control or diagnostic point
Longitude	10	DDDMMSSSSH, Longitude of control or diagnostic point
Elevation	8	Elevation of control or diagnostic point, relative to the specified vertical datum, in centimeters (May be blank)
X-coordinate	6	X-coordinate of digitized registration or control point
Y-coordinate	6	Y-coordinate of digitized registration or control point
Z-coordinate	6	Z-coordinate of digitized registration or control point (May be spaces)

NOTE: If this is a geographic data set (indicated by "GEO" in the Data Type field of the DSPG), the X, Y coordinates will be blank and the geographic coordinates, if any, are to be considered diagnostic points derived via the collection system.

The X, Y, and Z coordinates are relative to the X, Y, Z origin specified in the DSPG.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
		Data Set Accuracy Group
DSAG	4	Data Set Accuracy Group (DSAG)
Multiple Accuracy Outline Count	2	Number of Multiple Accuracy Outlines

NOTE: An accuracy outline is a subset area with an associated estimate of horizontal and/or vertical accuracy based on source material or production process used. If the Multiple Accuracy Outline Count is greater than zero, the following subrecord repeats for each Multiple Accuracy Outline. The number of occurrences is equal to the value in the Multiple Accuracy Outline Count data field, shown above.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Absolute Horizontal Accuracy	4	Absolute Horizontal Accuracy, meters
Absolute Vertical Accuracy	4	Absolute Vertical Accuracy, meters
Relative Horizontal Accuracy	4	Relative Horizontal Accuracy, meters
Relative Vertical Accuracy	4	Relative Vertical Accuracy, meters
Number of Coordinates	2	Number of coordinates in accuracy outline which follows

NOTE: The following geographic coordinate pair is repeated for each coordinate in this accuracy outline. The number of occurrences is equal to the value in the Number of Coordinates data field, shown above.

Latitude	9	DDMMSSSSH
Longitude	10	DDDMMSSSSH

5.4 Segment (SEG) Record.

The SEG record contains the actual coordinate strings for the segments which make up the features. This record consists of one or more physical blocks.

Cross-referencing multiple features and their attributes to a segment is accomplished by including with each segment a list of all coincident features to which the segment belongs. (See APPENDIX F).

The following segment subrecord is repeated for each segment in the data set. The number of occurrences is equal to the value in the Total Number of Segments data field, shown in the DSI record.

Segment IDs are integers "greater than zero" used only as SLF pointers. They bear no relationship to any digital product specification. There is no requirement for segment IDs to be sequential or to start with a specific value.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Segment ID	6	Unique identification number of this segment (key used in FEA record)
Feature Count	2	Count of features to which this segment belongs
Feature ID	6	Unique identification number of feature to which this segment belongs
Feature Orientation	1	The feature being represented is to the left "L", right "R", or coincident C" with the line segment. Feature orientation of a point is defined as "C".

NOTE: The Feature ID and Feature Orientation fields above are repeated for each feature to which this segment belongs. The number of occurrences is the Feature Count.

Point Count	5	Count of coordinate sets which follow
X-value	6	X-coordinate or Longitude, in units described in DSI record
Y-value	6	Y-coordinate or Latitude, in units described in DSI record

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Z-value (optional)	6	Z-coordinates or Elevation, in units described in DSI record

NOTES: The X, Y, and optional Z value fields are repeated for each point in the segment. The number of occurrences is the Point Count.

SLF is designed to accommodate data sets with either two-dimensional or three-dimensional coordinates. If the Vertical Units of Measure field in the DSI record is spaces, the Z-value field above **will not** exist; the coordinates are two-dimensional (X, Y or lambda, phi pairs). If it is not spaces, the Z-value field **will** exist; the coordinates are three-dimensions (X, Y, Z or lambda, phi, elevation triplets).

If this is a geographic data set (indicated by "GEO" in the Data Type field of the DSI record), the X and Y coordinates are the delta longitude and delta latitude, respectively, referenced to the origin defined in the DSI record. If it exists, the Z coordinate represents the elevation with reference to the Vertical Datum specified in the DSI record. X and Y values are always positive. Z values may be negative for elevations below vertical datum.

5.5 Feature (FEA) Record.

The FEA record contains identifying and descriptive information for each feature in the data set, along with a list of keys to the segments (coordinate strings) which make up the features. This record consists of one or more physical records.

The following feature subrecord is repeated for each feature in the data set. The number of occurrences is the Total Number of Features in the DSI record.

Feature IDs are integers "greater than zero" used only as SLF pointers. They bear no relationship to any digital product specification or to any data within the Feature Header field. There is no requirement for feature IDs to be sequential or to start with any specific value.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Feature ID	6	Unique identification number for the feature

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Feature Type	1	"P" Point, "L" Linear, "A" Areal
Feature Header Block Count	2	Number (n) of 40-byte blocks in the Feature Header Field
Feature Header	40*n	Feature descriptive information (as required by product specification)
Segment Count	3 or 5 (See Note)	Number of segments that make up this feature
Direction of Segment	1	"F" - For the same order as stored; "R" - For reverse of stored order; "D" - For a disjoint the same order as stored "E" - For a disjoint reverse of stored order; "I" - For an inside the same order as stored; "J" - For an inside reverse of stored order
Segment ID	6	Unique identification number of the segment (key to SEG record)

NOTES: the length of the Segment Count field is three digits for 2-dimensional data sets, five digits for 3-D.

The Direction of Segment ID fields, above, are repeated for each segment belonging to the feature. The number of occurrences is the Segment Count.

The Segment ID list for the feature is ordered such that the segments "track" the feature continuously from beginning to end.

Area features always follow the "feature left" convention; i.e., an observer traversing the feature boundary in the logical forward direction would see the feature on his left. The logical forward direction described by the ordering of segment coordinates either as stored (when the Direction of Segment is F, D, or I) or the reverse of the order as stored (when the Direction of Segment is R, E, or J).

For areal and linear features having more than one segment, explicit joining of segments is required; i.e., the first and last coordinates of adjoining segments are coincident, except for the beginning segment of a disjoint or island part of a feature (see

below). For isolated areal features consisting of only one segment, the first and last coordinates are coincident.

The Direction of Segment field of the FEA (Feature) Record can contain the following values:

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
		"F" - Forward: Used for the beginning segment of a feature and any subsequent segments except where "D", "E", "I", and "J", as defined below are used (See FIGURE 4a)
		"R" - Reverse: Used for the beginning segment of a feature and any subsequent segments except where "D", "E", "I", and "J", as defined below are used (See FIGURE 4b)
		"D" - Disjoint Forward: Used for the beginning segment of a disjoint part of an area or linear feature (See FIGURE 4c)
		"E" - Disjoint Reverse: Used for the beginning segment of a disjoint part of an area or linear feature (See FIGURE 4d)
		"I" - Inside forward: Used for the beginning segment of a hole or island within an area feature (See FIGURE 4e)
		"J" - Inside Reverse: Used for the beginning segment of a hole or island within an area feature (See FIGURE 4f)

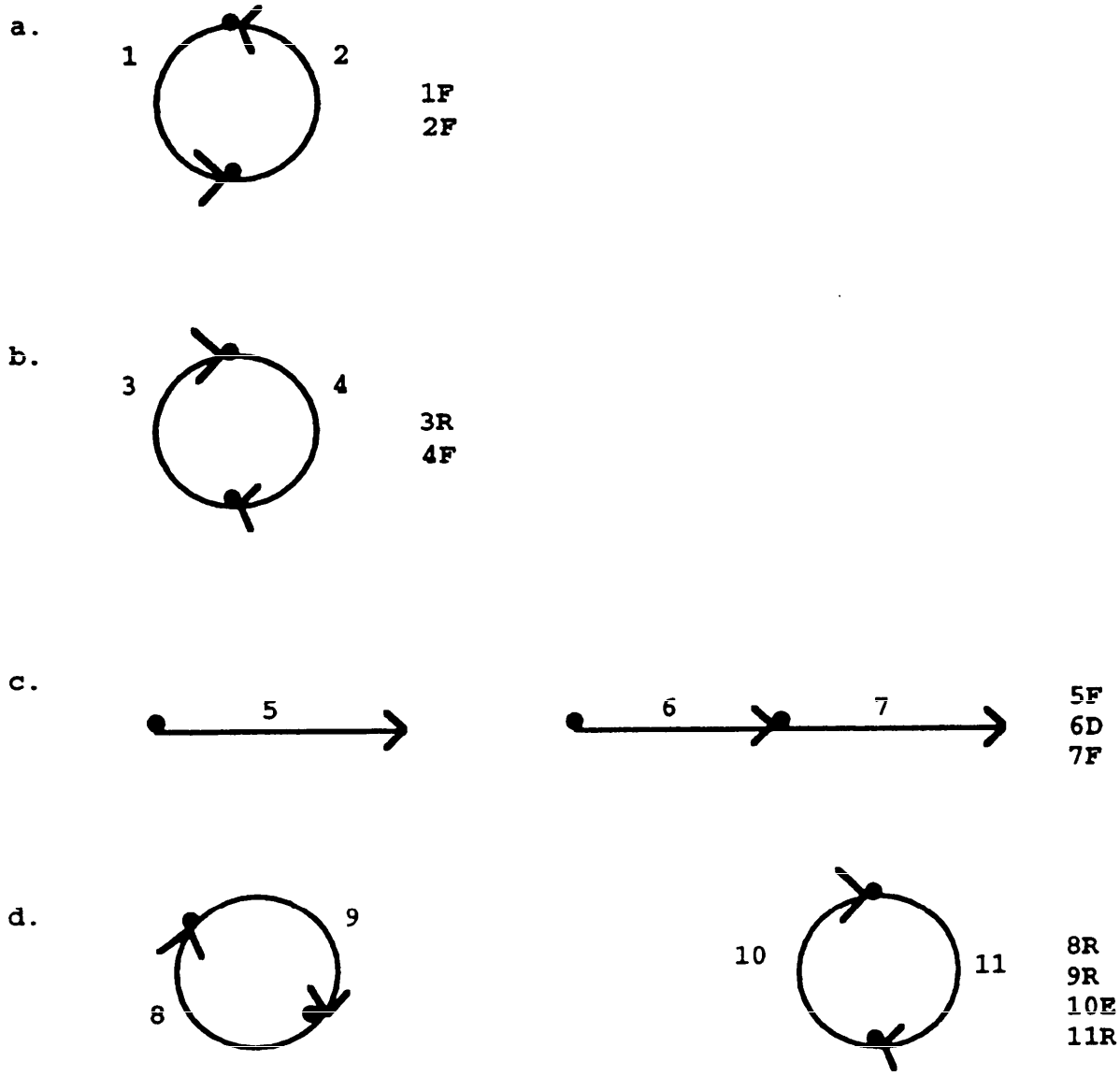
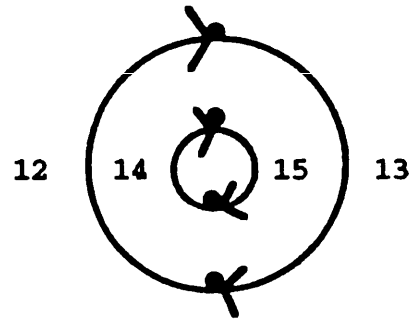


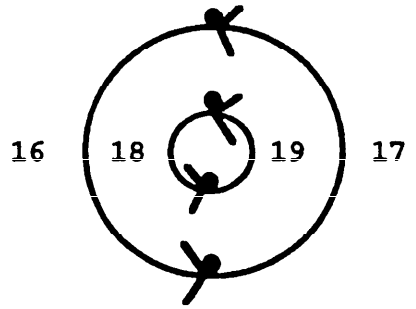
FIGURE 4. Examples of segment direction.

e.



12R
13R
14I
15F

f.



16F
17F
18J
19R

FIGURE 4. Examples of segment direction - Continued

Multiple segment point features are allowed (i.e., a point (type "P") feature may reference more than one segment). Each such segment may have only one coordinate set. For example, any identical point features may be represented as multiple SEG (segment) records pointing to a single FEA (feature) record.

The length (i.e., Feature Header Block Count) and contents of the Feature Header field are dependent on the particular product specification. They are defined in the appropriate product APPENDIX.

5.6 Text (TXT) Record.

The TXT record(s) is optional, and may contain free-format textual information regarding the data set and/or particular features within it. It is unique in that it is intended to be printed for reading by a person, rather than to be interpreted by a computer program.

The security classification of information in the TXT record(s) shall not exceed the overall classification of the Data Set, as indicated by the data Set Security Group (DSSG) in the DSI record.

FIELD NAME	LENGTH	DESCRIPTION OF CONTENTS
Character Count	4	Length (n), of character string which follows within this TXT physical record
Text	n	Character string, up to 1,968 bytes long

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This Standard is intended to become the common exchange format between production subsystems producing DMA digital cartographic feature products.

6.2 Acquisition requirements. When this specification is used in acquisition, the applicable issue of the DODISS must be cited in the solicitation (see 2.1.1 and 2.2).

6.3 Supersession data. This Standard supersedes DPS-SLF-A, Defense Mapping Agency Digital Production System Standard Linear Format (SLF) for Digital Cartographic Feature Data, 23 November 1990

6.4 International standardization agreements.

This section is not applicable to this Standard.

6.5 Subject term keyword listing.

Data Set Identifier
Feature
Segment
SLF Data Structure
Tape Label Record
Text

APPENDIX A
PROJECTION CODES AND PARAMETERS

A.1. SCOPE

A.1.1 Scope. This APPENDIX defines the allowable codes and parameters for Project Group fields of the DSI record. The projection code and parameters are necessary for conversion of digitized map coordinates to geographic coordinates. All latitudes are expressed as DDMMSSSSH. All longitudes are expressed as DDDMMSSSSH. This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

A.2. APPLICABLE DOCUMENTS

A.2.1 Government documents.

A.2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Defense Intelligence Agency

DIAM 65-5	Mapping, Charting and Geodesy Support System Data Elements and Related Features

(Copies of the above publications are available from the from the Defense Intelligence Agency, ATTN: DT-1A (C6-824), Washington, DC 20340-6161.)

A.2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

A.3. PROJECTION CODES AND PARAMETERS LIST

NOTE: This list is not all-inclusive, but represents commonly used projections. For additional codes, refer to DIA Manual 65-5.

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PROJECTION NAME	PROJECTION CODE	PARAMETERS			
		1	2	3	4
Albers Equal Area	AC	Central Meridian	Std. Parallel Nearest to Equator	Std. Parallel Farthest from Equator	-
Azimuthal Equal Area	AK	Longitude of Tangency	Latitude of Tangency	-	-
Azimuthal Equal Distant	AL	Longitude of Tangency	Latitude of Tangency	-	-
Gnomonic	GN	Longitude of Tangency	Latitude of Tangency	-	-
Hotline Oblique Mercator	RB	Longitude of Great Circle	Latitude of Great Circle	Azimuth of Great Circle	-
Lambert Conformal Conic	LE	Central Meridian	Std. Parallel Nearest to Equator	Std. Parallel Farthest from Equator	-
Lambert Equal Area	LJ	Central Meridian	-	-	-
Mercator	MC	Central Meridian	Latitude of True Scale	-	-
Oblique Mercator	OC	Longitude of Great Circle	Latitude of Great Circle	Azimuth of Great Circle	-

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PROJECTION NAME	PROJECTION CODE	PARAMETERS			
		1	2	3	4
Polar Stereo-graphic	PG	Central Meridian	Latitude of True Scale	-	-
Polyconic	PH	Central Meridian	-	-	-
Transverse Mercator	TC	Central Meridian	-	-	-

APPENDIX B

DATUMS

B.1. SCOPE

B.1.1 Scope. This APPENDIX list the datums which may be used, and the codes (abbreviations) which may appear in the Geodetic Datum, Sounding Datum, and the Vertical Reference System fields of the DSI record. This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

B.2 APPLICABLE DOCUMENTS

B.2.1 Government documents.

B.2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Defense Intelligence Agency

DIAM 65-5	Mapping, Charting and Geodesy Support System Data Elements and Related Features

(Copies of the above publications are available from the Defense Intelligence Agency, ATTN: DT-1A (C6-824), Washington, DC 20340-6161.)

B.2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

B.3. GEODETIC DATUMS AND CODE LIST

NOTE: This list is not all-inclusive; refer to DIAM 65-5.

	Geodetic Datums	Code
1.	Adindan	ADI
2.	Arc 1950	ARF
3.	Australian Geodetic	AUA

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4.	Bukit Rimpah	BUR
5.	Camp Area Astro.	CAZ
6.	Camp Inchauspe	CAI
7.	Chua Astro	CHU
8.	Corrego Alegre	COA
9.	Djakarta	BAT
10.	European 50	EUR
11.	G. Segara	GSE
12.	G. Serindung	GSF
13.	Geodetic 1949	GEO
14.	Ghana	GHA
15.	Guam 1963	GUA
16.	Herat North	HEN
17.	Hjorsey	HJO
18.	Hu-tzu-shan	HTN
19.	Indian	IND
20.	Ireland 1965	IRE
21.	Kertau	KEA
22.	Liberia 1964	LIB
23.	Local Astro	LOC
24.	Luzon	LUZ
25.	Merchich	MER
26.	Montjong Lowe	MOL
27.	Nigeria	NIG
28.	North American 1927	NAS
29.	North American 1983	NAX
30.	Old Hawaiian	OHA
31.	Ordinance Survey of Great Britain	OGB
32.	Provisional South American 1956	PRP
33.	Qornoq	QUO
34.	Sierra Leone 1960	SIB
35.	Tananarive Obsv. 1925	TAN
36.	Timbalai	TIL
37.	Tokyo	TOK
38.	Voirol	VOI
39.	World Geodetic System 1960	WGA
40.	World Geodetic System 1966	WGB
41.	World Geodetic System 1972	WGC
42.	World Geodetic System 1984	WGE
43.	Yacare	YAC
44.	Hermannskogel	HER
45.	European 79	ENB
46.	German	GDA

	Sounding Datums	Code
1.	Mean High Water	MHW
2.	Mean High Water Neaps	MHWN
3.	Mean High Water Springs	MHWS

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4.	Mean Higher High Water	MHHW
5.	Mean Low Water	MLW
6.	Mean Low Water Neaps	MLWN
7.	Mean Low Water Springs	MLWS
8.	Mean Lower Low Water	MLLW

	Vertical Reference System	Code
1.	Mean Sea Level (All elevations in the data set are referenced to the geoid of the specified datum.)	MSL
2.	Geodetic (All elevations in the data set are referenced to the ellipsoid of the specified datum.)	GEOD

AC measurements can be performed; however, they require more sophisticated instrumentation

APPENDIX C

UNITS OF MEASURE

C.1. SCOPE

C.1.1 Scope. This APPENDIX list allowable units of measure which can be used, and their codes (abbreviations) in the various Units of Measure fields of the DSI record. This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

C.2. APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

C.3. UNITS OF MEASURE

Unit		Code
1.	Centimeters	CM
2.	Decimeters	DM
3.	Degrees of Arc	DEG
4.	Fathoms	FM
5.	Feet	FT
6.	Fathoms and Feet	FF
7.	Inches	IN
8.	Kilometers	KM
9.	Meters	M
10.	Micrometers	UM
11.	Millimeters	MM
12.	Minutes of Arc	MA
13.	Nautical Miles	NM
14.	Seconds of Arc	SEC
15.	Statute Miles	MI
16.	Yards	YD

APPENDIX D

GRIDS

D.1. SCOPE

D.1.1 Scope. This APPENDIX list grids which may be used, and their codes (abbreviations) in the Grid System field of the DSI record. This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

D.2. APPLICABLE DOCUMENTS

D.2.1 Government documents.

D.2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Defense Intelligence Agency

DIAM 65-5	Mapping, Charting and Geodesy Support System Data Elements and Related Features

(Copies of the above publications are available from the from the Defense Intelligence Agency, ATTN: DT-1A (C6-824), Washington, DC 20340-6161.)

D.2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

D.3. GRID SYSTEM

NOTE: This list is not all-inclusive; refer to DIAM 65-5,

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	Grid	Code
1.	National Grid of Great Britain	ND
2.	Irish Transverse Mercator Grid	IK
3.	French Lambert Grid	FL
4.	India Zone	IN
5.	Ceylon Belt (Transverse Mercator)	CE
6.	Madagascar Grid (Laborde)	MO
7.	Malayan Rectified Skew Orthomorphic Grid	MG
8.	Netherlands East Indies Equatorial Zone British Metric Grid (Lambert)	NM
9.	New Zealand Belt	NZ
10.	Universal Transverse Mercator	UT
11.	Various U.S. State Plane	(See DIAM 65-5)
12.	Gauss-Kruger Grid (Transverse Mercator)	GK

APPENDIX E

ELLIPSOIDS

E.1. SCOPE

E.1.1 Scope. This APPENDIX list the ellipsoids which may be used and their codes (abbreviations) in the Ellipsoid field of the DSI record. This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

E.2. APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

E.3. ELLIPSOIDS AND CODES

	Ellipsoid	Code
1.	Airy	AAY
2.	Australian National	AUN
3.	Bessel	BES
4.	Clarke 1866	CLK
5.	Clarke 1880	CLJ
6.	Everest	EVE
7.	Fisher	FIS
8.	Geodetic Reference System 1980	GRS
9.	International	INT
10.	Modified Airy	AAM
11.	Modified Everest	EVM
12.	Walbeck	WAL
13.	World Geodetic System 1960	WGA
14.	World Geodetic System 1966	WGB
15.	World Geodetic System 1972	WGC
16.	World Geodetic System 1984	WGE
17.	Clark 1858	CLE
18.	Krasovsky	KRA

APPENDIX F

COMPARISON OF SLF CHAIN-NODE AND POLYGON DATA STRUCTURES

F.1. SCOPE

F.1.1 Scope. An important feature of SLF is a zero-overlap chain-node data structure for representing the spatial position of cartographic features. This APPENDIX uses a simple example to compare the chain-node concept to the traditional polygon method, and to show in more detail how segments (chains) are used in SLF to represent features. The example begins with three areal features as they might appear on a manuscript (FIGURE 5.a). This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

F.2. APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

F.3. POLYGON METHOD

In the polygon method, each feature would be digitized independently and would be represented by one string of coordinates. The common boundary where two features abut would be digitized independently for each feature and there would be no ensurance that they abutted precisely. There could be overlap or gaps along the boundary (FIGURE 5.b).

FIGURE 5.c shows the three polygon features. The arrows show the ordering of coordinates in the string. The solid line represents the digitized feature outline (with an overlap, based on hierarchy, of the lower numbered feature into the higher numbered one), while the dotted line represents the true boundary between features.

FIGURE 5.e shows the result of displaying the three features together. In some applications, the feature hierarchy (the higher numbered feature takes precedence) causes the overlap to be masked out, leaving the true boundary between the features. In others, the mismatch is simply tolerated.

F.4. CHAIN-MODE METHOD

In the chain-node method, the segments which make up the features are digitized (FIGURE 5.b). The common boundary between two features is digitized only once, ensuring that the features abut precisely. SLF stores the segments and provides the linkage

to concatenate them into features. FIGURE 5.d shows how each feature could be displayed independently, while FIGURE 5.f shows the result of displaying the three features together.

FIGURE 6. shows the SLF FEA and SEG records for the example, illustrating the cross-reference between features and segments. Since a segment may be used twice, SLF provides a direction indicator (F/R) to order the segment coordinates so that the feature is delineated correctly.

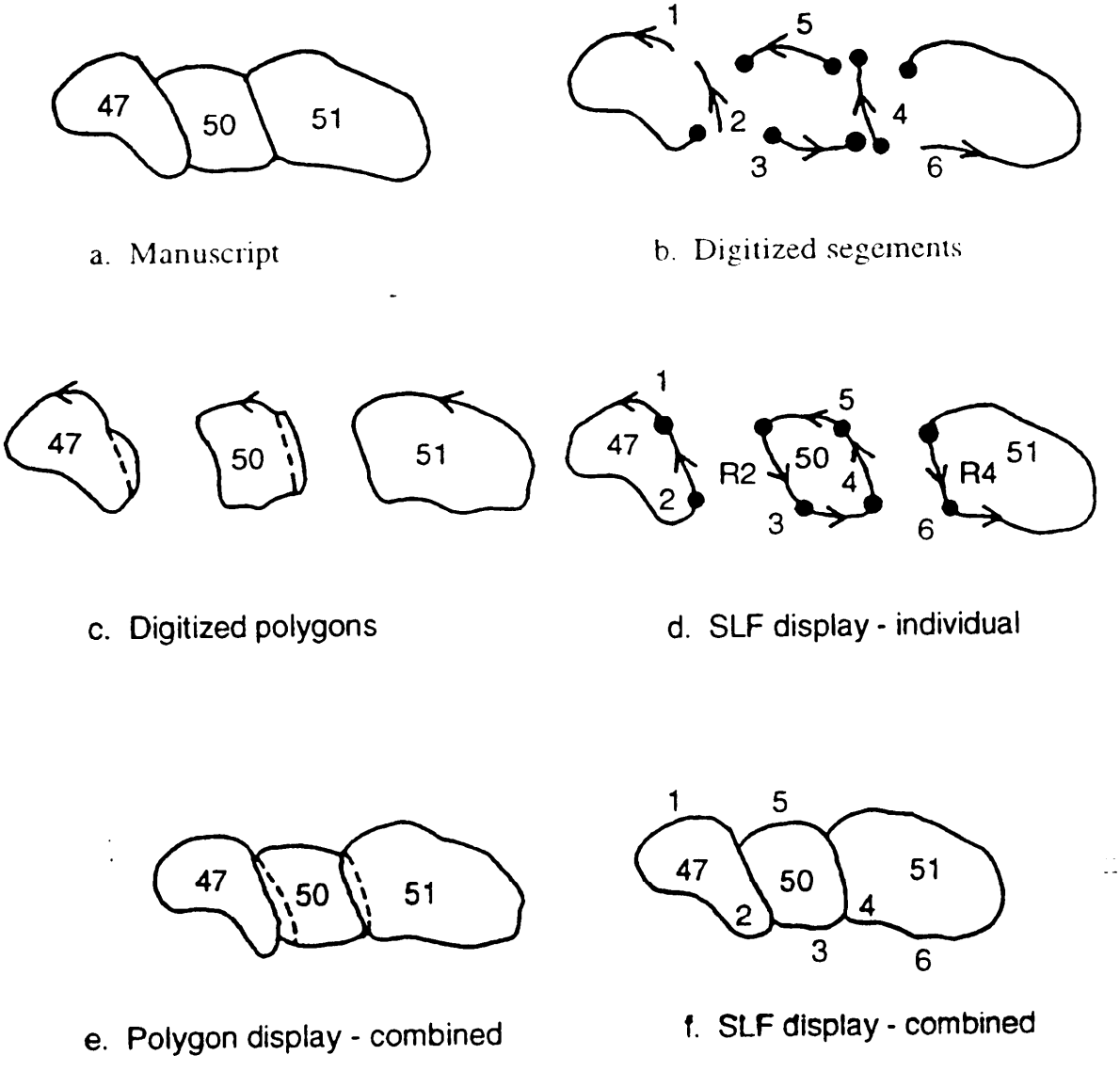

FIGURE 5. SLF vs. polygon example;

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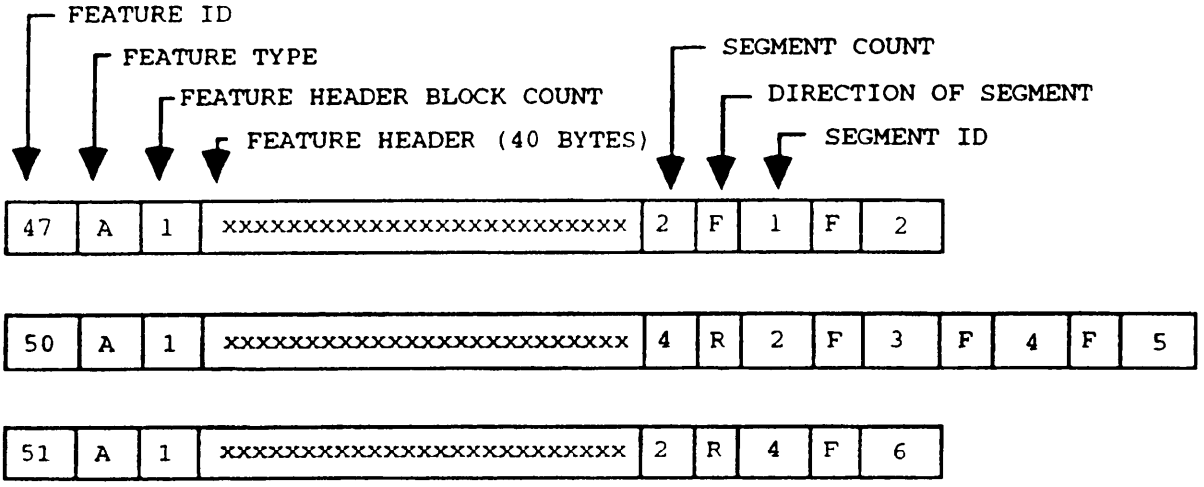
FEA RECORD



SEG RECORD

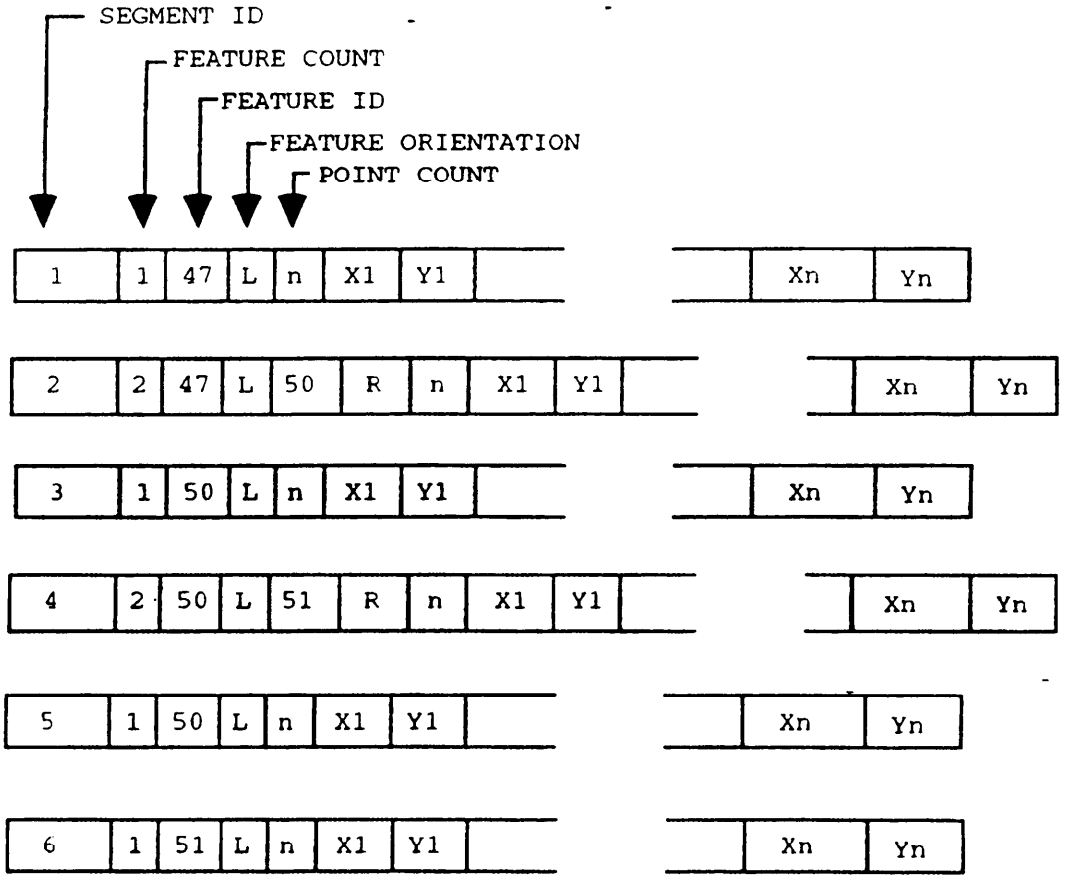


FIGURE 6. Example FEA and SEG records.

APPENDIX G

LIST OF ACRONYMS AND ABBREVIATIONS

G.1. SCOPE

G.1.1 Scope. This APPENDIX provides a list of of acronyms and abbreviations used in this Standard. This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

G.2. APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

G.3. ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
CCM	Cross-Country Movement
CII	Configuration Item Index
DDDMMSSSSH	
DDD	Degree of arc
MM	Minutes of arc
SSSS	Hundredths-of-seconds of arc
H	Hemisphere
DFAD	Digital Feature Analysis Data
DITD	Digital Interim Terrain Data
DLMS	Digital Landmass System
DMA	Defense Mapping Agency
DMAFF	DMA Feature File
DoD	Department of Defense
DPS	Digital Production System
DSAG	Data Set Accuracy Group
DSHG	Data Set History Group
DSI	Data Set Identifier
DSIG	Data Set Identification Group
DSMP	Data Set Map Projection
DSPG	Data Set Parameter Group
DSRG	Data Set Registration Group
DSSG	Data Set Security Group

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DSVG	Data Set Variable Field Address Group
DTAD	Digital Terrain Analysis Data
DTADT	Digital Terrain Analysis Data/Tactical
DTADP	Digital Terrain Analysis Data /Planning
EOF	End of File Sentinel
FEA	Feature
FE/S	Feature Extraction Segment
FID	Feature Identification Code
FIPS PUB	Federal Information Processing Standard Publication
fpi	frames per inch
GCR	Ground Coded Recording
GEO	Geographic Coordinates
GRC	General Roughness Category
HDR	Heading Record Sentinel
ITD	Interim Terrain Data
JOG	Joint Operations Graphics
MPO	Multi-Product Organization
MPS	Modernization Production System
OVC	Overlay Codes
PAM	Project Assignment Memorandum
PE	Phase Encoded
PTADB	Planning Terrain Analysis Data Base
RTAD	Relocatable Target Assessment Data
SEG	Segment
SID	Standard Instrument Departures
SLF	Standard Linear Format
SMC	Surface Material Category
SMQ	Surface Material Qualifier
SRQ	Surface Roughness Qualifier
TTADB	Tactical Terrain Analysis Data Base
TXT	Text
VOAC	Vertical Obstruction Analysis Code
VOD	Vertical Obstruction Data
VOIC	Vertical Obstruction Identification Code

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VOL	Volume Record Sentinel
VRF	Vegetation Roughness Factor
YYMM	Year/month (example, June 1983 equals 8306)

APPENDIX H

GLOSSARY

H.1. SCOPE

H.1.1 Scope. This APPENDIX provides definitions for some terms used in this Standard. This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

H.2. APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

H.3. DEFINITIONS

H.3.1 Areal Feature: An areal feature is defined as a segment or series of segments consisting of delta coordinates referenced to the data set origin and defined by specific attributes. Explicit intersection of end points of segments is required. Coordinates/segments defining areal features are sequenced counterclockwise by applying the stored "F/R" direction of segments.

H.3.2 Control (Registration) Point: A point whose geographic and machine coordinates are both known. Control points are used to adjust machine coordinates into projection coordinates.

H.3.3 Data Set Origin of Delta Coordinates: The data set origin (lower left), as depicted in the DSI record, represents the intersection of a coordinate axis system. This establishes the location within the data set. Each coordinate point in a feature is represented by difference measurements (delta values), which, when added to the value of the data set origin, describe the coordinate's location/value. The location of the file origin for a data set is product-dependent.

H.3.4 Diagnostic Point: A point whose geographic and machine coordinates are both known, but which does notparticipate in the adjustment of machine coordinates to projection coordinates. Such points may be used later in assessment of product accuracy.

H.3.5 Geographic Coordinates (GEO): Angular coordinate pairs (phi, lambda) that position a point on the Earth in terms of angular measurement from the Equator and Prime Meridian. A

projection transformation may be used to convert geographic coordinates into projection coordinates.

H.3.6 Intersection (I): An I is the coexistence of end points at a specific geographic location.

H.3.7 Latitude and Longitude of Origin: While the location of the file origin for a data set is product-dependent, it is always to the south and west of all points within the data set. Delta coordinates represent the magnitude (difference) between the origin and the data point. If in the northern and eastern hemispheres, the delta coordinates are **added** to the origin to determine position. If in the southern and western hemispheres, the delta coordinates are **subtracted** from the origin to determine position.

H.3.8 Line Segment (LS): An LS is a line which neither intersects with itself nor any other LS and consists of two end points (start and stop).

H.3.9 Linear Feature: A linear feature is defined as a segment or series of segments consisting of delta coordinates referenced to the data set origin and defined by specific attributes.

H.3.10 Machine Coordinates (DIGT): Cartesian coordinate pairs (X, Y) that position points on the digitizing table. Machine coordinates become projection coordinates when "adjusted" to control points.

H.3.11 Node: The start and/or stop point of a segment.

- Each segment intersection (e.g., linear and area features) mandates a node.

- A point feature on any segment mandates a node. However, they are not required to be considered coincident features.

H.3.12 Project Coordinates (MAP): Cartesian coordinate pairs (X, Y) that position points on a cartographic projection. A projection transformation may be used to convert projection coordinates into geographic coordinates.

APPENDIX I

IMPLEMENTING DFAD IN 2-D SLF

I.1. SCOPE

I.1.1 Scope. This APPENDIX describes the product-specific usage of SLF for DLMS/DFAD. It is primarily intended for the producers of DFAD production data to be released to the DMA Cartographic Data Base. Any ambiguity in the interpretation of SLF will be resolved in favor of consistency with the appropriate DMLS specifications. This APPENDIX is not a mandatory part of the Standard. The information contained herein is intended for guidance only.

I.2 APPLICABLE DOCUMENTS

I.2.1 Government documents.

I.2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Defense Mapping Agency (DMA)

PS/1CD/100 PS/1CE/100 PS/1CF/100 PS/1CG/100	DMA Product Specifications for Digital Landmass System (DLMS) Data Base
PS/1CE/200 PS/1CG/200	DMA Product Specification for Digital Feature Analysis Data (DFAD)
PS/1CK/200 PS/1CI/200	DMA Product Specifications for Level 1-C Data

(Copies of the above publications are available from the Defense Mapping Agency, ATTN: ATIS, ST A-10, 8613 Lee Highway, Fairfax, VA 22031-2137.)

I.2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes precedence. Nothing in this document, however, supersedes

applicable laws and regulations unless a specific exemption has been obtained.

I.3. SECTION 5.2.a, TAPE LABEL RECORDS

NOTE: The paragraphs below are keyed to the SLF section and paragraph numbers, and SLF data field names.

If an SLF tape contains more than one data set, they will be ordered on the tape as described in the DLMS specifications, Chapter 4, Section 200, Paragraph 205.

I.4. SECTION 5.3, DATA SET IDENTIFIER (DSI) RECORD

Product type is the same as DLMS Product Identifier. it must be "DFAD1", "DFAD2", or DFADC". "DFADC" applies only to level 1-C.

Data Set ID is the same as DLMS Unique Reference Number. It will comprise the ONC and cell number, formatted as described below. For example, ONC F-4 cell 27 would have the Data Set ID "F04b027bbbbbbbbbbbbb".

Character Position	Contents
1	ONC band letter
2-3	ONC number within band, with leading zero as required
4	Space
5-7	Cell number (3 digits) with leading zeros as required
8-20	Spaces

- Edition is the same as DLMS Data Edition Number. It must be "1" for new data. It must not exceed 99.
- Compilation Date will be the compilation date shown on the manuscript.
- Maintenance Date must be "0000" for new data.
- Security Classification is the same as DLMS Security Code. It must be "S" for non-US DFAD2 or if there are multiple accuracy outlines. It must be "U" otherwise.

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- Security Release is the same as DLMS Security Control and Release Marking. It must be spaces if the Security Classification is "U". It must be "NF" if the security classification is "S".

- Downgrading/Declassification Date is not currently required for DLMS; however, it will be shown in the SLF as "OADR" if the Security Classification is "S". Otherwise, it will be spaces.

- Security Handling is the same as DLMS Security Handling Description. It must be "LIMITED DISTRIBUTION".

- Data Type must be "GEO".

- Horizontal Units of Measure must be "SEC".

- Horizontal Resolution Units must be "0.100".

- Geodetic Datum must be "WGC" (WGS-72) or "WGE" (WGS-84).

- Ellipsoid must be "WGC" (WGS-72) or "WGE" (WGS-84).

- Vertical Units of Measure must be spaces.

- Vertical Resolution Units must be spaces.

- Vertical Reference System must be spaces.

- Sounding Datum must be spaces.

- Latitude and Longitude of Origin must be the southwest corner of the DLMS manuscript. The hundredths-of-seconds digit must always be zero.

- X, Y, Z Origin must be spaces.

- Latitude and Longitude of SW and NE corners are those of the DLMS manuscript. The hundredths-of-seconds digit must always be zero.

- Number of Point, Line and Areal Features reflect the SLF Feature Type in the FEA record.

- The DSMP group is not required for DLMS. The data may be present (for historical purposes) or may be spaces.

- Edition Code must be spaces.

- Product Specification must be "SPECXDLMS" (First Edition), "SPEXDLMS2" (Second Edition), "SPEXDLMSC" (Level 1-C) or "SPECDFAD2" (Second Edition).

- Specification Date must be "7707" (First Edition), "8304" (Second Edition), "8312" (Level 1-C) or "8604" (Second Edition).

- Specification Amendment Number must be "000" "011", "022", "033", "034", "040", or "050" for First Edition. It must be "000" or "010" for Second Edition. It must be "000" for Level 1-C. It must be "020" for SPECDFAD2, Amendment 2.0.

- Producer is the same as DLMS Producer Code. It must be "US090078" for DMAAC-produced data or "US090000" for DMAHTC-produced data.

- Digitizing system is the same as DLMS Digitizing Collection System. It may be used at the producer's discretion, or may be spaces.

- Processing System is not currently required for DLMS. It may be used at the producer's discretion, or may be spaces.

- Grid System must be spaces.

- Horizontal and Height Accuracies must be as defined in the DLMS specifications.

- Vertical Accuracies must be spaces.

- Data Generalization must be "0".

- Match/Merge Numbers must be "0" for new data.

- Match/Merge Dates must be "0000" for new data.

- Year and month of earliest source must be spaces.

- Year and month of latest source must be spaces.

- Data collection code must be spaces.

- Data collection criteria must be spaces.

- Registration Points Address may be spaces, indicating that the DSRG does not exist.

- Accuracy Subset Address must be spaces if there are not multiple accuracy outlines.

- The DSRG is not required for "GEO" data. It may be present (for historical purposes) or it may not exist.

- If there are not multiple accuracy outlines, the DSAG will not exist.

- If there are multiple accuracy outlines, the following rules apply:

- The overall Horizontal and Height Accuracies (in the DSHG group) will reflect the worst subset accuracy, in accordance with DLMS specifications.

- The outlines must completely cover the data set area, but without overlap.

- There must be no more than nine outlines, and no more than 14 coordinates in each outline.

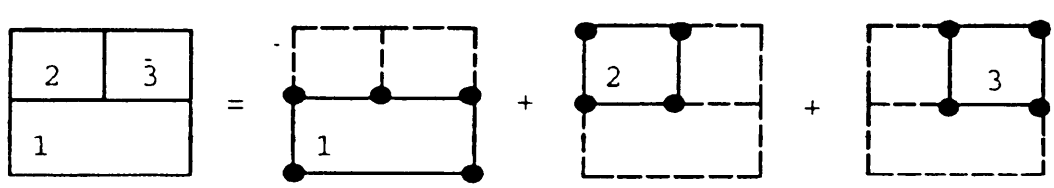
- The order of outlines starts at the southwest corner of the data set area.

- Outline coordinates start and end at the southwest corner of the outline.

- The outline tracks counterclockwise (feature left) and is explicitly closed (the last point duplicates the first).

- The hundredths-of-seconds digit in the coordinates will always be zero.

- Coordinate points must exist at all intersections:



- "Swiss Cheese" areas will be broken up:

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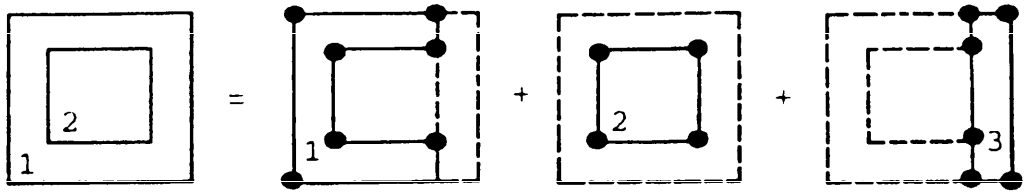

I.5. SECTION 5.4, SEGMENT (SEG) RECORD

- Feature Orientation will be "C" for linear and point features. For areal features, it will reflect the DLMS "feature left" convention. It will be "L" (left) when the corresponding Direction of Segment entry in the FEA record is "F" (forward). Conversely, it will be "R" (Right) when the Direction of the Segment is "R" (Reverse).

- The segment references are placed in the FEA Record such that the reflective side of a unidirectional linear feature is to the right.

- X-value and Y-value represent delta longitude and delta latitude, respectively, in tenths of arc seconds, referenced to the Latitude and Longitude of Origin specified in the DSI record.

- The Z-value field will not exist.

- Coordinates defining an areal feature are sequenced counterclockwise by applying the "F/R" from the Direction of Segment field.

- The total number of coordinates comprising a feature may not exceed 8,191 for areal and linear features, and 2,047 for point features. The total number of coordinates comprising a feature is the sum of the Point Counts of every segment comprising the feature, less the number of duplicate nodes. For a feature with N segments, the total would be:

  For "closed" features: (sum of N point counts) - N
  For "open" features: (sum of N point counts) - N + 1

I.6. SECTION 5.5, FEATURE (FEA) RECORD

- Feature Header Block Count will be "1".

- The following 40-byte feature header will be used in the Feature Header field for SLF/DFAD data:

Item Name	Length	Units	Range
Feature Analysis Code Number (FAC#)	5		1-16383
Feature Type	1	Code	0-2
Surface Material Category (SMC)	2	Code	1-14

Item Name	Length	Units	Range
Predominant Height	5	Meters	-1022 to 1022
Number of Structures	2	Code	0-13
Percent of Tree Cover	3	Percent	0,10,30
Percent of Roof Cover	3	Percent	0,20,30,80,100
Feature Identification Code (FID)	3	Code	See DFAD Specifications
Orientation	3	Degrees	0-360*
Directivity	1	Code	1-3
Length of Diameter	4	Meters	0-254**
Width	4	Meters	0-254**
Unused	4	Pad	Spaces (octal 040)

* Note: 360 degrees indicates an omnidirectional point feature.

**Note: In the special case of road interchanges (FID 230-239), both the width and length fields may range from 1 to 2540.

- In the Feature Header, units of measure for all distances (height, width, length and diameters) are Integer meters.

- The Feature Analysis Code Number (FAC#) and the Feature Identification Code (FID) are not related to the SLF Feature ID.

- The SLF Feature type will reflect the DFAD feature type within the DFAD feature header:

  - Point Feature = 0 = "P"
  - Linear Feature = 1 = "L"
  - Areal Feature = 2 = "A"

- The length of the Segment Count field is three digits.

I.7. FEATURE (FAC#) 1

FAC# 1 requires special handling in SLF/DFAD data sets:

- It must be physically the first feature in the FEA record.

- It must have exactly one segment in the SEG record. The segment must have exactly five coordinates: The SW, SE, NE and NW corners, respectively, of the data set area, plus a fifth coordinate duplicating the first (for closure).

- It does not properly conform to SLF segment rules, in that it does not share segments with other features which touch the data set boundary.

- It must coincide with the SW and NE data set limits as shown in the DSI record.

- It may be SMC10 (FID 902), SMC6 (FID 930-943), or SMC13 (FID960-967).

I.8. FEATURE HIERARCHY

The features in the FEA record must be sorted such that the physical order within the FEA record reflects a feature hierarchy:

- All areal (type 2) features, in descending order of area.

- Road interchanges (FID 230-239).

- All linear (type 1) features.

- All point (type 0) features except road interchanges.

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- Within the linear and point feature categories, the hierarchical numbering sequence (not necessarily the same numbers) established by the analyst must be preserved. To preserve traceability of a point to the manuscript, the same numbers may be preserved.

APPENDIX J

IMPLEMENTING TERRAIN ANALYSIS IN SLF

J.1. SCOPE

J.1.1 Scope. This APPENDIX describes the product-specific usage of SLF for Terrain Analysis. This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

J.2. APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

J.3. SURFACE CONFIGURATION/SLOPE -- 1 TO 3 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	010100-011000, (Note 1)
Total Character Count (all blocks)	4	Number	24-102 (Note 2)
Slope Category (Map Unit)	1	Code	A-H, Z, W
Slope Percent - Low of Range	3	Percent	0-100
Slope Percent - High of Range	3	Percent	0-100
Slope Percent - Code	1	Percent	0-9
F5 Slope Intercept Freq Module Factor	5	Number	0.000-1.000
Number of F1 Factors	1	Number	0-6 (Note 4)
	24	(End of fixed portion)	
Repeating field entries (see below)	0-16		
Unused	?	Pad Spaces (octal 40)	
	40 Bytes		

ITEM NAME	LENGTH	UNITS	RANGE
b. Blocks 2-3 (Optional):			
Repeating fields (see list below)	?-40		
Unused	?	Pad Spaces (octal 40)	
	40 Bytes		

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Surface Configuration Repeating Field Entries

ITEM NAME	LENGTH	UNITS	RANGE
F1 Slope Module Factor - Low	6	Kph	0.00-150.00
F1 Slope Module Factor - High	6	Kph	0.00-150.00
F1 Slope Module factor - Code	1	Code	To be defined
	13 Bytes, Occurs 1-6 times		

----------End-of-Slope

J.4. VEGETATION - FOREST/SWAMP -- 2 TO 5 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	020100-020203, (Note 1)
Total Character Count (all blocks)	4	Number	69-174 (Note 2)
Vegetation Map Unit:			
Vegetation Type	2	Code	Alphanumeric
Canopy Closure (Selected)	1	Code	0-7
Height of Vegetation (Selected)	2	Code	0-15 or 0-7
Name	4	Code	A000-Z999
Height of Lowest Branch - Low/Actual	5	Meters	0.0-120.0
Height of Lowest Branch - High of Range	5	Meters	0.0-120.0
Height of Lowest Branch - Code	2	Code	0-7
Aerial Obstruction	1	Code	0,1
Stem Diameter - Low/Actual	6	CMeters	0.0-2000.0
Stem Diameter - High of Range	2	CMeters	0.0-2000.0 (Bytes 1-2 of 6)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Stem Diameter - High of Range	4	CMeters	0.0-2000.0 (Bytes 4-6)
Stem Diameter - Code	2	Code	0-15
Undergrowth	1	Code	0-3
Tree Crown Diameter - Low/Actual	4	Meters	0.0-40.0
Tree Crown Diameter - High of Range	4	Meters	0.0-40.0
Tree Crown Diameter - Code	1	Code	0-7
Tree Spacing - Low/Actual	4	Meters	0.0-50.0
Tree Spacing - High of Range	4	Meters	0.0-50.0

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VEGETATION - FOREST/SWAMP (Continued)

ITEM NAME	LENGTH	UNITS	RANGE
Tree Spacing - Code	2	Code	0-15
Canopy Level	1	Number	0-3 (Note 4)
Number of F2 Factors	1	Number	0-6 (Note 4)
Number of VRFs	1	Number	0-3 (Note 4)
	29 Bytes	(End of fixed portion)	
Repeating fields (see list below)	0-11		
-or-			
Unused	0-11	Pad	Space (octal 40)
	40 Bytes		

c. Blocks 3-5 (Optional):

ITEM NAME	LENGTH	UNITS	RANGE
Repeating fields (see list below)	14-40		
Unused	0-26	Pad	Space (octal 40)
	40 Bytes		

Vegetation - Forest/Swamp Repeating Fields:

ITEM NAME	LENGTH	UNITS	RANGE
Canopy Closure - Low	3	Percent	0-100
Canopy Closure - High	3	Percent	0-100
Canopy Closure - Code	1	Code	0-4
Height of Vegetation - Low/Actual	5	Meters	0.0-150.0
Height of Vegetation - High of Range	5	Meters	0.0-150.0
Height of Vegetation - Code	2	Code	0-15 or 0-7
	19	Occurs Canopy Level (1-3) times, 19 x 3 = 57 bytes max	
F2 Vegetation Module Factor	5	Number	0.000-1.000
	5	Occurs Number of F2 Factor times, 5 x 6 = 30 bytes max	
Vegetation Roughness Factor - Actual	4	Units	0.00-1.00
Vegetation Roughness Factor - Code	2	Code	0-31
	6	Occurs Number of VRF times, 6 x 3 = 18 bytes max	

End-of-For/SwmVeg

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J.5. VEGETATION/NON-FORESTED -- 1 TO 3 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	020300-020317 (Note 1)
Total Character Count (all blocks)	4	Number	32-80 (Note 2)
Vegetation Map Unit:			
Vegetation Type	2	Code	Alphanumeric
Canopy Closure - Code	1	Code	0
Height of Vegetation - Code	2	Code	0-15 or 0-7
Name	4	Code	V001-V999
Height of Vegetation - Low/Actual	6	Meters	0.0-1000.0
Height of Vegetation - High of Range	6	Meters	0.0-1000.0
Number of F2 Factors	1	Number	0-6 (Note 4)
Number of VRFs	1	Number	0-3 (Note 4)
	33 Bytes	(End of fixed portion)	
Repeating fields (see list below)	0-7		
Unused	0-7	Pad	Spaces (octal 40)

b. Blocks 2-3 (Optional):

ITEM NAME	LENGTH	UNITS	RANGE
Repeating fields (see list below)	?-40		
Unused	?	Pad	Spaces (octal 40)
	40 Bytes		
F2 Vegetation Module Factor	5	Number	0.000-1.000
	5	Occurs	Number of F2 Factor times, 5 x 6 = 30 bytes max
Vegetation Roughness Factor - Actual	4	Units	0.00-1.00
Vegetation Roughness Factor - Code	2	Code	0-31
	6	Occurs	Number of VRF times, 6 x 3 = 18 bytes max

----------End-of-NFVeg

J.6. SURFACE MATERIALS -- 2 TO 6 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	030100-031000 (Note 1)
Total Character Count (all blocks)	4	Number	60-207 (Note 2)
Surface Material Map Units:			
Surface Material Type	2	Code	0-31
Surface Roughness Map Qualifier	1	Code	0-31
State of Ground Map Qualifier	1	Code	0-3
SOG Moisture Content	3	Percent	0-100,101,102
Depth of Surface Material - Low/Actual	5	Meters	0.0-100.0
Depth of Surface Material - High	5	Meters	0.0-100.0
Depth of Surface Material - Code	1	Code	0-3
SOG Moisture in Top 1/2 Meter	3	Percent	0-100
Depth to Bedrock - Low/Actual	6	Meters	0.0-1000.0
Depth to Bedrock - High	3	Meters	0.0-1000.0 (Bytes 1-3 of 6)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Depth to Bedrock - High	3	Meters	0.0-1000.0 (Bytes 3-6 of 6)
Depth to Bedrock - Code	2	Code	0-15
Rating Cone Index - Dry	3	Unit	0-300
Rating Cone Index - Wet	3	Unit	0-300
SOG Seasonal Period:			
SOG Seasonal Period Start	2	Number	01-16
SOG Seasonal Period End	2	Number	01-16
Number of SMQs	1	Number	0-5 (Note 4)
Number of SRFs	2	Number	0-12(Note 4)
Number of F3 Factors	1	Number	0-6 (Note 4)
Number of F4 Factors	1	Number	0-6 (Note 4)
	20	(End of fixed portion)	
Repeating fields (see list below)	?-20		
Unused	0-?	Pad	Spaces (octal 40)
	40 Bytes		

SURFACE MATERIALS - Continued.

c. Blocks 3-6 (Optional):

ITEM NAME	LENGTH	UNITS	RANGE
Repeating fields (see list below)	n-40		
Unused	?	Pad	Spaces (octal 40)
	40 Bytes per block		

APPENDIX J

Surface Materials Repeating Fields:

ITEM NAME	LENGTH	UNITS	RANGE
Surface Material Qualifier (SMQ)	3	Code	100-599
	3	Occurs Number of SMQ times, 3x5 = 15 bytes max	

ITEM NAME	LENGTH	UNITS	RANGE
Surface Roughness Factor - Actual	4	Unit	0.00-1.00
Surface Roughness Factor - Code	2	Code	0-15
	6	Occurs Number of SRF times, 6x12 = 72 bytes max	
F3 Soils Module Factor	5	Unit	0.000-1.000
	5	Occurs Number of F3 times, 5x6 = 30 bytes max	
Surface Roughness Module Factor	5	Unit	0.000-1.000
	5	Occurs Number of F4 times, 5x6 = 30 bytes max	

----------End-of-SM

J.7. TURAL CONSTRUCTION MATERIALS -- 2 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	040100-040400 (Note 1)
? Character Count (all blocks)	4	Number	40-56 (Note 2)
? Category (Map Unit Code)	2	Code	0-32
Depth of Overburden - Low/Actual	6	Meters	0.0-1000.0
Depth of Overburden - High of Range	6	Meters	0.0-1000.0
Depth of Overburden - Code	1	Code	0-7
? Principal Potential Use	2	Code	1-10 or 1-5
Material Thickness - Low/Actual	6	Meters	0.0-1000.0
Material Thickness - High of Range	6	Meters	0.0-1000.0
Material Thickness - Code	1	Code	0-3
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Number of SMQs	1	Number	0-5 (Note 4)
Surface Material Qualifier (SMQ)	3	Code	100-599 3x5 = 15 bytes max
Unused	24-36	Pad	Spaces (octal 40)
	40 Bytes		

----------End-of-NCM

J.8. SURFACE DRAINAGE AND TRANSPORTATION/NAVIGABLE WATERWAYS -- 6 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	050100-050900, 070301-070305 (Note 1)
Total Character Count (all blocks)	4	Number	213 (Note 2)
Drainage Type	2	Code	0-15 or 0-31
Water State Qualifier	1	Code	0-7
Name	4	Code	W001-W999
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
Length - Code	2	Code	0-31
Traversing Feature Class	2	Code	0-31
Width-Channel - Low/Actual	3	Meters	0.0-142.0 (Note 5) (Bytes 1-3 of 5)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Width-Channel - Low/Actual	2	Meters	0.0-142, 0 (Note 5) (Bytes 4-5 of 5)
Width-Channel - High of Range	5	Meters	0.0-142.0 (Note 5)
Width-Channel - Code	1	Code	0-7 or 0-3
Condition/Usability	1	Code	0-7
Width-Gap - Low/Actual	6	Meters	0.0-142.0 or 0.0-1000.0 (Note 5)
Width-Gap - High of Range	6	Meters	0.0-142.0 or 0.0-1000.0 (Note 5)

ITEM NAME	LENGTH	UNITS	RANGE
Width-Gap - Code	1	Code	0-7 or 0-3
Contamination	1	Code	0-3
Bank Height, Left - Low/Actual	6	Meters	0.0-1000.0
Bank Height, Left - High of Range	6	Meters	0.0-1000.0
Bank Height, Left - Code	1	Code	0-7 or 0-3
Potability	1	Code	0-3
Bank Height, Right - Low/Actual	3	Meters	0.0-1000.0 (Bytes 1-3 or 6)
	40 Bytes		

APPENDIX J

SURFACE DRAINAGE AND TRANSPORTATION/NAVIGABLE WATERWAYS - Continued.

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Bank Height, Right - Low/Actual	3	Meters	0.0-1000.0 (Bytes 4-6 of 6)
Bank Height, Right - High of Range	6	Meters	0.0-1000.0
Bank Height, Right - Code	1	Code	0-7 or 0-3
Water Accessibility	1	Code	0-2
Bank Slope, Left - Low/Actual	3	Percent	0-100 (Note 5)
Bank Slope, Left - High of Range	3	Percent	0-100 (Note 5)
Bank Slope, Left - Code	1	Code	0-7 or 0-2
Water Stage	1	Code	0-3
Bank Slope, Right - Low/Actual	3	Percent	0-100 (Note 5)
Bank Slope, Right - High of Range	3	Percent	0-100 (Note 5)
Bank Slope, Right - Code	1	Code	0-7 or 0-2
Bottom Materials	1	Code	0-7 or 0-6
Depth of Surface Drainage - Low/Actual	5	Meters	0.0-100.0
Depth of Surface Drainage - High	5	Meters	0.0-100.0
Depth of Surface Drainage - Code	1	Code	0-7 or 0-3
Depth Seasonal Period:			
Depth Seasonal Period Start	2	Code	01-16
	40 Bytes		

d. Block 4:

ITEM NAME	LENGTH	UNITS	RANGE
Depth Seasonal Period End	2	Code	01-16
Vegetation/Obstruction	2	Code	0-14
Pipe Diameter - Low/Actual	4	Meters	0.00-5.00
Pipe Diameter - High of Range	4	Meters	0.00-5.00
Pipe Diameter - Code	1	Code	0-7
Water Velocity - Low/Actual	3	Mtrs/Sec	0.0-5.0
Water Velocity - High of Range	3	Mtrs/Sec	0.0-5.0
Water Velocity - Code	1	Code	0-3
Storage Capacity - Low/Actual	8	Cubic Mtrs	0-10000000
Storage Capacity - High of Range	8	Cubic Mtrs	0-10000000
Storage Capacity - Code	1	Code	0-7
Tide-Low - Low	3	Meters	0.0-20.0 (Bytes 1-3 of 4)
	40 Bytes		

SURFACE DRAINAGE AND TRANSPORTATION/NAVIGABLE WATERWAYS - Continued.

e. Block 5:

ITEM NAME	LENGTH	UNITS	RANGE
Tide-Low - Low	3		(Byte 4 of 4)
Tide-Low - Mean	4	Meters	0.0-20.0
Tide-Low - High	4	Meters	0.0-20.0
Tide-Low - Code	2	Code	0-15
Tide-Low - Seasonal Period:			
Tide-Low - Seasonal Period Start	2	Code	01-16
Tide-Low - Seasonal Period End	2	Code	01-16
Tide-Mean - Low	4	Meters	0.0-20.0
Tide-Mean - Mean	4	Meters	0.0-20.0
Tide-Mean - High	4	Meters	0.0-20.0
Tide-Mean - Code	2	Code	0-15
Tide-Mean - Seasonal Period:			
Tide-Mean Seasonal Period Start	2	Code	01-16
Tide-Mean Seasonal Period End	2	Code	01-16
Tide-High - Low	4	Meters	0.0-20.0
Tide-High - Mean	1	Meters	0.0-20.0
	40 Bytes		(Byte 1 of 4)

f. Block 6:

ITEM NAME	LENGTH	UNITS	RANGE
Tide-High - Mean	3		(Bytes 2-4 of 4)
Tide-High - High	4	Meters	0.0-20.0
Tide-High - Code	2	Code	0-15
Tide-High - Seasonal Period:			
Tide-High Seasonal Period Start	2	Code	01-16
Tide-high Seasonal Period End	2	Code	01-16
Unused	27	Pad	Space (octal 40)
	40		

----------End-of-SD/Nav

J.9. DRAINAGE/SUB-SURFACE -- 3 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	050800-050806 (Note 1)
Total Character Count (all blocks)	4	Number	93 (Note 2)
Drainage Type	2	Code	0-15 or 0-31
Contamination	1	Code	0-3

APPENDIX J

DRAINAGE/SUB-SURFACE - Continued.

ITEM NAME	LENGTH	UNITS	RANGE
Depth of Overburden - Low/Actual	6	Meters	0.0-1000.0
Depth of Overburden - High of Range	6	Meters	0.0-1000.0
Depth of Overburden - Code	1	Code	0-7
Potability	1	Code	0-3
Aquifier Permeability - Low/Actual	4	L/m2/d	0-2000
Aquifier Permeability - High of Range	4	L/m2/d	0-2000
Aquifier Permeability	1	Code	0-7
Aquifier Materials	1	Code	0-7
Material Thickness - Low/Actual	3	Meters	0.0-1000.0
	40 Bytes		(Bytes 1-3 of 6)

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Material Thickness - Low/Actual	3	Meters	0.0-1000.0
			(Bytes 4-6 of 6)
Material Thickness - High of Range	6	Meters	0.0-1000.0
Material Thickness - Code	1	Code	0-7
Water Accessibility	1	Code	0-2
Aquifier Porosity - Low/Actual	3	Percent	0-100
Aquifier Porosity - High of Range	3	Percent	0-100
Aquifier Porosity	1	Code	0-7
Water Stage	1	Code	0-3
Depth to Water TABLE- Low/Actual	6	Meters	0.0-1000.0
Depth to Water TABLE- High of Range	6	Meters	0.0-1000.0
Depth to Water TABLE- Code	1	Code	0-7
Depth Seasonal Period:			
Depth Seasonal Period Start	2	Number	01-16
Depth Seasonal Period End	2	Number	01-16
Overburden Materials	1	Code	0-7
Yield of Well - Low/Actual	3	Ltrs/Min	0-1000000
	40 Bytes		(Bytes 1-3 of 7)

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Yield of Well - Low/Actual	4		(Types 4-7 of 7)
Yield of Well - High of Range	7	Ltrs/Min	0-1000000
Yield of Well - Code	1	Code	0-7
Water Resource Potential	1	Code	0-7
Unused	27	Pad	Space (octal 40)
	40 Bytes		

----------End-of-SSD

APPENDIX J

J.10. DRAINAGE-RELATED FEATURES -- 3 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	060100-060900 (Note 1)

DRAINAGE RELATED FEATURES - Continued.

ITEM NAME	LENGTH	UNITS	RANGE
Total Character Count (all blocks	4	Number	85 (Note 2))
Drainage Type	2	Code	0-15 or 0-31
Aerial Obstruction	1	Code	0,1
Name	4	Code	Bnnn,Dnnn,Tnnn
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
Length - Code	2	Code	0-31
Contamination	1	Code	0-3
Width - Gap - Low/Actual	4	Meters	0.0-142.0 or 0.0-1000.0 (Note 5) (Byte 4 of 6)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Width-Gap - Low/Actual	2		(Bytes 5-6 of 6)
Width-Gap - High of Range	6	Meters	0.0-142.0 or 0.0-1000.0 (Note 5)
Width-Gap - Code	1	Code	0-7 or 0-3
Water Accessibility	1	Code	0-1
Height - Low/Actual	7	Meters	0.00-1000.00
Height - High of Range	7	Meters	0.00-1000.00
Height - Code	2	Code	0-31
Water Stage	1	Code	0-3
Storage Capacity - Low/Actual	8	Cubic Mtrs	0-10000000
Storage Capacity - High of Range	5	Cubic Mtrs	0-10000000
	40 Bytes		(Bytes 1-5 of 8)

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Storage Capacity - High of Range	3	Code	(Bytes 6-8 of 8)
Storage Capacity - Code	1	Code	0-7
Approaches	1	Code	U,E,D,I
Unused	35	Pad	Spaces (octal 40)
	40 Bytes		

----------End-of-DRel

APPENDIX J

J.11. TRANSPORTATION/ROAD -- 3 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	070100-070111 (Note 1)
Total Character Count (all blocks)	4	Number	96 (Note 2)
Elevated Qualifier	1	Code	0-2
Traversing Feature Class	2	Code	0-31
Name	4	Code	H001-H999
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
Length - Code	2	Code	0-31
Vegetation/Obstruction	2	Code	0-14
Width-Transportation - Low/Actual	3	Meters	0.00-50.00 (Note 5) (Bytes 1-3 of 5)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Width-Transportation - Low/Actual	2		(Bytes 4-5 of 5)
Width-Transportation - High of Range	5	Meters	0.00-50.00 (Note 5)
Width-Transportation - Code	2	Code	0-15
Constriction - Low/Actual	3	Meters	0.0-4.0
Constriction - High of Range	3	Meters	0.0-4.0
Constriction - Code	1	Code	0-7
Curve Radius-Road - Low/Actual	4	Meters	0.0-30.0
Curve Radius-Road - High of Range	4	Meters	0.0-30.0
Curve Radius-Road - Code	1	Code	0,3
Grade and Direction - Low/Actual	2	Percent	0-75
Grade and Direction - High of Range	2	Percent	0-75
Grade and Direction - Code	1	Code	0-4
Shoulder Surface Material, Left	2	Code	0-31
Shoulder Surface Material, Right	2	Code	0-31
Shoulder Width, Left - Low/Actual	4	Meters	0.0-6.00
Shoulder Width, Left - High of Range	2	Meters	0.0-6.00 (Bytes 1-2 of 4)
	40 Bytes		

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Shoulder Width, Left - High of Range	2	Meters	0.0-6.00 (Bytes 3-4 of 4)
Shoulder Width, Left - Code	1	Code	0-7
Construction Material	2	Code	0-31
Shoulder Width, Right - Low/Actual	4	Meters	0.0-6.00
Shoulder Width, Right - High of Range	4	Meters	0.0-6.00
Shoulder Width, Right - Code	1	Code	0-7

APPENDIX J

TRANSPORTATION/ROAD - Continued.

ITEM NAME	LENGTH	UNITS	RANGE
Condition/Usability	1	Code	0-7
Alignment	1	Code	0-2
Unused	24	Pad	Spaces (octal 40)
	40		

----------End-of-Trans/Road

J.12. TRANSPORTATION/RAILROAD -- 2 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	070200-070207 (Note 1)
Total Character Count (all blocks)	4	Number	79 (Note 2)
Elevated Qualifier	1	Code	0-2
Railroad Type Qualifier	2	Code	00, 10-12, 20-22
Name	4	Code	RQ01-R999
Traversing Feature Class	2	Code	0-31
Vegetation/Obstruction	2	Code	0-14
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
Length - Code	2	Code	0-31
Condition/Usability	1	Code	0-7
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Gauge - Low Actual	5	Meters	0.00-10.00
Gauge - High of Range	5	Meters	0.00-10.00
Gauge - Code	1	Code	0-7
Alignment	1	Code	0-2
Curve Radius-Railroad - Low/Actual	6	Meters	0.0-1000.0
Curve Radius-Railroad - High of Range	6	Meters	0.0-1000.0
Curve Radius-Railroad - Code	1	Code	0
Grade and Direction - Low/Actual	2	Percent	0-75
Grade and Direction - High of Range	2	Percent	0-75
Grade and Direction - Code	1	Code	0-4
Number of Tracks - Low/Actual	3	Number	0-150
Number of Tracks - High of Range	3	Number	0-150
Number of Tracks - Code	1	Code	0-7
Construction Material	2	Code	0-31
Unused	1	Pad	Space (octal 40)
	40 Bytes		

----------End-of-Trans/Rail

J.13. TRANSPORTATION-RELATED/BRIDGE -- 5 TO 43 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	080100-080200 (Note 1)
Total Character Count (all blocks)	4	Number	183-1883 (Note 2)
Bridge Type	3	Code	0-100
Traversing Feature Class	2	Code	0-31
Bridge Number	5	Code	1-32767
Name	4	Code	B001-B999
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Length - Code	2	Code	0-31 -
Aerial Obstruction	1	Code	0,1
Width-Transportation - Low/Actual	5	Meters	0.00-50.00 (Note 5)
Width-Transportation - High of Range	5	Meters	0.00-50.00 (Note 5)
Width-Transportation - Code	2	Code	0-15
Condition/Usability	1	Code	0-7
Height - Low/Actual	7	Meters	0.00-1000.00
Height - High of Range	7	Meters	0.00-1000.00
Height - Code	2	Code	0-31
Bypass Conditions	1	Code	U,E,D,I
Elevation	6	Meters	-300.0 to +8850.0
Transit Time - Low/Actual	1	Minutes	0-600 (Byte 1 of 3)
	40 Bytes		

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Transit Time - Low/Actual	2		(Bytes 2-3 of 3)
Transit Time - High of Range	3	Minutes	0-600
Transit Time - Code	1	Code	To be defined
Horizontal Clearance - Low/Actual	5	Meters	0.00-50.00
Horizontal Clearance - High of Range	5	Meters	0.00-50.00
Horizontal Clearance - Code	2	Code	0-7
Overhead Clearance - Low/Actual	5	Meters	0.00-12.00

APPENDIX J

TRANSPORTATION-RELATED/BRIDGE - Continued.

Overhead Clearance - High of Range	5	Meters	0.00-12.00
Overhead Clearance - Code	1	Code	0-31
Underbridge Clearance - Low/Actual	6	Meters	0.0-1000.0
Underbridge Clearance - High of Range	5	Meters	0.0-1000.0 (Bytes 1-5 of 6)
	40 Bytes		

d. Block 4:

ITEM NAME	LENGTH	UNITS	RANGE
Underbridge Clearance - High of Range	1		(Byte 6 of 6)
Underbridge Clearance - Code	1	Code	0-7
Underbridge Movement	1	Code	0-7
Underbridge Class - One Way Tracked - Low/Act	5	Tons	0.0-150.0
Underbridge Class - One Way Tracked - High	5	Tons	0.0-150.0
Underbridge Class - One Way Tracked - Code	2	Code	0-15 or 0-7
Underbridge Class - Two Way Tracked - Low/Act	5	Tons	0.0-150.0
Underbridge Class - Two Way Tracked - High	5	Tons	0.0-150.0
Underbridge Class - Two Way Tracked - Code	2	Code	0-15 or 0-7
Underbridge Class - One Way Wheeled - Low/Act	5	Tons	0.0-150.0
Underbridge Class - One Way Wheeled - High	5	Tons	0.0-150.0
Underbridge Class - One Way Wheeled - Code	2	Code	0-15 or 0-7
Underbridge Class - Two Way Wheeled - Low/Act	1	Tons	0.0-150.0
	40 Bytes		(Byte 1 of 5)

e. Block 5:

ITEM NAME	LENGTH	UNITS	RANGE
? Class-Two Way Wheeled - Low/Act	4		(Bytes 2-5 of 5)
? Class-Two Way Wheeled - High	5	Tons	0.0-150.0
? Class-Two Way Wheeled - Code	2	Code	0-15 or 0-7
? of Military Load Class	1	Code	0-3
? of Spans - Low	3	Number	1-100
? of Spans - High	3	Number	1-100
? of Spans - Code	2	Code	0-15
Entry Count	3	Number	0-100 (Note 4)
	23 Bytes		(End of fixed portion)
? fields (see list below)	0-17		
	?	Pad	Spaces (octal 40)
	40 Bytes		

TRANSPORTATION-RELATED/BRIDGE - Continued.

f. Blocks 6-43 (Optional):

ITEM NAME	LENGTH	UNITS	RANGE
? fields (see list below)	?-40		
	2	Pad	Spaces (octal 40)
	40 Bytes		
Transportation - Related/Bridge Repeating Fields:			
Span Length - Low/Actual	7	Meters	0.00-2000.00
Span Length - High of Range	7	Meters	0.00-2000.00
Span Length - Code	1	Code	0-7
Span Construction Material	2	Code	0-31
	17	17 x 100 = 1700 bytes max	

----------End-of-TRel/Bridge

J.14. TRANSPORTATION-RELATED/OTHER -- 4 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	080300-081303 (Note 1)
Total Character Count (all blocks)	4	Number	135 (Note 2)
Drainage Type	2	Code	0-15 or 0-31
Traversing Feature Class	2	Code	0-31
Name	4	Code	Dnnn, Tnnn
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
Length - Code	2	Code	0-31
Condition/Usability	1	Code	0-7
Width-Transportation - Low/Actual	3	Meters	0.00-50.00 (Note 5) (Bytes 1-3 of 5)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Width-Transportation - Low/Actual	2		(Bytes 4-5 of 5)
Width-Transportation - High of Range	5	Meters	0.00-50.00 (Note 5)
Width-Transportation - Code	2	Code	0-15
Water Stage	1	Code	0-3
Height - Low/Actual	7	Meters	0.00-1000.00
Height - High of Range	7	Meters	0.00-1000.00
Height - Code	2	Code	0-31

Feature Type in the FFA record

TRANSPORTATION-RELATED/OTHER - Continued.

ITEM NAME	LENGTH	UNITS	RANGE
Construction Material	2	Code	0-31
Elevation	6	Meters	-300.0 to +8850.0
Depth of Surface Draining- Low/Actual	5	Meters	0.0-100.0
Depth of Surface Draining - High	1	Meters	0.0-100.0 (Byte 1 of 5)
	40 Bytes		

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Depth of Surface Drainage - High	4		(Bytes 2-5 of 5)
Depth of Surface Drainage - Code	1	Code	0-7 or 0-3
Depth Seasonal Period:			
Depth Seasonal Period Start	2	Number	01-16
Depth Seasonal Period End	2	Number	01-16
Bottom Materials	1	Code	0-7 or 0-6
Depth of Overburden - Low/Actual	6	Meters	0.0-1000.0
Depth of Overburden - High of Range	6	Meters	0.0-1000.0
Depth of Overburden - Code	1	Code	0-7
Overburden Materials	1	Code	0-7
Transit Time - Low/Actual	3	Minutes	0-600
Transit Time - High of Range	3	Minutes	0-600
Transit Time - Code	1	Code	To be defined
Approaches	1	Code	U,E,D,I
Horizontal Clearance - Low/Actual	5	Meters	0.00-50.00
Horizontal Clearance - High of Range	3	Meters	0.00-50.00 (Bytes 1-3 of 5)
	40 Bytes		

d. Block 4:

ITEM NAME	LENGTH	UNITS	RANGE
Horizontal Clearance - High of Range	2	Meters	0.00-50.00 (Bytes 4-5 of 5)
Horizontal Clearance - Code	2	Code	0-7
Overhead Clearance - Low/Actual	5	Meters	0.00-12.00
Overhead Clearance - High of Range	5	Meters	0.00-12.00
Overhead Clearance - Code	1	Code	0-31
Unused	25	Pad	Spaces (octal 40)
	40 Bytes		

----------End-of-TRel/Other

APPENDIX J

J.15. AERONAUTICAL/OBSTACLES/AERIAL OBSTRUCTIONS/COAST AND LANDING BEACHES -- 2 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	090000-110500, 140000-140305 (Note 1)
Total Character Count (all blocks)	4	Number	79 (Note 2)
Name	4	Code	A001-Z999
Aerial Obstruction	1	Code	0,1
Condition/Usability	1	Code	0-7
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	8	Meters	20000.00
Length - Code	2	Code	0-31
Orientation - Symbolized Feature	1	Code	L,R
Width (Other) - Low/Actual	5	Meters	0.00-300.00 (Bytes 1-5 or 6)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Width (Other) - Low/Actual	1		(Byte 5 of 6)
Width (Other) - High of Range	6	Meters	0.00-300.00
Width (Other) - Code	2	Code	0-15
Tower Type	1	Code	0-4
Height - Low/Actual	7	Meters	0.00-1000.00
Height - High of Range	7	Meters	0.00-1000.00
Height - Code	2	Code	0-31
Construction Material	2	Code	0-31
Elevation	6	Meters	-300.0 to +8850.0
Orientation - Feature	3	Degrees	0-180
Elevated Structure Shape/Placement:			
Elevated Structure Shape	1	Code	0-4
Elevated Structure Placement	1	Code	0-4
Unused	1	Pad	Space (octal 40)
	40 Bytes		

----------End-of-AO

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J.16. LAND USE FEATURES AND SPECIAL FEATURES -- 2 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	120000-130500 (Note 1)
Total Character Count (all blocks)	4	Number	180 (Note 2)
Land Use Qualifier	3	Code	0-120
Name	4	Code	A001-Z999
Left Side ID	4	Code	A001-Z999
Right Side ID	4	Code	A001-Z999
Length - Low/Actual	8	Meters	20000.00
Length - High of Range	7	Meters	20000.00 (Bytes 1-7 of 8)
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
Length - High of Range	7	Meters	20000.00 (Byte 8 of 8)
Length - Code	2	Code	0-31
Aerial Obstruction	1	Code	0,1
Width (Other) - Low/Actual	6	Meters	0.00-300.00
Width (Other) - High of Range	6	Meters	0.00-300.00
Width (Other) - Code	2	Code	0-15
Condition/Usability	1	Code	0-7
Height - Low/Actual	7	Meters	0.00-1000.00
Height - High of Range	7	Meters	0.00-10000.00
Height - Code	1	Code	0-31 (Byte 1 of 2)
	40 Bytes		

c. Block 3:

ITEM NAME	LENGTH	UNITS	RANGE
Height - Code	1		(Byte 2 of 2)
Construction Material	2	Code	0-31
Storage Capacity - Low/Actual	8	Cubic Mtrs	0-10000000
Storage Capacity - High of Range	8	Cubic Mtrs	0-10000000
Storage Capacity - Code	1	Code	0-7
Orientation - Symbolized Feature	1	Code	L, R
Pipe Diameter - Low/Actual	4	Meters	0.00-5.00
Pipe Diameter - High of Range	4	Meters	0.00-5.00
Pipe Diameter - Code	1	Code	0-7
Tower Type	1	Code	0-4
Elevation	6	Meters	-300.0 to +8850.0
Orientation - Feature	3	Degrees	0-180
	40 Bytes		

LAND USE FEATURES AND SPECIAL FEATURES - Continued.

d. Block 4:

ITEM NAME	LENGTH	UNITS	RANGE
Elevated Structure Shape/Placement:			
Elevated Structure Shape	1	Code	0-4
Elevated Structure Placement	1	Code	0-4
Population - Low/Actual	10	Number	0-5000000000
Population - High of Range	10		
Population - Code	2	Code	To be defined
Number of Structures/Km2-Low/Actual	4	Number	0-6000
Number of Structures/Km2-Low of Rng	4	Number	0-6000
Number of Structures/Km2	3	Code	To be defined
Roof Type	1	Code	0-9
Shape Code	1	Code	0-6
Monitor Type	1	Code	0-3
Pattern Descriptors:			
Pattern Type	1	Code	0-3
Pattern Grid	1	Code	-128 to +127 (Byte 1 of 4)
	40 Bytes		

e. Block 5:

ITEM NAME	LENGTH	UNITS	RANGE
Pattern Grid	3		(Bytes 2-4 of 4)
Pattern Width/Angular Spacing	4	Meters/	0-300
		Degrees	0-180
Pattern Length	4	Meters	0-99999
Pattern Orientation	3	Code	0-2
Pattern Reserved/Not Used	6	Pad	Space (octal 40)
Unused	20	Pad	Space (octal 40)
	40 Bytes		

----------End-of-LandUse

J.17. INTERMEDIATE CROSS-COUNTRY MOVEMENT -- 2 40-BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	150000 (Note 1)
Total Character Count (all blocks)	4	Number	41 (Note 2)
Surface Configuration Feature Number	5	Number	1-65535
Slope Category (Map Unit)	1	Code	A-H,Z,W
F5 Slope Intercept Freq. Module Factor	5	Unit	0.000-1.000
Vegetation Feature Number	5	Number	1-65535
Vegetation Map Unit:			
Vegetation Type	2	Code	Alphanumeric

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INTERMEDIATE CROSS-COUNTRY MOVEMENT - Continued.

ITEM NAME	LENGTH	UNITS	RANGE
Representative Canopy Closure	1	Code	0-4
Representative Height of Vegetation	2	Code	0-15 or 0-7
Surface Materials Feature Number	5	Number	1-65535
Surface Materials Map Unit:			
Surface Material Type	2	Code	0-31
Surface Roughness Map Qualifier	2	Code	0-15
	40 Bytes		

b. Block 2:

ITEM NAME	LENGTH	UNITS	RANGE
State of Ground Map Qualifier	1	Code	0-3
Unused	39	Pad	Space (octal 40)
	40 Bytes		

----------End-of-I-CCM

J.18. FINAL CROSS-COUNTRY MOVEMENT -- 1 TO 3 40 BYTE BLOCKS

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	160000 (Note 1)
Total Character Count (all blocks)	4	Number	20-97 (Note 2)
CCM Basic Movement Category (Map Unit)	1	Code	0-7 to 0-3
Number of CCM Movement Veh Types	2	Number	1-12 (Note 5)
	13	(End of fixed portion)	
Repeating fields (see list below)	4-27		
Unused	?	Pad	Spaces (octal 40)
	40 Bytes		

b. Blocks 2-3 (Optional):

Repeating field entries (see below)	?-40		
Unused	?-17	Pad	Spaces (octal 40)
	40 Bytes		

Final CCM Variable Entries:

ITEM NAME	LENGTH	UNITS	RANGE
CCM Movement Vehicle Type	2	Code	0-12
CCM Speed Descriptor - Low	2	Kph/Mph	0-30
CCM Speed Descriptor - High	2	Kph/Mph	0-30
CCM Obstacle Type - or-			
CCM Passage Blocked Area	1	Code	0-7, 0-3
	7	Occurs 1-12 times	

----------End-of-Final-CCM

J.19. CONCEALMENT - AERIAL DETECTION (SUMMER/WINTER) -- 1 40-BYTE BLOCK

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	170100-170200 (Note 1)
Total Character Count (all blocks)	4	Number	13 (note 2)
C-AD Concealment Category (Map Unit)	2	Code	0-7 or 0-14
C-AD Open Water Flag	1	Code	0-1
Unused	27	Pad	Spaces (octal 40)
	40 Bytes		

----------End-of-C-AD

J.20. ANCESTRY FEATURE -- 1 TO 5 40-BYTE BLOCKS (NOTE 6)

a. Block 1:

ITEM NAME	LENGTH	UNITS	RANGE
Feature Category	6	Code	490000-490100 (Note 1)
Total Character Count (all blocks)	4	Number	38200 (Note 2)
Data Set Specification:			
Project Area Name	9	Characters	
Product Area Name	9	Characters	
Data Set Name	9	Characters	
Number of Synthetic Product Ancestors	1	Number	1-6 (Note 4)
	38	(End of fixed portion)	
Repeating fields (see list below)	2		
	40 Bytes		

b. Blocks 2-5 (Optional):

Repeating fields (see list below)	?-40	25 to 160 Bytes	
Unused	?	Pad	Spaces (octal 40)
	40 Bytes		

Ancestry Feature Repeating Field Entries:

ITEM NAME	LENGTH	UNITS	RANGE
Ancestor Project Area Name	9	Characters	
Ancestor Product Area Name	9	Characters	
Ancestor Data Set Name	9	Characters	
	27 Bytes, Occurs 1-6 times		

----------End-of-Ancestry

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NOTES:

1. Feature Category values have been defined in the TADB Functional Description. There is no direct correlation between Feature Category and FEA Block format. The seventeen (17) FEA formats defined for SLF-TA correspond to the combination of attributes/microdescriptors required to describe each record.

2. Total Character Count includes all FEA Blocks for Feature. No padding (spaces) has been inserted between attributes/microdescriptors. Fields are logically split, as necessary, at the end of each 40-byte block. Total Character Count does NOT include padding (spaces) in the last 40-byte block.

3. All "code" microdescriptor values/ranges have been defined in the TADB Data Dictionary, APPENDIX A to the TADB Functional Description. Values shown in this document correspond to the maximum range defined, and may not all be "assigned" (in use) at the present time.

4. Fields annotated are "count" fields, which control the occurrence of one or more following repeating fields.

5. Fields annotated may have a "high-value" of all '9s' to indicate measurement exceeded assigned range.

6. The Ancestry Feature identifies the data set. For synthetic products such as Intermediate Cross-Country Movement (CCM), it also provides for identification of ancestor data sets that were used to generate the intermediate product. The Intermediate CCM data set must identify from one to three ancestor data sets: Surface Configuration/Slope, Vegetation, and Surface Materials. An SLF-TA Segment Block (SEG) will be associated with the Ancestry feature.

TO 31Z-10-4 provides procedures for establishing safe operating distances. Safety criteria: Air Force

APPENDIX K

IMPLEMENTING DFAD IN 3-D SLF

K.1. SCOPE

K.1.1 Scope. This APPENDIX describes the product-specific usage of SLF for DLMS/DFAD. It is primarily intended for the producers of DFAD production data to be released to the DMA Cartographic Data Base. **Any ambiguity in the interpretation of SLF will be resolved in favor of consistency with the appropriate DLMS specifications.** This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

K.2. APPLICABLE DOCUMENTS

K.2.1 Government documents.

K.2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Defense Mapping Agency (DMA)

PS/1CD/100 PS/1CE/100 PS/1CF/100 PS/1CG/100	DMA Product Specifications for Digital Landmass System (DLMS) Data Base
PS/1CE/200 PS/1CG/200	DMA Product Specification for Digital Feature Analysis Data (DFAD)
PS/1CK/200 PS/1CI/200	DMA product Specifications for Level 1-C Data

(Copies of the above publications are available from the Defense Mapping Agency, ATTN: ATIS, ST A-10, 8613 Lee Highway, Fairfax, VA 22031-2137.)

K.2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document

takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

NOTE: The notes below are keyed to the SLF section and paragraph numbers, and data field names.

K.3. SECTION 5.2.a, TAPE LABEL RECORDS

If an SLF tape contains more than one data set, they will be ordered on the tape as described in the DLMS specifications, Chapter 4, Section 200, Paragraph 205.

- The first 17 characters of the DSI data set ID will be placed in the HDR1 file identifier field.

K.4. SECTION 5.3, DATA SET IDENTIFIER (DSI) RECORD

- Product Type is the same as DLMS Product Identifier. It must be "DFAD1", "DFAD2", or "DFADC".

- Data Set ID is the same as DLMS Unique Reference Number. It will comprise the ONC and cell number, left-justified, space-filled. For example, ONC F-4 cell 27 would have the Data Set ID "*F04b027bbbbbbbbbbbbb*".

- Edition is the same as DLMS Data Edition Number. It must be "1" for new data. It must not exceed 99.

- Compilation Date will be the compilation date shown on the manuscript.

- Maintenance Date must be "0000" for new data.

- Security Classification is the same as DLMS Security Code. It must be "S" for non-US DFAD2 or if there are multiple accuracy outlines. It must be "U" otherwise.

- Security Release is the same as DLMS Security Control and Release Marking. It must be spaces if the Security Classification is "U". It must be "NF" if the Security Classification is "S".

- Downgrading/Declassification Date is not currently required for DLMS; however, it will be shown in the DLF as "OADR" if the Security Classification is "S". Otherwise, it will be spaces.

- Security Handling is the same as DLMS Security Handling Description. The default value will be "LIMITED DISTRIBUTION".

- Data Type must be "GEO".

- Horizontal Units of Measure must be "SEC".

- Horizontal Resolution Units must be "0.010".

- Geodetic Datum must be "WGE" (WGS-84).

- Ellipsoid must be "WGE" (WGS-84).

- Vertical Units of Measure must be "M" (meters).

- Vertical Resolution Units must be "0.010" meters.

- Vertical Reference System must be "MSL".

- Sounding Datum must be spaces.

- Latitude and Longitude of Origin must be the southwest corner of the DLMS manuscript. The hundredths-of-seconds digit must always be zero.

- X and Y Origin must be spaces. Z Origin is defined in Section 200, Paragraph 203.

- Latitude and Longitude of SW and NE corners are those of the DLMS manuscript. The hundredths-of-seconds digit must always be zero.

- Number of Point, Line, and Areal Features reflect the SLF Feature Type in the FEA record.

- The DSMP group is not required for DLMS. The data may be present (for historical purposes) or may be spaces.

- Edition Code must be spaces.

- Product Specification must be "SPEXDLMS2", "SPEXDLMSC" or "SPECDFAD2".

- Specification Date must be "8304", "8312" or "8604".

- Specification Amendment Number must be "000" for SPEXDLMS2 or SPEXDLMSC. It must be "010" for SPEXDLMS2, Amendment 1. It must be 020" for SPECDFAD2, Amendment 2.0.

- Producer is the same as DLMS Producer Code. It must be "US090078" for DMAAC-produced data or "US090000" for DMAHTC-produced data.

- Digitizing system is the same as DLMS Digitizing Collection System. It may be used at the producer's discretion, or may be spaces.

- Processing System is not currently required for DLMS. It may be used at the producer's discretion, or may be spaces.

- Grid System must be spaces.

- Horizontal and Height Accuracies must be as defined in the DLMS specifications.

- Vertical Accuracies must be spaces.

- Data Generalization must be "0".

- Match/Merge Numbers must be "0" for new data.

- Match/Merge Dates must be "0000" for new data.

- Year and month of earliest source must be spaces.

- Year and month of latest source must be spaces.

- Data collection code must be spaces.

- Data collection criteria must be spaces.

- Registration Points Address may be spaces, indicating that the DSRG does not exist.

- Accuracy Subset Address must be spaces if there are not multiple accuracy outlines.

- The DSRG is not required for "GEO" data. It may be present (for historical purposes) or it may not exist.

- If there are no multiple accuracy outlines, the DSAG will not exist.

- If there are multiple accuracy outlines, the following rules apply:

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- The overall Horizontal and Height Accuracies (in the DSHG group) will reflect the worst subset accuracy, in accordance with DLMS specifications.

- The outlines must completely cover the data set area, but without overlap.

- There must be no more than nine outlines, and no more than 14 coordinates in each outline.

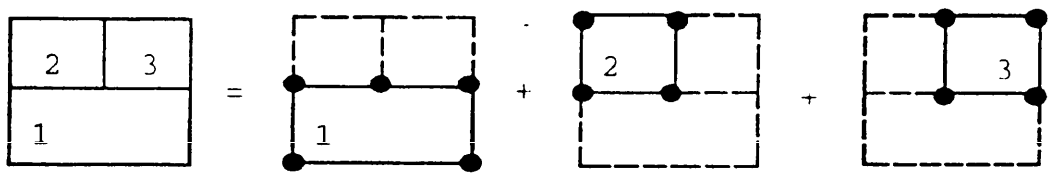
- The order of the outlines starts at the southwest corner of the data set area.

- Outline coordinates start and end at the southwest corner of the outline.

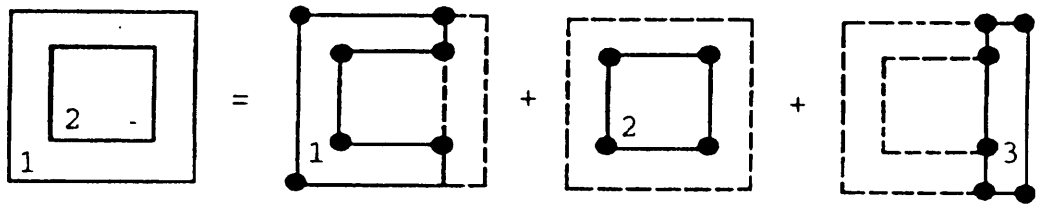
- The outline tracks counterclockwise (feature left) and is explicitly closed (the last point duplicates the first).

- The hundredths-of-seconds digit in the coordinates will always be zero.

- Coordinate points must exist at all intersections.



- "Swiss Cheese" areas will be broken up:



K.5. SECTION 5.4, SEGMENT (SEG) RECORD

- Feature Orientation will be "C" for linear and point features. For areal features, it will reflect the DLMS "feature left" convention. It will be "L" (left) when the corresponding Direction of Segment entry in the FEA record is "F" (Forward), "D" (Disjoint Forward), or "I" (Inside Forward). Conversely, it will be "R" (Right) when the Direction of the Segment is "R" (Reverse), "E" (Disjoint Reverse), or "J" (Inside Reverse).

- FEA records for point features will have "F" for direction of all segments. Corresponding SEG records will have one X, Y, Z coordinate set each.

- The segment references are placed in the FEA Record such that the reflective side of unidirectional linear features is to the right.

- X-value, Y-value, and Z-value represent delta longitude, delta latitude, and delta elevation respectively, referenced to the Latitude, Longitude, and Elevation of Origin in units of resolution specified in the DSI record.

K.6. SECTION 5.5, FEATURE (FEA) RECORD

- The feature header will be defined by the DMAFF Document as found in EIF15034, Appendix 10.35.

- DMAFF first 40 byte feature header block will be the same for all features on a tape and will be recreated for each revision of a data set. No maintenance of this data will take place

- DMAFF feature header block Fields 6 and 7 for horizontal and vertical accuracy are ABSOLUTE accuracy.

- DMAFF 40-byte feature header blocks will be created and read as all uppercase characters.

- For DMAFF attributes for which no value is collected, fields will be blanks.

- In cases where the product specifications require selection of an attribute code which corresponds to a range of values, the lower bound of the range will be stored in the DMAFF attribute field.

- For the purposes of storing DFAD height, length, and width values (DMAFF HGT, LEN, and WID attributes), a zero value will be interpreted as "0 meters" rather than "unknown."

Negative values for height will be preceded with a - character. If more than 3 characters are required, the DMAFF convention for use of the next available VAL field will be followed; the HGT attribute will be filled with 999 and the next available VAL field will contain the height value and sign.

- For density measure of structures (DMAFF DMS attribute) the value stored will be expressed per 150 by 150 meter area for DFAD Level 1. For DFAD Level 2, the value stored will be expressed per 30 by 30 meter area.

- The length of the Segment Count field is five digits.

K.7. FEATURE HIERARCHY

The features in the FEA record must be sorted such that the physical order within the FEA record reflects a feature hierarchy:

- All area features in hierarchical order such that an area feature completely contained in another area feature appears later in the sequence

- Road interchanges (FID 230-239)

- All linear features

- All point features except road interchanges

- Within the linear and point feature categories, the relative hierarchical sequence established by the analyst must be preserved.

APPENDIX L

IMPLEMENTING DIGITAL TERRAIN ANALYSIS DATA IN 3-D SLF

L.1. SCOPE

L.1.1 Scope. This APPENDIX describes the conventions to be followed in preparing Digital Terrain Analysis Data sets using 3-D SLF. It is primarily intended to support the production of the Tactical Terrain Analysis Data Base and the Planning Terrain Analysis Data Base overlays (except Surface Configuration, or Slope). This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

NOTE: The notes below are keyed to the appropriate sections, paragraphs numbers, and SLF data field names of the Digital Production System (DPS) Standard Linear Format for Digital Cartographic Feature Data. Only those sections requiring special instructions are addressed in this APPENDIX.

20 APPLICABLE DOCUMENTS

L.2.1 Government documents.

L.2.1.1 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Defense Mapping Agency

EIF 15034 DMA Feature File

Defense Intelligence Agency

DIAM 65-19 Standard Security Markings Manual

(Copies of the above publications are available from the Defense Intelligence Agency, ATTN: DT-1A (C6-824), Washington, DC 20340-6161.)

L.2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards) the text of this document takes precedence. Nothing in this document, however, supersedes

applicable laws and regulations unless a specific exemption has been obtained.

L.3. SECTION 5.2.a, TAPE LABEL RECORDS

Data sets for all five overlays (Vegetation, Surface Materials, Surface Drainage, Transportation, Obstacles, Slope and MPO) as tasked, distinguished by unique Overlay Codes (OVC) in the DSI, will be included in one file on one tape.

L.4. SECTION 5.3 DATA SET IDENTIFIER (DSI) RECORD

Data Set Identification Group:

- Product Type is "DTADT" (Digital Terrain Analysis Data/Tactical) for data collected for the 1:50,000 Tactical Terrain Analysis Data Base and "DTADP" (Digital Terrain Analysis Data/Planning) for data collected for the 1:250,000 Planning Terrain Analysis Data Base.

- Data Set ID is the same as the PTADB/TTADB stock number. It will be left-justified and all spaces will be filled. For example, "1501*DNM*3208*SDVMT*0*bbb*" (*b* represents the ASCII space code) is the complete data set covering the same geographic area as Sheet NM 32-8, a 1:250,000 DMA map.

Character Position	Contents
1-5	Series
6-11	Sheet Number
12-17	Overlays Included:
12	"S" or *b* (Surface Configuration)
13	"V" or *b* (Vegetation)
14	"M" or *b* (Surface Materials)
15	"D" or *b* (Surface Drainage)
16	"T" or *b* (Transportation)
17	"O" or *b* (Obstacles)
18	"P" or *b* (MPO)
19-20	ASCII Spaces

- Edition is '1' for a new data set. Edition will be incremented by one for each new edition (update).

- Compilation Date will be the year and month, "YYMM", the data set is validated.

- Maintenance Date must be "0000" for new data and for a revised (updated) data set, the year and month of revision will be entered, "YYMM".

- SLF Version Date will be the date of the SLF version which applies to the data set as defined in Section 200.

- DMAFF Version Date is "850214" for the Second Edition.

- DSIG Reserve field is not currently used and must be filled with ASCII spaces.

Data Set Security Group:

- Security Classification is the highest classification given to the data set as assigned in the Project Assignment Memorandum (PAM).

- Security Release is the equivalent two character security control and release code as stated in the PAM. For the appropriate code, see DIAM 65-19.

- Downgrading/Declassification Date field will contain "OADR", if no date is assigned.

- Security Handling field will be based on security requirements and limited to the field size as specified.

- DSSG Reserve field is not currently used and must be filled with ASCII spaces.

Data Set Parameter Group:

- Data Type must be "GEO".

- Horizontal Units of Measure must be "SEC".

- Horizontal Resolution Units must be "0.010 for TTADB and "0.020" for PTADB. Therefore, the maximum product size will be 2 degrees and 30 seconds by 2 degrees and 30 seconds for a TTADB and 5 degrees by 5 degrees for a PTADB.

- Geodetic Datum must be "WGE" (WGS-84).

- Ellipsoid must be "WGE" (WGS-84).

- Vertical Units of Measure must be "*Mbb*" (meters).

- Vertical Resolution Units must be "0.010" for TTADB and PTADB.

- Vertical Reference System must be "*MSLb*" (mean sea level).

- Sounding Datum field is not applicable and must be filled with ASCII spaces.

- Latitude and Longitude of Origin must be the southwest corner of the data set. The hundredths-of-seconds digit must always be zero.

- X and Y Coordinates of Origin fields are not applicable and must be filled with ASCII spaces. Z Origin is defined in Section 200, Paragraph 203.

- Latitude and Longitude of SW and NE corners are those of the data set. The hundredths-of-seconds digit must always be zero.

- Total Number of Features reflects the total number of feature subrecords in the Feature Record.

- Number of Point, Linear, and Areal Features reflects the total number of feature subrecords per type in the Feature Record.

- Total Number of Segments reflects the total number of segment subrecords in the Segment Record.

- DSPG Reserve field is not currently used, and must be filled with ASCII spaces.

Data Set Map Projection Group:

- This group is not utilized for "GEO" data sets.

Data Set History Group:

- Edition Code must be "000" for first-time coverage of a geographic area. This value will be specified by the operator as "RRV", in which "RR" is the recompilation count, and "V" is the revision count.

- Production Specification must be either "SPECX250PTADB" when collecting for the PTADB or "SPECX050TTADB" when collecting for the TTADB. Currently no digital specifications exist for Terrain Analysis, therefore the hardcopy specification will be utilized until others are

written. At this time, the new specification name will be utilized.

- Specification Date must be either "8212" (PTADB) or "8201" (TTADB) until new specifications are written.

- Specification Amendment Number will be shown in the current specification document.

- Producer is "US090000" for DMAHTC. Otherwise, the current producer of the data set will be stored.

- Digitizing System represents the system which digitizes the data set, such as "*FESbFEEbbb*" or "*AGDSbbbbbb*".

- Processing System represents the system which processes the data set, such as "*FESbDPEbbb*" or "*TAPSbbbbb*".

- Grid System field is not used for Digital Terrain Analysis products, and must be filled with ASCII spaces.

- Absolute Horizontal Accuracy must be expressed in 0.01 meter units. For example, "5521" is equivalent to 55.21 meters.

- Absolute Vertical Accuracy must be expressed in 0.01 meter units.

- Relative Horizontal Accuracy must be expressed in 0.01 meter units.

- Relative Vertical Accuracy must be expressed in 0.01 meter units.

- Height Accuracy must be expressed in 0.01 meter units.

- Data Generalization Code will be "0". No note will be required in the Text Record.

- Match/Merge Numbers and Dates for all DMAHTC produced data bases will be provided. This value is zero-filled for new data.

- Year and Month of Earliest and Latest Sources used in production of the data sets will be provided.

- Data Collection Code field is normally filled with an ASCII space.

- Data Collection Criteria may be used to denote a detailed reference in a specification document; otherwise, it is filled with ASCII spaces.

- Data Set Variable Field Address Group - This group is not utilized for "GEO" data sets.

- Data Set Registration Points Group is not utilized for "GEO" data sets.

L.5. SECTION 5.4, SEGMENT (SEG) RECORD

- X-value and Y-value represent delta longitude and delta latitude respectively, in hundredths of arc seconds referenced to the Latitude and Longitude of Origin specified in the DSI record.

- Z-value represents delta elevation referenced to the Elevation of Origin and specified in units of resolution in the DSI record.

- The Direction of Segment fields in the Feature Records must agree with the "feature-left" convention.

- Feature Orientation for linear and point features will be "C"-coincident for point and linear features, however, some linear features will be represented by "feature-left" convention.

  Cuts, fills, escarpments, and depressions are often so steep that they must be depicted as linear features. For post-processing and symbolization purposes, it is understood that the segment(s) associated with these features will represent the tops of the features. [The feature orientation for these features will be "L" (Left); i.e., the Direction of Segment field (in the Feature Record) will be "F" (forward), if an observer facing in the direction of digitization would see the down-hill side of the feature on his right; the Direction of Segment will be "R" (reverse) in the opposite case.]

L.6. SECTION 5.5, FEATURE (FEA) RECORD

- Feature Header Block Count will be variable.

- Feature Header codes for the Digital Terrain Analysis Data produced by DMA are specified in DMA Feature File, Second Edition, EIF15034, APPENDIX 10.35.

- The length of the Segment Count field is five digits.

- Direction of Segment fields for areal and linear features such as fills, cuts, escarpments, and depressions will follow the conventions described in section 5 of this APPENDIX.

L.7. SECTION 5.6, TEXT (TXT) RECORD

- The character count contains the total number of characters utilized for each physical text record.

- The TEXT RECORD will contain the necessary roughness factors, description, and vegetation parameters required to prepare the Vegetation Table for the 1:50,000 TTADB for the 1:250,000 PTADB Hardcopy Specifications. These Factors are compiled on a project-wide basis during the collection phase, and should be completed before further processing occurs on these features.

- A second TEXT RECORD will contain the necessary Surface Roughness Factors and descriptions required to prepare the Surface Materials overlay (for either the TTADB or the PTADB). These Factors are compiled on a project-wide basis during the feature extraction phase, and should be completed before further processing occurs on these features.

L.7.1 TXT Record for the Feature Extraction Segment (FE/S).

The format and content of the SLF TXT record for the DTAD Vegetation TABLE for the FE/S is as defined in TABLE I for the TTADB and as defined in TABLE II for the PTADB. This TXT record will be utilized only when the Vegetation overlay is collected. The format and content of the SLF TXT record for the DTAD Surface Roughness TABLE for the FE/S is as defined in TABLE III for both the TTADB and the PTADB. This TXT record will be utilized only when the Surface Materials overlay is collected.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1-3	'TXT'	3
4-8	'----1'	5
9-12	Number of characters included in this TXT logical record	4
13-44	'VEGETATION-ROUGHNESS-INFORMATION	32
45-69	Project Name (left-justified, fill unused spaces with ASCII blanks)	25
70-81	'NON-FORESTED'	12
82-83	'A1'	2
84-86	VRF for A1 (Format: XXX, Range: 0.00 - 1.00 or 9.99 for Not Evaluated Areas)	3
87-88	'A2'	2
89-91	VRF for A2	3
92-93	'A3'	2
94-96	VRF for A3	3
97-98	'A4'	2
99-101	VRF for A4	3
102-103	'B1'	2
104-106	VRF for B1	3
107-108	'B2'	2
109-111	VRF for B2	3
112-113	'G1'	2
114-116	VRF for G1	3
117-118	'G2'	2
119-121	VRF for G2	3
122-123	'-H'	2
124-126	VRF for H	3
127-128	'-I'	2
129-131	VRF for I	3
132-133	'-J'	2
134-136	VRF for J	3
137-138	'-K'	2
139-141	VRF for K	3
142-143	'-L'	2
144-146	VRF for L	3
147-148	'-M'	2
149-151	VRF for M	3
152-153	'-N'	2
154-156	VRF for N	3
157-158	'-W'	2

TABLE I. TTADB Format.

TXT Character Position	Content	#Bytes Needed
159-161	VRF for W	3
162-163	'-X'	2
164-166	VRF for X	3
167-174	'FORESTED'	8
175-177	'C11'	3
178-180	Average Stem Diameter for C11 (Format: XXX, Range: 000-999cm)	3
181-183	Average Tree Spacing for C11 (Format: XXX, Range: 000-999dm)	3
184-186	Vegetation Roughness Factor (VRF) for C11 (Format: XXX, Range: 0.00-1.00 or 9.99 for Not Evaluated areas)	3
187-189	'C12'	3
190-192	Average Stem Diameter for C12	3
193-195	Average Tree Spacing for C12	3
196-198	VRF for C12	3
199-201	'C13'	3
202-204	Average Stem Diameter for C13	3
205-207	Average Tree Spacing for C13	3
208-210	VRF for C13	3
211-213	'C14'	3
214-216	Average Stem Diameter for C14	3
217-219	Average Tree Spacing for C14	3
220-222	VRF for C14	3
223-225	'C15'	3
226-228	Average Stem Diameter for C15	3
229-231	Average Tree Spacing for C15	3
232-234	VRF for C15	3
235-237	'C16'	3
238-240	Average Stem Diameter for C16	3
241-243	Average Tree Spacing for C16	3
244-246	VRF for C16	3
247-249	'C17'	3
250-252	Average Stem Diameter for C17	3
253-255	Average Tree Spacing for C17	3
256-258	VRF for C17	3
259-261	'C18'	3
262-264	Average Stem Diameter for c18	3
265-267	Average Tree Spacing for C18	3
268-270	VRF for C18	3

TABLE I. TTADB Format - Continued.

control and provide user access to non-processed 5-kHz UHF

APPENDIX L

TXT Character Position	Content	#Bytes Needed
271-273	'C19'	3
274-276	Average Stem Diameter for C19	3
277-279	Average Tree Spacing for C19	3
280-282	VRF for C19	3
283-285	'C21'	3
286-288	Average Stem Diameter for C21	3
289-291	Average Tree Spacing for C21	3
292-294	VRF for C21	3
295-297	'C22'	3
298-300	Average Stem Diameter for C22	3
301-303	Average Tree Spacing for C22	3
304-306	VRF for C22	3
307-309	'C23'	3
310-312	Average Stem Diameter for C23	3
313-315	Average Tree Spacing for C23	3
316-318	VRF for C23	3
319-321	'C24'	3
322-324	Average Stem Diameter for C24	3
325-327	Average Tree Spacing for C24	3
328-330	VRF for C24	3
331-333	'C25'	3
334-336	Average Stem Diameter for C25	3
337-339	Average Tree Spacing for C25	3
340-342	VRF for C25	3
343-345	'C26'	3
346-348	Average Stem Diameter for C26	3
349-351	Average Tree Spacing for C26	3
352-354	VRF for C26	3
355-357	'C27'	3
358-360	Average Stem Diameter for C27	3
361-363	Average Tree Spacing for C27	3
364-366	VRF for C27	3
367-369	'C28'	3
370-372	Average Stem Diameter for C28	3
373-375	Average Tree Spacing for C28	3
376-378	VRF for C28	3
379-381	'C29'	3
382-384	Average Stem Diameter for C29	3
385-387	Average Tree Spacing for C29	3
388-390	VRF for C29	3

TABLE I. TTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
391-393	'C31'	3
394-396	Average Stem Diameter for C31	3
397-399	Average Tree Spacing for C31	3
400-402	VRF for C31	3
403-405	'C32'	3
406-408	Average Stem Diameter for C32	3
409-411	Average Tree Spacing for C32	3
412-414	VRF for C32	3
415-417	'C33'	3
418-420	Average Stem Diameter for C33	3
421-423	Average Tree Spacing for C33	3
424-426	VRF for C33	3
427-429	'C34'	3
430-432	Average Stem Diameter for C34	3
433-435	Average Tree Spacing for C34	3
436-438	VRF for C34	3
439-441	'C35'	3
442-444	Average Stem Diameter for C35	3
445-447	Average Tree Spacing for C35	3
448-450	VRF for C35	3
451-453	'C36'	3
454-456	Average Stem Diameter for C36	3
457-459	Average Tree Spacing for C36	3
460-462	VRF for C36	3
463-465	'C37'	3
466-468	Average Stem Diameter for C37	3
469-471	Average Tree Spacing for C37	3
472-474	VRF for C37	3
475-477	'C38'	3
478-480	Average Stem Diameter for C38	3
481-483	Average Tree Spacing for C38	3
484-486	VRF for C38	3
487-489	'C39'	3
490-492	Average Stem Diameter for C39	3
493-495	Average Tree Spacing for C39	3
496-498	VRF for C39	3
499-501	'C41'	3
502-504	Average Stem Diameter for C41	3
505-507	Average Tree Spacing for C41	3
508-510	VRF for C41	3

TABLE I. TTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
511-513	'C42'	3
514-516	Average Stem Diameter for C42	3
517-519	Average Tree Spacing for C42	3
520-522	VRF for C42	3
523-525	'C43'	3
526-528	Average Stem Diameter for C43	3
529-531	Average Tree Spacing for C43	3
532-534	VRF for C43	3
535-537	'C44'	3
538-540	Average Stem Diameter for C44	3
541-543	Average Tree Spacing for C44	3
544-546	VRF for C44	3
547-549	'C45'	3
550-552	Average Stem Diameter for C45	3
553-555	Average Tree Spacing for C45	3
556-558	VRF for C45	3
559-561	'C46'	3
562-564	Average Stem Diameter for C46	3
565-567	Average Tree Spacing for C46	3
568-570	VRF for C46	3
571-573	'C47'	3
574-576	Average Stem Diameter for C47	3
577-579	Average Tree Spacing for C47	3
580-582	VRF for C47	3
583-585	'C48'	3
586-588	Average Stem Diameter for C48	3
589-591	Average Tree Spacing for C48	3
592-594	VRF for C48	3
595-597	'C49'	3
598-600	Average Stem Diameter for C49	3
601-603	Average Tree Spacing for C49	3
604-606	VRF for C49	3
607-609	'D11'	3
610-612	Average Stem Diameter for D11	3
613-615	Average Tree Spacing for D11	3
616-618	VRF for D11	3
619-621	'D12'	3
622-624	Average Stem Diameter for D12	3
625-627	Average Tree Spacing for D12	3
628-630	VRF for D12	3

TABLE I. TTADB Format - Continued.

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TXT Character Position	Content	#Bytes Needed
631-633	'D13'	3
634-636	Average Stem Diameter for D13	3
637-639	Average Tree Spacing for D13	3
640-642	VRF for D13	3
643-645	'D14'	3
646-648	Average Stem Diameter for D14	3
649-651	Average Tree Spacing for D14	3
652-654	VRF for D14	3
655-657	'D15'	3
658-660	Average Stem Diameter for D15	3
661-663	Average Tree Spacing for D15	3
664-666	VRF for D15	3
667-669	'D16'	3
670-672	Average Stem Diameter for D16	3
673-675	Average Tree Spacing for D16	3
676-678	VRF for D16	3
679-681	'D17'	3
682-684	Average Stem Diameter for D17	3
685-687	Average Tree Spacing for D17	3
688-690	VRF for D17	3
691-693	'D18'	3
694-696	Average Stem Diameter for D18	3
697-699	Average Tree Spacing for D18	3
700-702	VRF for D18	3
703-705	'D19'	3
706-708	Average Stem Diameter for D19	3
709-711	Average Tree Spacing for D19	3
712-714	VRF for D19	3
715-717	'D21'	3
718-720	Average Stem Diameter for D21	3
721-723	Average Tree Spacing for D21	3
724-726	VRF for D21	3
727-729	'D22'	3
730-732	Average Stem Diameter for D22	3
733-735	Average Tree Spacing for D22	3
736-738	VRF for D22	3
739-741	'D23'	3
742-744	Average Stem Diameter for D23	3
745-747	Average Tree Spacing for D23	3
748-750	VRF for D23	3

TABLE I. TTADB Format - Continued.

guard numbers, and the roll number qualifying these numbers, for a

APPENDIX L

TXT Character Position	Content	#Bytes Needed
751-753	'D24'	3
754-756	Average Stem Diameter for D24	3
757-759	Average Tree Spacing for D24	3
760-762	VRF for D24	3
763-765	'D25'	3
766-768	Average Stem Diameter for D25	3
769-771	Average Tree Spacing for D25	3
772-774	VRF for D25	3
775-777	'D26'	3
778-780	Average Stem Diameter for D26	3
781-783	Average Tree Spacing for D26	3
784-786	VRF for D26	3
787-789	'D27'	3
790-792	Average Stem Diameter for D27	3
793-795	Average Tree Spacing for D27	3
796-798	VRF for D27	3
799-801	'D28'	3
802-804	Average Stem Diameter for D28	3
805-807	Average Tree Spacing for D28	3
808-810	VRF for D28	3
811-813	'D29'	3
814-816	Average Stem Diameter for D29	3
817-819	Average Tree Spacing for D29	3
820-822	VRF for D29	3
823-825	'D31'	3
826-828	Average Stem Diameter for D31	3
829-831	Average Tree Spacing for D31	3
832-834	VRF for D31	3
835-837	'D32'	3
838-840	Average Stem Diameter for D32	3
841-843	Average Tree Spacing for D32	3
844-846	VRF for D32	3
847-849	'D33'	3
850-852	Average Stem Diameter for D33	3
853-855	Average Tree Spacing for D33	3
856-858	VRF for D33	3
859-861	'D34'	3
862-864	Average Stem Diameter for D34	3
865-867	Average Tree Spacing for D34	3
868-870	VRF for D34	3

TABLE I. TTADB Format - Continued.

Feature Type in the FFA record

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TXT Character Position	Content	#Bytes Needed
871-873	'D35'	3
874-876	Average Stem Diameter for D35	3
877-879	Average Tree Spacing for D35	3
880-882	VRF for D35	3
883-885	'D36'	3
886-888	Average Stem Diameter for D36	3
889-891	Average Tree Spacing for D36	3
892-894	VRF for D36	3
895-897	'D37'	3
898-900	Average Stem Diameter for D37	3
901-903	Average Tree Spacing for D37	3
904-906	VRF for D37	3
907-909	'D38'	3
910-912	Average Stem Diameter for D38	3
913-915	Average Tree Spacing for D38	3
916-918	VRF for D38	3
919-921	'D39'	3
922-924	Average Stem Diameter for D39	3
925-927	Average Tree Spacing for D39	3
928-930	VRF for D39	3
931-933	'D41'	3
934-936	Average Stem Diameter for D41	3
937-939	Average Tree Spacing for D41	3
940-942	VRF for D41	3
943-945	'D42'	3
946-948	Average Stem Diameter for D42	3
949-951	Average Tree Spacing for D42	3
952-954	VRF for D42	3
955-957	'D43'	3
958-960	Average Stem Diameter for D43	3
961-963	Average Tree Spacing for D43	3
964-966	VRF for D43	3
967-969	'D44'	3
970-972	Average Stem Diameter for D44	3
973-975	Average Tree Spacing for D44	3
976-978	VRF for D44	3
979-981	'D45'	3
982-984	Average Stem Diameter for D45	3
985-987	Average Tree Spacing for D45	3
988-990	VRF for D45	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
991-993	'D46'	3
994-996	Average Stem Diameter for D46	3
997-999	Average Tree Spacing for D46	3
1000-1002	VRF for D46	3
1003-1005	'D47	3
1006-1008	Average Stem Diameter for D47	3
1009-1011	Average Tree Spacing for D47	3
1012-1014	VRF for D47	3
1015-1017	'D48'	3
1018-1020	Average Stem Diameter for D48	3
1021-1023	Average Tree Spacing for D48	3
1024-1026	VRF for D48	3
1027-1029	'D49'	3
1030-1032	Average Stem Diameter for D49	3
1033-1035	Average Tree Spacing for D49	3
1036-1038	VRF for D49	3
1039-1041	'E11'	3
1042-1044	Average Stem Diameter for E11	3
1045-1047	Average Tree Spacing for E11	3
1048-1050	VRF for E11	3
1051-1053	'E12'	3
1054-1056	Average Stem Diameter for E12	3
1057-1059	Average Tree Spacing for E12	3
1060-1062	VRF for E12	3
1063-1065	'E13'	3
1066-1068	Average Stem Diameter for E13	3
1069-1071	Average Tree Spacing for E13	3
1072-1074	VRF for E13	3
1075-1077	'E14'	3
1078-1080	Average Stem Diameter for E14	3
1081-1083	Average Tree Spacing for E14	3
1084-1086	VRF for E14	3
1087-1089	'E15'	3
1090-1092	Average Stem Diameter for E15	3
1093-1095	Average Tree Spacing for E15	3
1096-1098	VRF for E15	3
1099-1101	'E16'	3
1102-1104	Average Stem Diameter for E16	3
1105-1107	Average Tree Spacing for E16	3
1108-1110	VRF for E16	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1111-1113	'E17'	3
1114-1116	Average Stem Diameter for E17	3
1117-1119	Average Tree Spacing for E17	3
1120-1122	VRF for E17	3
1123-1125	'E18'	3
1126-1128	Average Stem Diameter for E18	3
1129-1131	Average Tree Spacing for E18	3
1132-1134	VRF for E18	3
1135-1137	'E19'	3
1138-1140	Average Stem Diameter for E19	3
1141-1143	Average Tree Spacing for E19	3
1144-1146	VRF for E19	3
1147-1149	'E21'	3
1150-1152	Average Stem Diameter for E21	3
1153-1155	Average Tree Spacing for E21	3
1156-1158	VRF for E21	3
1159-1161	'E22'	3
1162-1164	Average Stem Diameter for E22	3
1165-1167	Average Tree Spacing for E22	3
1168-1170	VRF for E22	3
1171-1173	'E23'	3
1174-1176	Average Stem Diameter for E23	3
1177-1179	Average Tree Spacing for E23	3
1180-1182	VRF for E23	3
1183-1185	'E24'	3
1186-1188	Average Stem Diameter for E24	3
1189-1191	Average Tree Spacing for E24	3
1192-1194	VRF for E24	3
1195-1197	'E25'	3
1198-1200	Average Stem Diameter for E25	3
1201-1203	Average Tree Spacing for E25	3
1204-1206	VRF for E25	3
1207-1209	'E26'	3
1210-1212	Average Stem Diameter for E26	3
1213-1215	Average Tree Spacing for E26	3
1216-1218	VRF for E26	3
1219-1221	'E27'	3
1222-1224	Average Stem Diameter for E27	3
1225-1227	Average Tree Spacing for E27	3
1228-1230	VRF for E27	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1231-1233	'E28'	3
1234-1236	Average Stem Diameter for E28	3
1237-1239	Average Tree Spacing for E28	3
1240-1242	VRF for E28	3
1243-1245	'E29'	3
1246-1248	Average Stem Diameter for E29	3
1249-1251	Average Tree Spacing for E29	3
1252-1254	VRF for E29	3
1255-1257	'E31'	3
1258-1260	Average Stem Diameter for E31	3
1261-1263	Average Tree Spacing for E31	3
1264-1266	VRF for E31	3
1267-1269	'E32'	3
1270-1272	Average Stem Diameter for E32	3
1273-1275	Average Tree Spacing for E32	3
1276-1278	VRF for E32	3
1279-1281	'E33'	3
1282-1284	Average Stem Diameter for E33	3
1285-1287	Average Tree Spacing for E33	3
1288-1290	VRF for E33	3
1291-1293	'E34'	3
1294-1296	Average Stem Diameter for E34	3
1297-1299	Average Tree Spacing for E34	3
1300-1302	VRF for E34	3
1303-1305	'E35'	3
1306-1308	Average Stem Diameter for E35	3
1309-1311	Average Tree Spacing for E35	3
1312-1314	VRF for E35	3
1315-1317	'E36'	3
1318-1320	Average Stem Diameter for E36	3
1321-1323	Average Tree Spacing for E36	3
1324-1326	VRF for E36	3
1327-1329	'E37'	3
1330-1332	Average Stem Diameter for E37	3
1333-1335	Average Tree Spacing for E37	3
1336-1338	VRF for E37	3
1339-1341	'E38'	3
1342-1344	Average Stem Diameter for E38	3
1345-1347	Average Tree Spacing for E38	3
1348-1350	VRF for E38	3

TABLE I. TTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
1351-1353	'E39'	3
1354-1356	Average Stem Diameter for E39	3
1357-1359	Average Tree Spacing for E39	3
1360-1362	VRF for E39	3
1363-1365	'E41'	3
1366-1368	Average Stem Diameter for E41	3
1369-1371	Average Tree Spacing for E41	3
1372-1374	VRF for E41	3
1375-1377	'E42'	3
1378-1380	Average Stem Diameter for E42	3
1381-1383	Average Tree Spacing for E42	3
1384-1386	VRF for E42	3
1387-1389	'E43'	3
1390-1392	Average Stem Diameter for E43	3
1393-1395	Average Tree Spacing for E43	3
1396-1398	VRF for E43	3
1399-1401	'E44'	3
1402-1404	Average Stem Diameter for E44	3
1405-1407	Average Tree Spacing for E44	3
1408-1410	VRF for E44	3
1411-1413	'E45'	3
1414-1416	Average Stem Diameter for E45	3
1417-1419	Average Tree Spacing for E45	3
1420-1422	VRF for E45	3
1423-1425	'E46'	3
1426-1428	Average Stem Diameter for E46	3
1429-1431	Average Tree Spacing for E46	3
1432-1434	VRF for E46	3
1435-1437	'E47'	3
1438-1440	Average Stem Diameter for E47	3
1441-1443	Average Tree Spacing for E47	3
1444-1446	VRF for E47	3
1447-1449	'E48'	3
1450-1452	Average Stem Diameter for E48	3
1453-1455	Average Tree Spacing for E48	3
1456-1458	VRF for E48	3
1459-1461	'E49'	3
1462-1464	Average Stem Diameter for E49	3
1465-1467	Average Tree Spacing for E49	3
1468-1470	VRF for E49	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1471-1474	'FC11'	4
1475-1477	Average Stem Diameter for FC11	3
1478-1480	Average Tree Spacing for FC11	3
1481-1483	VRF for FC11	3
1484-1487	'FC12'	4
1488-1490	Average Stem Diameter for FC12	3
1491-1493	Average Tree Spacing for FC12	3
1494-1496	VRF for FC12	3
1497-1500	'FC13'	4
1501-1503	Average Stem Diameter for FC13	3
1504-1506	Average Tree Spacing for FC13	3
1507-1509	VRF for FC13	3
1510-1513	'FC14'	4
1514-1516	Average Stem Diameter for FC14	3
1517-1519	Average Tree Spacing for FC14	3
1520-1522	VRF for FC14	3
1523-1526	'FC15'	4
1527-1529	Average Stem Diameter for FC15	3
1530-1532	Average Tree Spacing for FC15	3
1533-1535	VRF for FC15	3
1536-1539	'FC21'	4
1540-1542	Average Stem Diameter for FC21	3
1543-1545	Average Tree Spacing for FC21	3
1546-1548	VRF for FC21	3
1549-1552	'FC22'	4
1553-1555	Average Stem Diameter for FC22	3
1556-1558	Average Tree Spacing for FC22	3
1559-1561	VRF for FC22	3
1562-1565	'FC23'	4
1566-1568	Average Stem Diameter for FC23	3
1569-1571	Average Tree Spacing for FC23	3
1572-1574	VRF for FC23	3
1575-1578	'FC24'	4
1579-1581	Average Stem Diameter for FC24	3
1582-1584	Average Tree Spacing for FC24	3
1585-1587	VRF for FC24	3
1588-1591	'FC25'	4
1592-1594	Average Stem Diameter for FC25	3
1595-1597	Average Tree Spacing for FC25	3
1598-1600	VRF for FC25	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1601-1604	'FC31'	4
1605-1607	Average Stem Diameter for FC31	3
1608-1610	Average Tree Spacing for FC31	3
1611-1613	VRF for FC31	3
1614-1617	'FC32'	4
1618-1620	Average Stem Diameter for FC32	3
1621-1623	Average Tree Spacing for FC32	3
1624-1626	VRF for FC32	3
1627-1630	'FC33'	4
1631-1633	Average Stem Diameter for FC33	3
1634-1636	Average Tree Spacing for FC33	3
1637-1639	VRF for FC33	3
1640-1643	'FC34'	4
1644-1646	Average Stem Diameter for FC34	3
1647-1649	Average Tree Spacing for FC34	3
1650-1652	VRF for FC34	3
1653-1656	'FC35'	4
1657-1659	Average Stem Diameter for FC35	3
1660-1662	Average Tree Spacing for FC35	3
1663-1665	VRF for FC35	3
1666-1669	'FC41'	4
1670-1672	Average Stem Diameter for FC41	3
1673-1675	Average Tree Spacing for FC41	3
16676-1678	VRF for FC41	3
1679-1682	'FC42'	4
1683-1685	Average Stem Diameter for FC42	3
1686-1688	Average Tree Spacing for FC42	3
1689-1691	VRF for FC42	3
1692-1695	'FC43'	4
1696-1698	Average Stem Diameter for FC43	3
1699-1701	Average Tree Spacing for FC43	3
1702-1704	VRF for FC43	3
1705-1708	'FC44'	4
1709-1711	Average Stem Diameter for FC44	3
1712-1714	Average Tree Spacing for FC44	3
1715-1717	VRF for FC44	3
1718-1721	'FC45'	4
1722-1724	Average Stem Diameter for FC45	3
1725-1727	Average Tree Spacing for FC45	3
1728-1730	VRF for FC45	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1731-1734	'FD11'	4
1735-1737	Average Stem Diameter for FD11	3
1738-1740	Average Tree Spacing for FD11	3
1741-1743	VRF for FD11	3
1744-1747	'FD12'	4
1748-1750	Average Stem Diameter for FD12	3
1751-1753	Average Tree Spacing for FD12	3
1754-1756	VRF for FD12	3
1757-1760	'FD13'	4
1761-1763	Average Stem Diameter for FD13	3
1764-1766	Average Tree Spacing for FD13	3
1767-1769	VRF for FD13	3
1770-1773	'FD14'	4
1774-1776	Average Stem Diameter for FD14	3
1777-1779	Average Tree Spacing for FD14	3
1780-1782	VRF for FD14	3
1783-1786	'FD15'	4
1787-1789	Average Stem Diameter for FD15	3
1790-1792	Average Tree Spacing for FD15	3
1793-1795	VRF for FD15	3
1796-1799	'FD21'	4
1800-1802	Average Stem Diameter for FD21	3
1803-1805	Average Tree Spacing for FD21	3
1806-1808	VRF for FD21	3
1809-1812	'FD22'	4
1813-1815	Average Stem Diameter for FD22	3
1816-1818	Average Tree Spacing for FD22	3
1819-1821	VRF for FD22	3
1822-1825	'FD23'	4
1826-1828	Average Stem Diameter for FD23	3
1829-1831	Average Tree Spacing for FD23	3
1832-1834	VRF for FD23	3
1835-1838	'FD24'	4
1839-1841	Average Stem Diameter for FD24	3
1842-1844	Average Tree Spacing for FD24	3
1845-1847	VRF for FD24	3
1848-1851	'FD25'	4
1852-1854	Average Stem Diameter for FD25	3
1855-1857	Average Tree Spacing for FD25	3
1858-1860	VRF for FD25	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
1861-1864	'FD31'	4
1865-1867	Average Stem Diameter for FD31	3
1868-1870	Average Tree Spacing for FD31	3
1871-1873	VRF for FD31	3
1874-1877	'FD32'	4
1878-1880	Average Stem Diameter for FD32	3
1881-1883	Average Tree Spacing for FD32	3
1884-1886	VRF for FD32	3
1887-1890	'FD33'	4
1891-1893	Average Stem Diameter for FD33	3
1894-1896	Average Tree Spacing for FD33	3
1897-1899	VRF for FD33	3
1900-1903	'FD34'	4
1904-1906	Average Stem Diameter for FD34	3
1907-1909	Average Tree Spacing for FD34	3
1910-1912	VRF for FD34	3
1913-1916	'FD35'	4
1917-1919	Average Stem Diameter for FD35	3
1920-1922	Average Tree Spacing for FD35	3
1923-1925	VRF for FD35	3
1926-1929	'FD41'	4
1930-1932	Average Stem Diameter for FD41	3
1933-1935	Average Tree Spacing for FD41	3
1936-1938	VRF for FD41	3
1939-1942	'FD42'	4
1943-1945	Average Stem Diameter for FD42	3
1946-1948	Average Tree Spacing for FD42	3
1949-1951	VRF for FD42	3
1952-1955	'FD43'	4
1956-1958	Average Stem Diameter for FD43	3
1959-1961	Average Tree Spacing for FD43	3
1962-1964	VRF for FD43	3
1965-1968	'FC44'	4
1969-1971	Average Stem Diameter for FC44	3
1972-1974	Average Tree Spacing for FC44	3
1975-1977	VRF for FC44	3
1978-1980	FILL WITH ASCII BLANKS	3

TABLE I. TTADB Format - Continued.

THIS IS THE BEGINNING OF THE SECOND PHYSICAL RECORD

TXT Character Position	Content	#Bytes Needed
1-3	'TXT'	3
4-8	'----2'	5
9-12	'FD45'	4
13-15	Average Stem Diameter for FD45	3
16-18	Average Tree Spacing for FD45	3
19-21	VRF for FD45	3
22-25	'FE11'	4
26-28	Average Stem Diameter for FE11	3
29-31	Average Tree Spacing for FE11	3
32-34	VRF for FE11	3
35-38	'FE12'	4
39-41	Average Stem Diameter for FE12	3
42-44	Average Tree Spacing for FE12	3
45-47	VRF for FE12	3
48-51	'FE13'	4
52-54	Average Stem Diameter for FE13	3
55-57	Average Tree Spacing for FE13	3
58-60	VRF for FE13	3
61-64	'FE14'	4
65-67	Average Stem Diameter for FE14	3
68-70	Average Tree Spacing for FE14	3
71-73	VRF for FE14	3
74-77	'FE15'	4
78-80	Average Stem Diameter for FE15	3
81-83	Average Tree Spacing for FE15	3
84-86	VRF for FE15	3
87-90	'FE21'	4
91-93	Average Stem Diameter for FE21	3
94-96	Average Tree Spacing for FE21	3
97-99	VRF for FE21	3
100-103	'FE22'	4
104-106	Average Stem Diameter for FE22	3
107-109	Average Tree Spacing for FE22	3
110-112	VRF for FE22	3
113-116	'FE23'	4
117-119	Average Stem Diameter for FE23	3
120-122	Average Tree Spacing for FE23	3
123-125	VRF for FE23	3

TABLE I. TTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
126-129	'FE24'	4
130-132	Average Stem Diameter for FE24	3
133-135	Average Tree Spacing for FE24	3
136-138	VRF for FE24	3
139-142	'FE25'	4
143-145	Average Stem Diameter for FE25	3
146-148	Average Tree Spacing for FE25	3
149-151	VRF for FE25	3
152-155	'FE31'	4
156-158	Average Stem Diameter for FE31	3
159-161	Average Tree Spacing for FE31	3
162-164	VRF for FE31	3
165-168	'FE32'	4
169-171	Average Stem Diameter for FE32	3
172-174	Average Tree Spacing for FE32	3
175-177	VRF for FE32	3
178-181	'FE33'	4
182-184	Average Stem Diameter for FE33	3
185-187	Average Tree Spacing for FE33	3
188-190	VRF for FE33	3
191-194	'FE34'	4
195-197	Average Stem Diameter for FE34	3
198-200	Average Tree Spacing for FE34	3
201-203	VRF for FE34	3
204-207	'FE35'	4
208-210	Average Stem Diameter for FE35	3
211-213	Average Tree Spacing for FE35	3
214-216	VRF for FE35	3
217-220	'FE41'	4
221-223	Average Stem Diameter for FE41	3
224-226	Average Tree Spacing for FE41	3
227-229	VRF for FE41	3
230-233	'FE42'	4
234-236	Average Stem Diameter for FE42	3
237-239	Average Tree Spacing for FE42	3
240-242	VRF for FE42	3
243-246	'FE43'	4
247-249	Average Stem Diameter for FE43	3
250-252	Average Tree Spacing for FE43	3
253-255	VRF for FE43	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
256-259	'FE44'	4
260-262	Average Stem Diameter for FE44	3
263-265	Average Tree Spacing for FE44	3
266-268	VRF for FE44	3
269-272	'FE45'	4
273-275	Average Stem Diameter for FE45	3
276-278	Average Tree Spacing for FE45	3
279-281	VRF for FE45	3
282-285	'FP11'	4
286-288	Average Stem Diameter for FP11	3
289-291	Average Tree Spacing for FP11	3
292-294	VRF for FP11	3
295-298	'FP12'	4
299-301	Average Stem Diameter for FP12	3
302-304	Average Tree Spacing for FP12	3
305-307	VRF for FP12	3
308-311	'FP13'	4
312-314	Average Stem DiameterforFP13	3
315-317	Average Tree Spacing for FP13	3
318-320	VRF for FP13	3
321-324	'FP14'	4
325-327	Average Stem Diameter for FP14	3
328-330	Average Tree Spacing for FP14	3
331-333	VRF for FP14	3
334-337	'FP15'	4
338-340	Average Stem Diameter for FP15	3
341-343	Average Tree Spacing for FP15	3
344-346	VRF for FP15	3
347-350	'FP21'	4
351-353	Average Stem Diameter for FP21	3
354-356	Average Tree Spacing for FP21	3
357-359	VRF for FP21	3
360-363	'FP22'	4
364-366	Average Stem Diameter for FP22	3
367-369	Average Tree Spacing for FP22	3
370-372	VRF for FP22	3
373-376	'FP23'	4
377-379	Average Stem Diameter for FP23	3
380-382	Average Tree Spacing for FP23	3
383-385	VRF for FP23	3
386-389	'FP24'	4
390-392	Average Stem Diameter for FP24	3
393-395	Average Tree Spacing for FP24	3
396-398	VRF for FP24	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
399-402	'FP25'	4
403-405	Average Stem Diameter for FP25	3
406-408	Average Tree Spacing for FP25	3
409-411	VRF for FP25	3
412-415	'FP31'	4
416-418	Average Stem Diameter for FP31	3
419-421	Average Tree Spacing for FP31	3
422-424	VRF for FP31	3
425-428	'FP32'	4
429-431	Average Stem Diameterfor FP32	3
432-434	Average Tree Spacing for FP32	3
435-437	VRF for FP32	3
438-441	'FP33'	4
442-444	Average Stem Diameter for FP33	3
445-447	Average Tree Spacing for FP33	3
448-450	VRF for FP33	3
451-454	'FP34'	4
455-457	Average Stem Diameter for FP34	3
458-460	Average Tree Spacing for FP34	3
461-463	VRF for FP34	3
464-467	'FP35'	4
468-470	Average Stem Diameter for FP35	3
471-473	Average Tree Spacing for FP35	3
474-476	VRF for FP35	3
477-480	'FP41'	4
481-483	Average Stem Diameter for FP41	3
484-486	Average Tree Spacing for FP41	3
487-489	VRF for FP41	3
490-493	'FP42'	4
494-496	Average Stem Diameter for FP42	3
497-499	Average Tree Spacing for FP42	3
500-502	VRF for FP42	3
503-506	'FP43'	4
507-509	Average Stem Diameter for FP43	3
510-512	Average Tree Spacing for FP43	3
513-515	VRF for FP43	3
516-519	'FP44'	4
520-522	Average Stem Diameter for FP44	3
523-525	Average Tree Spacing for FP44	3
526-528	VRF for FP44	3

TABLE I. TTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
529-532	'FP45'	4
533-535	Average Stem Diameter for FP45	3
536-538	Average Tree Spacing for FP45	3
539-541	VRF for FP45	3
542-578	'End Vegetation Roughness Information'	36
579-1980	FILL WITH ASCII BLANKS	1401

TABLE I. TTADB Format - Continued.

TABLE II. PTADB Format.

TXT Character Position	Content	#Bytes Needed
1-3	'TXT'	3
4-8	'----1'	5
9-12	Number of characters included in this TXT logical record.	4
13-44	'VEGETATION ROUGHNESS INFORMATION'	32
45-69	Project Name (left-justified, fill unused spaces with ASCII blanks)	25
70-81	'NON-FORESTED'	12
82-83	'A1'	2
84-86	VRF for A1 (Format: XXX, Range: 0.00 - 1.00 or 9.99 for Not Evaluated Areas)	3
87-88	'A2'	2
89-91	VRF for A2	3
92-93	'A3'	2
94-96	VRF for A3	3
97-98	'A4'	2
99-101	VRF for A4	3
102-103	'A5'	2
104-106	VRF for A5	3
107-108	'B1'	2
109-111	VRF for B1	3
112-113	'B2'	2
114-116	VRF for B2	3
117-118	'G1'	2
119-121	VRF for G1	3
122-123	'G2'	2
124-126	VRF for G2	3
127-128	'-H'	2
129-131	VRF for H	3
132-133	'-I'	2
134-136	VRF for I	3
137-138	'-J'	2
139-141	VRF for J	3
142-143	'-K'	2
144-146	VRF for K	3
147-148	'-L'	2
149-151	VRF for L	3
152-153	'-M'	2
154-156	VRF for M	3
157-158	'-N'	2

TXT Character Position	Content	#Bytes Needed
159-161	VRF for N	3
162-163	'-W'	2
164-166	VRF for W	3
167-168	'-X'	2
169-171	VRF for X	3
172-179	'FORESTED'	8
180-182	'C12'	3
183-185	Average Stem Diameter for C12 (Format: XXX, Range: 000-999cm)	3
186-188	Average Tree Spacing for C12 (Format: XXX, Range: 000-999dm)	3
189-191	Vegetation Roughness Factor (VRF) for C12 (Format: XXX, Range:0.00-1.00 or 9.99 for Not Evaluated Area)	3
192-194	'C13'	3
195-197	Average Stem Diameter for C13	3
198-200	Average Tree Spacing For C13	3
201-203	VRF for C13	3
204-206	'C22'	3
207-209	Average Stem Diameter for C22	3
210-212	Average Tree Spacing for C22	3
213-215	VRF for C22	3
216-218	'C23'	3
219-221	Average Stem Diameter for C23	3
222-224	Average Tree Spacing for C23	3
225-227	VRF for C23	3
228-230	'C32'	3
231-233	Average Stem Diameter for C32	3
234-236	Average Tree Spacing for C32	3
237-239	VRF for C32	3
240-242	'C33'	3
243-245	Average Stem Diameter for C33	3
246-248	Average Tree Spacing for C33	3
249-251	VRF for C33	3
252-254	'C42'	3
255-257	Average Stem Diameter for C42	3
258-260	Average Tree Spacing for C42	3
261-263	VRF for C42	3

TABLE II. PTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
264-266	'C43'	3
267-269	Average Stem Diameter for C43	3
270-272	Average Tree Spacing for C43	3
273-275	VRF for C43	3
276-278	'D12'	3
279-281	Average Stem Diameter for D12	3
282-284	Average Tree Spacing for D12	3
285-287	VRF for D12	3
288-290	'D13'	3
291-293	Average Stem Diameter for D13	3
294-296	Average Tree Spacing for D13	3
297-299	VRF for D13	3
300-302	'D22'	3
303-305	Average Stem Diameter for D22	3
306-308	Average Tree Spacing for D22	3
309-311	VRF for D22	3
312-314	'D23'	3
315-317	Average Stem Diameter for D23	3
318-320	Average Tree Spacing For D23	3
321-323	VRF for D23	3
324-326	'D32'	3
327-329	Average Stem Diameter for D32	3
330-332	Average Tree Spacing For D32	3
333-335	VRF for D32	3
336-338	'D33'	3
339-341	Average Stem Diameter for D33	3
342-344	Average Tree Spacing for D33	3
345-347	VRF for D33	3
348-350	'D42'	3
351-353	Average Stem Diameter for D42	3
354-356	Average Tree Spacing for D42	3
357-359	VRF for D42	3
360-362	'D43'	3
363-365	Average Stem Diameter for D43	3
366-368	Average Tree Spacing for D43	3
369-371	VRF for D43	3
372-374	'E12'	3
375-377	Average Stem Diameter for E12	3
378-380	Average Tree Spacing for E12	3
381-383	VRF for E12	3

TABLE II. PTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
384-386	'E13'	3
387-389	Average Stem Diameter for E13	3
390-392	Average Tree Spacing for E13	3
393-395	VRF for E13	3
396-398	'E22'	3
399-401	Average Stem Diameter for E22	3
402-404	Average Tree Spacing for E22	3
405-407	VRF for E22	3
408-410	'E23'	3
411-413	Average Stem Diameter for E23	3
414-416	Average Tree Spacing for E23	3
417-419	VRF for E23	3
420-422	'E32'	3
423-425	Average Stem Diameter for E32	3
426-428	Average Tree Spacing for E32	3
429-431	VRF for E32	3
432-434	'E33'	3
435-437	Average Stem Diameterfor E33	3
438-440	Average Tree Spacing for E33	3
441-443	VRF for E33	3
444-446	'E42'	3
447-449	Average Stem Diameter for E42	3
450-452	Average Tree Spacing for E42	3
453-455	VRF for E42	3
456-458	'E43'	3
459-461	Average Stem Diameter for E43	3
462-464	Average Tree Spacing for E43	3
465-467	VRF for E43	3
468-471	'FC11'	4
472-474	Average Stem Diameter for FC11	3
475-477	Average Tree Spacing for FC11	3
478-480	VRF for FC11	3
481-484	'FC12'	4
485-487	Average Stem Diameter for FC12	3
488-490	Average Tree Spacing for FC12	3
491-493	VRF for FC12	3
494-497	'FC13'	4
498-500	Average Stem Diameter for FC13	3
501-503	Average Tree Spacing for FC13	3
504-506	VRF for FC13	3

TABLE II. PTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
507-510	'FC21'	4
511-513	Average Stem Diameter for FC21	3
514-516	Average Tree Spacing for FC21	3
517-519	VRF for FC21	3
520-523	'FC22'	4
524-526	Average Stem Diameter for FC22	3
527-529	Average Tree Spacing for FC22	3
530-532	VRF for FC22	3
533-536	'FC23'	4
537-539	Average Stem Diameter for FC23	3
540-542	Average Tree Spacing for FC23	3
543-545	VRF for FC23	3
546-549	'FC31'	4
550-552	Average Stem Diameter for FC31	3
553-555	Average Tree Spacing for FC31	3
556-558	VRF for FC31	3
559-562	'FC32'	4
563-565	Average Stem Diameter for FC32	3
566-568	Average Tree Spacing for FC32	3
569-571	VRF for FC32	3
572-575	'FC33'	4
576-578	Average Stem Diameter for FC33	3
579-581	Average Tree Spacing for FC33	3
582-584	VRF for FC33	3
585-588	'FC41'	4
589-591	Average Stem Diameter for FC41	3
592-594	Average Tree Spacing for FC41	3
595-597	VRF for FC41	3
598-601	'FC42'	4
602-604	Average Stem Diameter for FC42	3
605-607	Average Tree Spacing for FC42	3
608-610	VRF for FC42	3
611-614	'FC43'	4
615-617	Average Stem Diameter for FC43	3
618-620	Average Tree Spacing for FC43	3
621-623	VRF for FC43	3
624-627	'FD11'	4
628-630	Average Stem Diameter for FD11	3
631-633	Average Tree Spacing for FD11	3
634-636	VRF for FD11	3
637-640	'FD12'	4
641-643	Average Stem Diameter for FD12	3
644-646	Average Tree Spacing for FD12	3
647-649	VRF for FD12	3

TABLE II. PTADB Format - Continued.

APPENDIX L

TXT Character Position	Content	#Bytes Needed
650–653	'FD13'	4
654-656	Average Stem Diameter for FD13	3
657-659	Average Tree Spacing for FD13	3
660-662	VRF for FD13	3
663–666	'FD21'	4
667-669	Average Stem Diameter for FD21	3
670-672	Average Tree Spacing for FD21	3
673-675	VRF for FD21	3
676–679	'FD22'	4
680-682	Average Stem Diameter for FD22	3
683-685	Average Tree Spacing for FD22	3
686-688	VRF for FD22	3
689–692	'FD23'	4
693-695	Average Stem Diameter for FD23	3
696-698	Average Tree Spacing for FD23	3
699-701	VRF for FD23	3
702–705	'FD31'	4
706-708	Average Stem Diameter for FD31	3
709-711	Average Tree Spacing for FD31	3
712-714	VRF for FD31	3
715–718	'FD32'	4
719-721	Average Stem Diameter for FD32	3
722-724	Average Tree Spacing for FD32	3
725-727	VRF for FD32	3
728–731	'FD33'	4
732-734	Average Stem Diameter for FD33	3
735-737	Average Tree Spacing for FD33	3
738-740	VRF for FD33	3
741–744	'FD41'	4
745-747	Average Stem Diameter for FD41	3
748-750	Average Tree Spacing for FD41	3
751-753	VRF for FD41	3
754–757	'FD42'	4
758-760	Average Stem Diameter for FD42	3
761-763	Average Tree Spacing for FD42	3
764-766	VRF for FD42	3
767–770	'FD43'	4
771-773	Average Stem Diameter for FD43	3
774-776	Average Tree Spacing for FD43	3
777–779	VRF for FD43	3

TABLE II. PTADB Format - Continued.

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TXT Character Position	Content	#Bytes Needed
780-783	'FE11'	4
784-786	Average Stem Diameter for FE1 1	3
787-789	Average Tree Spacing for FE11	3
790-792	VRF for FE11	3
793-796	'FE12'	4
797-799	Average Stem Diameter for FE12	3
800-802	Average Tree Spacing for FE12	3
803-805	VRF for FE12	3
806-809	'FE13'	4
810-812	Average Stem Diameter for FE13	3
813-815	Average Tree Spacing for FE13	3
816-818	VRF for FE13	3
819-822	'FE21'	4
823-825	Average Stem Diameter for FE21	3
826-828	Average Tree Spacing for FE21	3
829-831	VRF for FE21	3
832-835	'FE22'	4
836-838	Average Stem Diameter for FE22	3
839-841	Average Tree Spacing for FE22	3
842-844	VRF for FE22	3
845-848	'FE23'	4
849-851	Average Stem Diameter for FE23	3
852-854	Average Tree Spacing for FE23	3
855-857	VRF for FE23	3
858-861	'FE31'	4
862-864	Average Stem Diameter for FE31	3
865-867	Average Tree Spacing for FE31	3
868-870	VRF for FE31	3
871-874	'FE32'	4
875-877	Average Stem Diameter for FE32	3
878-880	Average Tree Spacing for FE32	3
881-883	VRF for FE32	3
884-887	'FE33'	4
888-890	Average Stem Diameter for FE33	3
891-893	Average Tree Spacing for FE33	3
894-896	VRF for FE33	3
897-900	'FE41'	4
901-903	Average Stem Diameter for FE41	3
904-906	Average Tree Spacing for FE41	3
907-909	VRF for FE41	3

TABLE II. PTADB Format - Continued.

TXT Character Position	Content	#Bytes Needed
910–913	'FE42'	4
914-916	Average Stem Diameter for FE42	3
917-919	Average Tree Spacing for FE42	3
920-922	VRF for FE42	3
923–926	'FE43'	4
927-929	Average Stem Diameterfor FE43	3
930-932	Average Tree Spacing for FE43	3
933-935	VRF for FE43	3
936–939	'FP11'	4
940-942	Average Stem Diameter for FP11	3
943-945	Average Tree Spacing for FP11	3
946-948	VRF for FP11	3
949–952	'FP12'	4
953-955	Average Stem Diameterfor FP12	3
956-958	Average Tree Spacing for FP12	3
959-961	VRF for FP12	3
962–965	'FP13'	4
966-968	Average Stem Diameter for FP13	3
969-971	Average Tree Spacing for FP13	3
972-974	VRF for FP13	3
975–978	'FP21'	4
979-981	Average Stem Diameter for FP21	3
982-984	Average Tree Spacing for FP21	3
985-987	VRF for FP21	3
988–991	'FP22'	4
992-994	Average Stem Diameter for FP22	3
995-997	Average Tree Spacing for FP22	3
998-1000	VRFfor FP22	3
1001–1004	'FP23'	4
1005-1007	Average Stem Diameter for FP23	3
1008-1010	Average Tree Spacingfor FP23	3
1011–1013	VRF for FP23	3
1014–1017	'FP31'	4
1018-1020	Average Stem Diameter for FP31	3
1021-1023	Average Tree Spacing for FP31	3
1024–1026	VRF for FP31	3
1027–1030	'FP32'	4
1031-1033	Average Stem Diameter for FP32	3
1034-1036	Average Tree Spacing for FP32	3
1037-1039	VRFfor FP32	3

TABLE II. PTADB Format - Continued

TXT Character Position	Content	#Bytes Needed
1040–1043	'FP33'	4
1044-1046	Average Stem Diameter for FP33	3
1047-1049	Average Tree Spacing for FP33	3
1050-1052	VRF for FP33	3
1053–1056	'FP41 '	4
1057-1059	Average Stem Diameterfor FP41	3
1060–1062	Average Tree Spacing for FP41	3
1063-1065	VRF for FP41	3
1066–1069	'FP42'	4
1070-1072	Average Stem Diameter for FP42	3
1073-1075	Average Tree Spacing for FP42	3
1076-1078	VRF for FP42	3
1079–1082	'FP43'	4
1083-1085	Average Stem Diameter for FP43	3
1086-1088	Average Tree Spacing for FP43	3
1089-1091	VRF for FP43	3
1092-1128	'End Vegetation Roughness Information'	36
1129-1980	FILL WITH ASCIIB LANKS	851

TABLE II. PTADB Format - Continued.

TABLE III. Text Record Format for Surface Materials Overlay

TXT Character Position	Content
1-3	'TXT'
4-8	'-----' (Number of physical TXT block used)
9-13	'-----' (Number of characters included this TXT logical record)
14-42	'SURFACE ROUGHNESS INFORMATION'
43-68	Project Name (left-justified, with trailing ASCII spaces, if needed)
69-71	Number of Surface Type (Range: 001-099)
72-73	Number of Vehicle Types (Range: 01-07)
74-75	Surface Roughness Qualifier (SRQ) (Range: 01-99)
76-175	Description of surface type (left-justified, with trailing ASCII spaces, if needed)
GENERAL ROUGHNESS CATEGORIES (UP TO SEVEN VEHICLE TYPES)	
176-200	First Vehicle Type (left-justified, with trailing ASCII spaces, if needed)
201-204	GRC-first Vehicle Type (Format: 'X.XX', Range: 0.00 - 1.00 or 9.99 for Not Evaluated)
205-229	Second Vehicle Type
230-233	GRC-second Vehicle Type
234-258	Third Vehicle Type
259-262	GRC-third vehicle Type
263-287	Fourth Vehicle Type
288-291	GRC-fourth Vehicle Type
292-316	Fifth Vehicle Type
317-320	GRC-fifth Vehicle Type
321-345	Sixth Vehicle Type
346-349	GRC-sixth Vehicle Type
350-374	Seventh Vehicle Type
375-378	GRC-seventh Vehicle Type
379-397	'End Surface Type XX' ('XX' is Surface Type Count)

SEQUENCE SPECIFIED IN CHARACTERS 74-397 IS REPEATED FOR EACH SURFACE TYPE.

END SURFACE ROUGHNESS PORTION OF TEXT RECORD WITH THE FOLLOWING: 'Finish Surface Roughness Information'

APPENDIX M

IMPLEMENTING INTERIM TERRAIN DATA (ITD) IN 2-D SLF

M.1 SCOPE

M.1.1 Scope. This APPENDIX describes the conventions to be followed in preparing Interim Terrain Data (ITD) sets using 2-D SLF. It is primarily intended to support the production of the ITD. Interim Terrain Data is created by collecting the features from the Tactical Terrain Analysis Data Base (TTADB) and Planning Terrain Analysis data Base (PTADB) hardcopy overlays in digital form. The notes below are keyed to the appropriate sections, paragraphs numbers, and SLF data field names of the Digital Production System (DPS) Standard Linear Format for Digital Cartographic Feature Data. Only those sections requiring special instructions are addressed in this APPENDIX. Users should refer to the main document for all other information not requiring special instructions. This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

M.2. APPLICABLE DOCUMENTS

This section is not applicable to this APPENDIX

M.3. SECTION 5.2.c, DATA SET LOGICAL RECORDS

Text records are required for ITD to complete the Vegetation and Surface Roughness information.

M.4. SECTION 5.3, DATA SET IDENTIFIER (DSI) RECORD

- Product Type is "DITDT" (Digital Interim Terrain Data/Tactical) for data collected for the 1:50,000 Tactical Terrain Analysis Data Base (TTADB) and "DITDP" (Digital Interim Terrain Data/Planning) for data collected for the 1:250,000 Planning Terrain Analysis Data Base (PTADB) (5 bytes).

- Data Set ID is the same as the PTADB/TTADB stock number (20 bytes). It will be left-justified and all spaces will be filled. For example, "*V742J051542bVMDT0bbb*" (*b* represents the ASCII space code) is the complete data set covering the same geographic area as Sheet 5154II. Explanation follows:

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Character Position	Contents
1-5	Series
6-11	Sheet Number (Left-justified with ASCII space at the end if necessary)
12-17	Overlays included:
12	"S" or *b* (TBD)
13	"V" or *b* (Vegetation)
14	"M" or *b* (Surface Materials)
15	"D" or *b* (Surface Drainage)
16	"T" or *b* (Transportation)
17	"O" or *b* (Obstacles)
18-20	ASCII Spaces

- Edition is "1" for a new data set. Edition will be incremented by one for each new edition (3 bytes)

- Compilation Date is the year and month, "YYMM", the data set is validated (4 bytes). Compilation date must be lather than April 1989.

- Maintenance Date must be "0000" for new data; and for a revised (updated) data set the year and month of the revision will be entered, "YYMM" (4 bytes).

- SLF Version Date will be the date of the SLF version which applies to the data set, "YYMMDD", ("950816") (6 bytes).

- DMAFF Version Date will be the date of the DMAFF version which applies to the data set, "YYMMDD", ("890831") (6 bytes)

- DSIG Reserve field is currently not used and must be filled with ASCII spaces (28 bytes).

Data Set Security Group, "DSSG" (4 bytes):

- Security Classification is the highest classification given to the data set.

Security Classification Code (1 byte):

"T" = TOP SECRET
"S" = SECRET
"C" = CONFIDENTIAL
"F" = For Official Use Only (Caveat)
"R" = Restricted (NATO Definition)
"U" = Unclassified

- Security Release is the equivalent two-character security control and release code based on source and ancillary materials (2 bytes). This field must have valid data.

- Downgrading/Declassification Date field will contain "OADR" if no date is assigned (6 bytes). Blanks are acceptable.

- Security Handling field will be based on special security requirements (21 bytes). This field must have valid data.

- DSSG Reserve field is not currently used and must be filled with ASCII spaces (40 bytes).

Data Set Parameter Group, "DSPG" (4 bytes):

- Data Type must be "GEO" (3 bytes).

- Horizontal Units of Measure must be "SEC" (3 bytes).

- Horizontal Resolution Units must be "0.010" for TTADB (1:50,000 scale ITD) and "0.020" for PTADB (1:250,000 scale ITD). Therefore, the maximum product size will be about 2 degrees and 30 minutes for TTADB and about 5 degrees and 30 minutes for PTADB (5 bytes).

- Geodetic Datum must be "WGE" (WGS-84) or local datum code from APPENDIX B (3 bytes) when no conversion to WGS-84 exists. This is the datum for horizontal positions in the data set.

- Ellipsoid must be "WGE" (WGS-84) or ellipsoid code from APPENDIX E (3 bytes). This is the ellipsoid to which the horizontal datum is referenced.

- Vertical Units of Measure must be "***bbb***" (***b*** = blanks) (3 bytes). If this field contains ASCII blanks, the segment record will contain x, y-pairs. If this field has a units code "***Mbb***" (M = meters, ***b*** = blanks), then the segment record will contain x, y, z-triplets. Since ITD will be collected as two-dimensional data, this field will be filled with ASCII spaces.

- Vertical Resolution Units must be "***b.bbb***" (***b*** = blanks) for 1:50,000 and 1:250,000 scale ITD for two-dimensional data (5 bytes). For three-dimensional data this field contains "0.010".

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Data Set Parameter Group (Continued)

- Vertical Reference System must be "*MSLb*" (mean sea level) (4 bytes).

- Sounding Datum field is not applicable and must be filled with ASCII spaces (4 bytes).

- Latitude (9 bytes, "DDMMSSSSH") and Longitude (10 bytes, "DDDMMSSSSH") of Origin must be the southwest corner of the data set (total bytes = 19). The hundredths-of-seconds digit must always be zero.

- X (10 bytes), Y (10 bytes), and Z (10 bytes) Coordinates of Origin fields are not applicable and must be filled with ASCII spaces (total bytes = 30).

- Latitude (9 bytes, "DDMMSSSSH") and Longitude (10 bytes, "DDDMMSSSSH") of SW and NE corners are of the area covering the data set (total bytes = 38). The hundredths-of-seconds digit must always be zero.

- Total Number of Features (6 bytes)

- Number of Point (6 bytes), Linear (6 bytes), and Areal Features (6 bytes) in this data set (total bytes = 18)

- Total Number of Segments (6 bytes)

- DSPG Reserve field is not currently used, and must be filled with ASCII spaces (40 bytes).

Data Set Map Projection Group, "DSMP" (4 bytes):

Other DSMP elements are not used for "GEO" data sets. Fill with ASCII blanks (91 bytes) (total bytes = 95).

Data Set History Group, "DSHG" (4 bytes):

- Edition Code must be "000" for first-time coverage of a geographic area (3 bytes).

- Product Specification is "MIL-PRF-89014".

- Specification Date must be "9508" (4 bytes).

- Specification Amendment Number will be shown in the current specification document (3 bytes).

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Data Set History Group (Continued)

- Producer is "USØ90000" for DMAHTC and "USØ90078" for DMAAC. Otherwise, the producer of the data will request a unique identification code from DMA (8 bytes).

- Digitizing System represents the system which digitizes the data set (10 bytes). Producers of ITD/PITD shall submit the name and recommended acronym for their production system (up to 10 alphanumeric characters) which will be validated and recorded by DMA.

- Processing System represents the system which processed the data set (transforming, formatting, etc.) (10 bytes). Producers of ITD shall submit the name and recommended acronym for their production system (up to 10 alphanumeric characters) which will be validated and recorded by DMA.

- Grid System code identifies the grid system of the data set. This field is not used for ITD data and must be filled with ASCII spaces (2 bytes).

- Absolute Horizontal Accuracy of the ITD must be expressed in centimeter units (4 bytes). For ITD, this field is not used. Fill with ASCII spaces.

- Absolute Vertical Accuracy of the ITD must be expressed in centimeter units (4 bytes). For ITD, this field is not used. Fill with ASCII spaces.

- Relative Horizontal Accuracy of the ITD must be expressed in centimeter units (4 bytes). For ITD, this field is not used. Fill with ASCII spaces.

- Relative Vertical Accuracy of the ITD must be expressed in centimeter units (4 bytes). For ITD, this field is not used. Fill with ASCII spaces.

- Height Accuracy of the ITD must be expressed in centimeter units (4 bytes). For ITD, this field is not used. Fill with ASCII spaces.

- Data Generalization Code will be "0". No note will be required in the Text Record (1 byte).

- Match/Merge Numbers and Dates for all Production Center-produced data bases will be provided. This value is zero-filled for new data (20 bytes).

Data Set History Group (Continued)

- Year and Month of Earliest and Latest Sources used in production of the data sets will be provided (8 bytes).

- Data Collection Code shall be filled with an ASCII space (1 byte).

- Data Collection Criteria may be used to denote a detailed reference in a specification document; otherwise, it is filled with ASCII spaces (3 bytes).

- Data Conversion Code shall be "001" for ITD (1:50,000 scale) processed at 0.1 second resolution and converted to 0.01 second resolution on output by adding a trailing zero to each coordinate. Otherwise, it is filled with ASCII spaces (3 bytes).

- DSHG Reserve is 25 ASCII spaces (25 bytes).

NOTE: The remainder of the DSI data is not utilized for ITD. Therefore, the remainder of the 1980-byte block can be filled with ASCII deletes, or a minimum set of data may be included for the remaining subrecord groups. In either case, it is not necessary to read the remainder of the DSI record for ITD. The following fields are shown to define the remaining subrecord groups and to show minimum elements that could be included in the data set for each subgroup:

Data Set Variable Field Address Group, "DSVG" (4 bytes):

- This group is not utilized for "GEO" data sets.

- Other DSVG elements are filled with ASCII spaces (50 bytes)

Data Set Registration Points Group, "DSRG" (4 bytes):

- This group is not utilized for "GEO" data sets.

- Number of registration points is "000" (3 bytes).

- Other DSRG elements do not exist for ITD since the number of registration points is 0.

Data Set Accuracy Group, "DSAG" (4 bytes):

- This group is not utilized for a "GEO" data set.

- Multiple Accuracy Outline Count is 00 (2 bytes).

- Other DSAG elements (zero bytes) do not exist for ITD since the multiple accuracy count above is 0.

M.5. SECTION 5.4, SEGMENT (SEG) RECORD

- X-value and Y-value represent delta longitude and delta latitude, respectively, in hundredths of arc seconds referenced to the Latitude and Longitude of Origin specified in the DSI record.

- Z-value represents delta elevation referenced to the Elevation of Origin and specified in units of resolution in the DSI record. This value does not exist for two-dimensional data and therefore will not be present in ITD data.

- The Direction of Segment fields in the Feature Records must agree with the "feature-left" convention.

- Feature Orientation for linear and point features will be "C"-coincident for point and linear features (such as cuts, fills and escarpments).

- Depressions are depicted as areal features.

M.6. SECTION 5.5, FEATURE (FEA) RECORD

- Feature Header Block Count can be variable. Set to 7 for ITD

- Feature codes for the ITD/PITD produced by DMA are specified in APPENDIX A of the ITD/PITD military specification and in the Second Edition DMA Feature File (DMAFF).

- Direction of Segment files for areal and linear features such as fills, cuts, escarpments, and depressions will follow the conventions described in Section 5.4.

- The FEA Record contains identifying and descriptive information for each feature in the data set, along with a list of keys to the segments (coordinate strings) which make up the features. This record consists of one or more physical records.

- The length of the Segment Count field is three digits for the ITD two-dimensional data sets.

- The length of the feature header field for the ITD which consists of seven 40-byte blocks is 7 x 40 or 280 bytes. Feature Header 40-byte blocks are designated as 40.1 through 40.7.

• Feature Header descriptive information.

- Only one field is used for ITD data in the Feature Header 40.1.

- Security classification will be filled with a one-byte alpha character code which is defined in the DSI Data Set Security Group.

- All unused fields shall be filled with ASCII spaces (Octal 040).

M.7. Section 5.6, Text (TXT) Record

• Use the text records TXT 1 through M, and M+1 through N when producing DITD. The first M text record(s) stores Miscellaneous Features (9D010) and/or "Not Evaluated" Features (9D020), and will not be included if there are no 9D010 or 9D020 features for thematic files OVC = 1, 2, 4, 5, 6. Text record(s) 1 through M are always included for the Surface Materials thematic file (OVC = 3). Text records M+1 through N will occur **only** for the Surface Materials thematic file (OVC = 3).

• The format and content of SLF TXT Records for Miscellaneous Features and Not Evaluated Features are as defined in TABLE IV. The format and content for Surface Materials SLF TXT Records are as defined in TABLE V.

• The security classification of information in the TXT Record(s) shall not exceed the overall classification of the data set, as indicated by the Data Set Security Group (DSSG) in the DSI record.

TABLE IV. TXT Record(s) 1 through M Format - Description of Miscellaneous Features 9D010 and Not Evaluated Features 9D020[1,2,3]

TXT Character Position	Content	#Bytes Needed

1-3	"TXT" (Identifier for Text Record)	3
4-8	"bbbbI" Where I identifies this Physical Block. TXT Block number (I) is incremental beginning with 1.	5
9-13	Number of characters included in this TXT physical record (variable depending on the number of Miscellaneous and/or Not Evaluated Features)	5
14-39	Project Name (left-justified with trailing ASCII blanks if needed)	26
	FIRST MISCELLANEOUS OR NOT EVALUATED FEATURE IN THIS BLOCK	
40-44	9D010 and/or 9D020 Feature ID (SLF Feature identification code)	5
45-50	SLF Feature ID Number	6
51-200	Description/Information about features	150
201	(SEQUENCE SPECIFIED IN CHARACTERS 40-200 IS REPEATED FOR EACH EXISTING MISCELLANEOUS OR NOT EVALUATED FEATURE)	1771
	START EACH NEW TEXT RECORD BLOCK WITH THE FOLLOWING:	
1-3	"TXT"	3
4-8	TXT Block Number is computed by N = N+1 where N is the previous block number.	5
9-13	Number of characters included in this block	5

Notes:

1. If neither Miscellaneous nor Not Evaluated Features exist:
   - For OVC = 1, 2, 4, 5, 6, this Text Record is not recorded.
   - For OVC = 3, the fields between character positions 1-39 will be data-filled and the remainder of the block will be filled with ASCII spaces.

2. If Miscellaneous or Not Evaluated Features exist:
   - For OVC = 1, 2, 4, 5, 6, enter data for all features. After the last description/information field, fill the remainder of the block with ASCII delete characters.
   - For OVC = 3, enter data same as above except fill with ASCII spaces to the end of the block.

3. In the last text block after the last Miscellaneous or Not Evaluate Feature description field, fill the remainder of the block with ASCII deletes Data continues from byte 1980 from one block to byte number 14 of the next block.

APPENDIX M

TABLE V. TXT Record(s) M+1 through N Format - Surface Roughness Information[1]

TXT Character Position	Content	#Bytes Needed
1-3	"TXT" (Identifier for Text Record)	3
4-8	"bbbbI" Where I identifies this Physical Block. TXT Block number (I) is incremental beginning with M+1.	5
9-13	Number of characters included in this TXT physical record	5
14-42	"SURFACE ROUGHNESS INFORMATION"	29
43-68	Project Name (left-justified with trailing ASCII blanks)	26
69-71	Number of Surface Roughness Types (Range 001 - 099)	3
	FIRST SRQ TYPE	
72-73	"00" (value or SRQ counter) corresponds to 3rd digit of map unit code.	2
74-173	"No Data" indicates that SRQ = 0 = no data available.	100
	SECOND SRQ TYPE	
174-175	"01" corresponds to 3rd digit of map unit code; indicates that the definition for SRQ = 1 will follow.	2
176-275	"No Surface Roughness Effect" (SRQ = 1 = No Surface Roughness Effect)	100
	THIRD SRQ TYPE	
276-277	"02" corresponds to 3rd digit of map unit code.	2
278-377	For ITD enter "Area of High Landslide Potential." For PITD enter the description of the surface roughness type (left-justified, with trailing ASCII spaces if needed).	100

TABLE V. TXT Record(s) M+1 through N Format - Continued

	FOURTH SRQ TYPE	
378-379	"03" corresponds to 3rd digit of map unit code.	2
380-479	Description of the surface roughness type (left-justified, with trailing ASCII spaces)	100
	SRQ TYPE 5-99	
480	SEQUENCE SPECIFIED IN CHARACTERS 378-479 IS REPEATED FOR EACH SRQ TYPE.	48-
	START EACH NEW TEXT RECORD BLOCK WITH THE FOLLOWING:	
1-3	"TXT"	3
4-8	TXT Block Number is computed by N = N + 1 where N = The Previous Block Number.	5
9-13	Number of Characters included in this Block	5

Note:
1. The block(s) will only exist for the Surface Roughness thematic file (OVC = 3). In the last text block after the last SRQ description field, fill the remainder of the block with ASCII deletes. Data continues from byte 1980 of one block to byte number 14 of the next block.

APPENDIX N

IMPLEMENTING RELOCATABLE TARGET ASSESSMENT DATA (RTAD) IN 2-D SLF

N.1 SCOPE

N.1.1 Scope. This APPENDIX describes the conventions to be followed in preparing Relocatable Target Assessment Data (RTAD) using 2-D SLF. The notes below are keyed to the appropriate sections, paragraph numbers, and SLF data field names of the Digital Production System Standard Linear Format for Digital Cartographic Feature Data. Only those sections requiring special instructions are addressed in this APPENDIX. Users should refer to the main document for all other information not requiring special instructions. This APPENDIX is a mandatory part of the Standard. The information contained herein is intended for compliance.

N.2 APPLICABLE DOCUMENTS

This section is not applicable to this Standard.

N.3. SECTION 5.2.c, DATA SET LOGICAL RECORDS

Text Records are required for RTAD to complete the miscellaneous Vegetation features.

N.4. SECTION 5.3, DATA SET IDENTIFIER (DSI) RECORD

1. Data Set Identification Group, "DSIG" (4 bytes):

   a. Product Type is "RTADP" (Relocatable Target Assessment Data/P) for data collected for the 1:250,000 RTAD product (5 bytes).

   b. Data Set ID is based on the JOG stock number (20 bytes). It will be left-justified and all spaces will be filled. For JOG sheet numbers with more that one zone number, only the first zone number is used in the Data Set ID. For example, JOG sheet NP 29, 30-06 would be coded: 1501*INP*2906*bbbbTbbbb* for Level 1 RTAD products, 1501*INP*2906*bbbbTRbbb* for Level 2 RTAD products, and 1501*INP*2906*bVbbDTRbbb* for Level 3 RTAD products, (*b* represents the ASCII space code). Explanation follows:

Character Position	Contents
1 - 5	Series (ref. 1501I)
6 - 11	Sheet Number (ref. 1501)
12 - 17	Overlays Included
12	*b* (Surface Configuration)
13	"V" or *b* (Vegetation)
14	*b* (Surface Materials)
15	"D" or *b* (Surface Drainage)
16	"T" (Transportation - rail)
17	"R" or *b* (Transportation - road)
18 - 20	ASCII Spaces

c. Edition is "1" for a new data set. Edition will be incremented one for each new edition (3 bytes).

d. Compilation Date is the year and month, "YYMM", the data set is validated (4 bytes).

e. Maintenance Date is "0000" for new data, and for a revised (updated) data set, the year and month of the revision will be entered, "YYMM" (4 bytes).

f. SLF Version Date is the date of the SLF version which applies to the data set, "YYMMDD", ("950816") (6 bytes).

g. DMAFF Version Date is the date of the DMAFF version which applies to the data set, "YYMMDD", ("890831") (6 bytes).

h. DSIG Reserve field is not currently used and is filled with ASCII spaces (28 bytes).

2. Data Set Security Group, "DSSG" (4 bytes):

a. Security Classification is the highest classification given to the data set.

<u>Security Classification Code (1 byte):</u>

"T" = TOP SECRET
"S" = SECRET
"C" = CONFIDENTIAL
"F" = For Official Use Only (Caveat)
"R" = Restricted (NATO Definition)
"U" = Unclassified (warning)

b. Security Release is the equivalent two-character security control and release code based on source and ancillary materials (2 bytes).

c. Downgrading/Declassification Date field will contain a date, "OADR", or blanks if no date is assigned (6 bytes).

d. Security Handling field will be based on special security requirements. There must be valid data in this field (21 bytes).

e. DSSG Reserve field is not currently used and must be filled with ASCII spaces (40 bytes).

3. Data Set Parameter Group, "DSPG" (4 bytes):

a. Data Type must be "GEO" (3 bytes).

b. Horizontal Units of Measure must be "SEC" (3 bytes).

c. Horizontal Resolution Units must be "0.020" for RTAD (1:250,000 scale). Therefore, the maximum product size will be about 5 degrees and 30 minutes for RTAD (5 bytes).

d. Geodetic Datum will be "WGE" (WGS-84). This is the datum for horizontal positions in the data set.

e. Ellipsoid must be "WGE" (WGS-84). This is the ellipsoid to which the horizontal datum is referenced.

f. Vertical Units of Measure must be "*bbb*" (*b* = blanks) (3 bytes). Vertical Units of Measure - If this field contains ASCII blanks, the segment record will contain x, y pairs. If this field has a units code "*Mbb*" (M = meters, *b* = blanks), then the segment record will contain x, y, z triplets. Since RTAD will be collected as two-dimensional data, this field will be filled with ASCII spaces.

g. Vertical Resolution Units must be "*b.bbb*" (*b* = ASCII space) for 1:250,000 scale RTAD for two-dimensional data (5 bytes). For three-dimensional data this field contains "0.010".

h. Vertical Reference System must be "*MSLb*" (mean sea level) (4 bytes) (*b* = ASCII space).

the data set are referenced to the

i. Sounding Datum field is not applicable and must be filled with ASCII spaces (4 bytes).

j. Latitude (9 bytes, 'DDMMSSSSH') and Longitude (10 bytes, 'DDDMMSSSSH') of Origin must be the southwest corner of the data set (total bytes = 19). The hundredths-of-seconds digit must always be zero.

k. X (10 bytes), Y (10 bytes), and Z (10 bytes) Coordinates of Origin fields are not applicable and must be filled with ASCII spaces (total bytes = 30).

l. Latitude (9 bytes, 'DDMMSSSSH') and Longitude (10 bytes, 'DDDMMSSSSH') of SW and NE corners of the area covering the data set (total bytes = 38). The hundredths-of-seconds digit must always be zero.

m. Total Number of Features (6 bytes).

n. Number of Point (6 bytes), Linear (6 bytes), and Areal Features (6 bytes) in this data set (total bytes = 18).

o. Total Number of Segments (6 bytes).

p. DSPG Reserve field is not currently used, and must be filled with ASCII spaces (40 bytes).

4. Data Set Map Projection Group, "DSMP" (4 bytes):

Other DSMP elements are not used for "GEO" data sets. Fill with ASCII blanks (91 bytes) (total bytes = 95).

5. Data Set History Group, "DSHG" (4 bytes):

a. Edition Code must be "000" for first-time coverage of a geographic area (3 bytes).

b. Product Specification is "SPECX250RTADP" (for 1:250,000 scale data).

c. Specification Date must be "9008" or more current date: either is acceptable(4 bytes).

d. Specification Amendment Number will be shown in the current specification document (3 bytes).

e. Producer is "US090000" for DMAHTC and "US090078" for DMAAC. Otherwise, the producer of the data will

request a unique identification code from DMA (8 bytes).

f. Digitizing System represents the system which digitizes the data set (10 bytes). Producers of RTAD shall submit the name and recommended acronym for their production system (up to 10 alphanumeric characters) which will be validated and recorded by DMA.

g. Processing System represents the system which processed the data set (transforming, formatting, etc.) (10 bytes). Producers of RTAD shall submit the name and recommended acronym for their production system (up to 10 alphanumeric characters) which will be validated and recorded by DMA.

h. Grid System code identifying the grid system of the data set. (Not used for RTAD.) Fill with ASCII spaces (2 bytes).

i. Absolute Horizontal Accuracy of the RTAD must be expressed in meter units or ASCII spaces (4 bytes).

j. Absolute Vertical Accuracy of the RTAD must be expressed in meter units (4 bytes). (Not used for RTAD.) Fill with ASCII spaces.

k. Relative Horizontal Accuracy of the RTAD must be expressed in meter units or ASCII spaces (4 bytes).

l. Relative Vertical Accuracy of the RTAD must be expressed in meter units (4 bytes). (Not used for RTAD.) Fill with ASCII spaces.

m. Height Accuracy of the RTAD must be expressed in meter units (4 bytes). (Not used for RTAD.) Fill with ASCII spaces.

n. Data Generalization Code will be "0". No note will be required in the Text Record (1 byte).

o. Match/Merge Numbers and Dates for all DMA-produced data bases will be provided. This value is zero-filled for new data (20 bytes).

p. Year and Month of Earliest and Latest Sources used in production of the data sets will be provided (8 bytes).

q. Data Collection Code shall be filled with an ASCII space (1 byte).

r. Data Collection Criteria may be used to denote a detailed reference in a specification document; otherwise, it is filled with ASCII spaces (3 bytes).

s. Data Conversion Code is 3 ASCII delete characters (OCTAL 177) (3 bytes).

t. DSHG Reserve is 25 ASCII spaces (25 bytes).

NOTE: The remainder of the DSI data is not utilized for RTAD. Therefore, the remainder of the 1980-byte block can be filled with ASCII delete characters, or a minimum set of data may be included for the remaining subrecord groups. In either case, it is not necessary to read the remainder of the DSI record for RTAD. The following fields are shown to define the remaining subrecord groups and to show minimum elements that could be included in the data set for each subgroup. After the last byte of meaningful data, the remainder of the 1980 byte block will be filled with ASCII delete characters.

6. Data Set Variable Field Address Group, "DSVG" (4 bytes):

a. This group is not utilized for "GEO" data sets.

b. Other DSVG elements are ASCII spaces (50 bytes).

7. Data Set Registration Points Group, "DSRG" (4 bytes):

a. This group is not utilized for "GEO" data sets.

b. Number of registration points is "000" (3 bytes).

c. Other DSRG elements (zero bytes) do not exist for RTAD since the number of registration points is 0.

8. Data Set Accuracy Group, "DSAG" (4 bytes):

a. Accuracy Subset Address must be spaces if there are not multiple accuracy outlines.

b. If there are not multiple accuracy outlines, the DSAG will not exist.

c. If there are multiple accuracy outlines, the following rules apply:

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1) The overall Horizontal and Height Accuracies (in the DSHG group) will reflect the worst subset accuracy, in accordance with DLMS specifications.

2) The outlines must completely cover the data set area, but without overlap.

3) There must be no more that nine outlines, and no more than 14 coordinates in each outline.

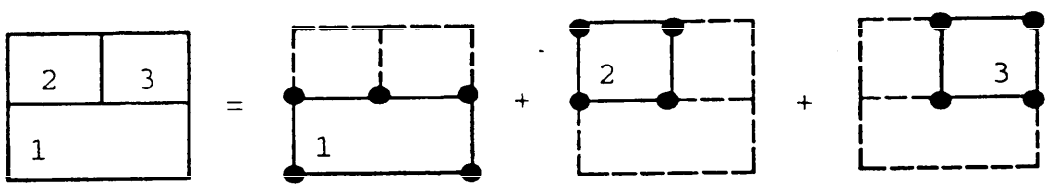
4) The order of outlines starts at the southwest corner of the data set area.

5) Outline coordinates start and end at the southwest corner of the outline.

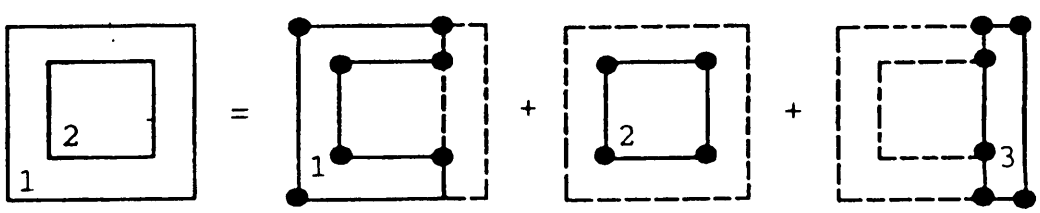
6) The outline tracks counterclockwise (feature left) and is explicitly closed (the last point duplicates the first).

7) The hundredths-of-seconds digit in the coordinates will always be zero.

8) Coordinate points must exist at all intersections:



- "Swiss Cheese" areas will be broken up:



N.5. SECTION 5.4, SEGMENT (SEG) RECORD

1. X-value and Y-value represent delta longitude and delta latitude, respectively, in hundredths-of-arc-seconds

referenced to the Latitude and Longitude of Origin specified in the DSI record.

2. Z-value represents delta elevation referenced to the Elevation of Origin and specified in units of resolution in the DSI record. This value does not exist for two-dimensional data and therefore will not be present in RTAD data.

3. Feature Orientation for linear and point features will be "C"-coincident.

N.6. SECTION 5.5, FEATURE (FEA) RECORD

1. Feature Header Block Count can be variable. Set to 7 (40 byte blocks) for RTAD.

2. The FEA Record contains identifying and descriptive information for each feature in the data set, along with a list of keys to the segments (coordinate strings) which make up the features. This record consists of one or more physical records.

   a. The length of the Segment Count field is three digits for the RTAD two-dimensional data sets.

   b. The length of the feature header field for the RTAD, which consists of seven 40-byte blocks, is 7 x 40, or 280 bytes. Feature Header 40-byte blocks are designated as 40.1 through 40.7.

   c. Values for all attributes shall be stored in their respective positions in the feature record.

3. Feature Header descriptive information.

   a. Only one field is used for RTAD in the Feature Header 40.1. Security classification will be filled with a one-byte alpha character code which is defined in the DSI Data Set Security Group.

   b. All unused fields shall be Qfilled with ASCII spaces (OCTAL 040).

N.7. SECTION 5.6, TEXT (TXT) RECORD

Text (TXT) Record 1 is defined for use with production systems other than FE/S for RTAD. The text record stores Miscellaneous Feature (9D010) information.

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This text record will not be included for thematic files if the OVC code is 3, 4, 5. Text record will exist if the OVC code is 2. TABLE VI. defines TXT Record #1, Description of Miscellaneous Features 9D010.

TABLE VI. TXT Record #1 - Description of Miscellaneous Features 9D010.

TXT Character Position	# Bytes	Content
1 - 3	3	"TXT" (Identifier for Text Record)
4 - 8	5	"*bbbb*1" (Identifies this as the first text physical block)(*b* indicates blank)
9 - 13	5	Number of characters in this TXT physical record (variable depending on the number of miscellaneous features)
14 - 39	26	Project name (left-justified with trailing ASCII spaces if needed)
40 - 44	5	9D010 Feature ID (SLF Feature identification code)
45 - 50	6	SLF Feature ID Number
51 - 200	150	Description/Information about features
201 - 1971	1771	Repeat the format for first miscellaneous feature up to 11 times.
1972 - 1980	9	Fill with ASCII delete characters

CONCLUDING MATERIAL

Custodian
DMA - MP

Preparing Activity
DMA - MP

(Project MCGT-0114)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-STD-2413(DMA)	2. DOCUMENT DATE *(YYMMDD)* 950816

3. DOCUMENT TITLE Standard Practice for Standard Linear Format (SLF) for Digital Cartographic Feature Data

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON *(If applicable)*	7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY

a. NAME Defense Mapping Agency ATTN: ATIS, ST A-10	b. TELEPHONE *(Include Area Code)* (1) Commercial (703) 285-9238	(2) AUTOVON 356-9238
ADDRESS *(Include Zip Code)* 8613 Lee Highway Fairfax, VA 22031-2137	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA. 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	

DD Form 1426, OCT 89 *Previous editions are obsolete.* 198-290

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