

Chapter 7 Map Compilation

7-1. General

This chapter describes a process, commonly used by most districts, to create Intergraph design (DGN) files from digital survey files. Note: Other CADD systems and procedures can be used, providing that the same coordinate information and descriptive data can be imported into the CADD routine.

7-2. CVTPC

The collected survey data are of little value in their present form. The coded *ASCII Coordinate File* which has been edited to conform to the USACE Coordinate File Standards is now ready to be converted into an Intergraph design file. This conversion is accomplished using the software package "CVTPC," and the process shown in Figure 7-1. Figure 7-2 displays the screen in CVTPC. From this figure, all the data attributes can be seen. The attribute setup is constructed of rows and columns. For example, level, color, and weight are columns. Point, Line, Elev. are rows. The rows are assigned to the columns selected. This becomes the file which is written. The only other requirement is the file from which the data are read. This file information is entered in the model setup section on the right side of the screen. The file information is entered into the "Input Files" block at the top of the screen. Documentation can be obtained from the U.S. Army Topographic Engineering Center.

a. CVTPC converts the *ASCII Coordinate File* into Intergraph design files. The program code is written in Intergraph's Microstation Design Language (MDL) and therefore can only be executed while Microstation is running and the user is currently in a design file.

b. The *ASCII Coordinate File* may have its coordinates and point descriptors placed in any order, i.e., "Point name X Y and Z point code or Y X Z point code, point name." The ASCII data can be separated by spaces or commas, or it can be designated by column position. For example, ASCII data files separated by spaces would be of the form:

1 32987.34 45890.01 123.44 MANHOLE

Data separated by commas would be of the form:

1,32987.34,45890.01,123.44,MANHOLE

Data separated by columns would be of the form:

1 32987.34 45890.01 123.44 MANHOLE

where the point name (number) is in column 0, X coordinate in columns 5-12, Y coordinate in columns 15-22, Z coordinate in columns 25-30, and the point code in columns 31-37. CVTPC will run on any PC that has Microstation version 4.0 or later. A typical ASCII file is shown in Figure 7-3. An example of the basic information for a typical utility is shown in Figure 7-4.

7-3. File Descriptions

a. *Attribute File*. Links the point descriptors in *ASCII Coordinate File* to the cells, assigns colors, levels, weights, text scale, and active angle.

b. *Model File*. Specifies seed file, cell library and contains a blueprint of the ASCII Coordinate File format. The method of coordinate input, column or comma.

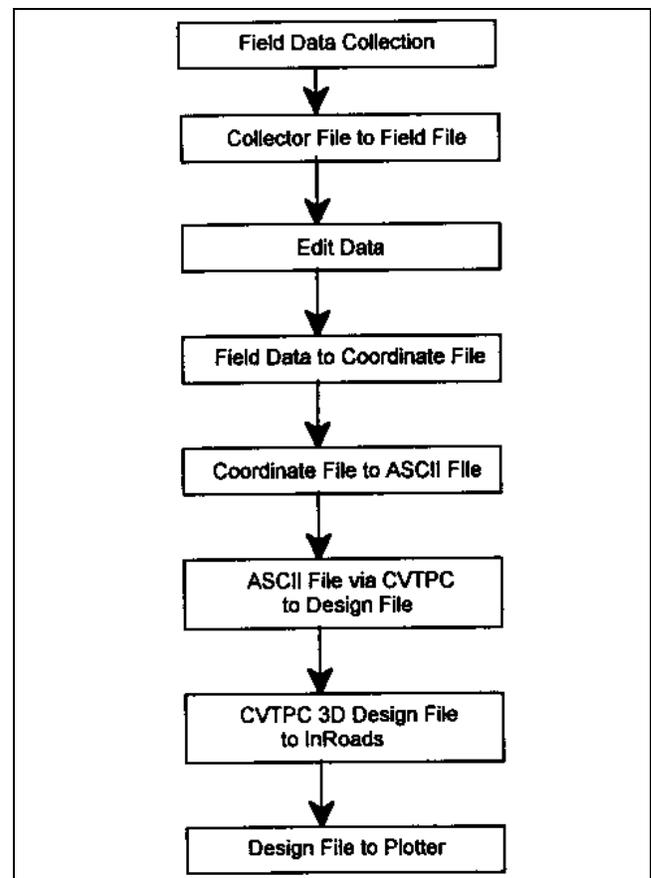


Figure 7-1. Field to map conversion process

Input Files

Ascii File example3.asc
Cell Library civsur.cel
Attr File example3.att
Model File example3.mod

Attribute Setup

Attributes	Level	Color	Weight	L Style
Point	1	0	0	0
Line	0	0	0	
Elev	2	3	0	2.00
Pt Name	0	0	0	1.00
Cell	0	0	0	1.00
Label	0	0	0	1.00
Op Note	0	0	0	1.00

Optional Note

Point Code

Cell Name

Save

Model Setup

Field Position

Northing 1
Easting 2
Elevation 3
Pt Name 0
Pt Code 0
Label 0

Data Type Commas
String Type Line
Dec. places in elev. 1
Remove Neg Sign

Save

Attr Num 1 +
Search Attr 1 Thru 1 -

Return Start

Figure 7-2. CVTPC screen

```

1, 782365, 36345890, 2275214, 86945614, 573, 478884514979, 0/C, CONC, BUI
2, 782345, 353423830, 2275248, 10642741, 572, 461137277167, CA, STO, BASIN
5, 782300, 16161151, 2275267, 51443841, 573, 374514576417, LIGHT, POLE
4, 782228, 247274107, 2275336, 70541060, 573, 139822606559, LIGHT, POLE
5, 782227, 255064638, 2275263, 13552007, 573, 45109899176, LIGHT, POLE
6, 782123, 898941644, 2275248, 81129011, 572, 936901350331, LIGHT, POLE
7, 782162, 301674707, 2275250, 72455895, 572, 829347106902, CHAIN, LINE
8, 782179, 16636350, 2275244, 70641817, 573, 79011391871, CELL, INSTALLED
9, 782224, 871855204, 2275248, 70849814, 573, 515351194113, CHAIN, LINE
10, 782225, 312567276, 2275262, 16480142, 573, 641561202855, PUNK, BOLT
11, 782228, 843634009, 2275253, 61782810, 573, 805112025631, CHAIN, LINE
12, 782278, 907272298, 2275210, 82584227, 573, 62293729323, 0/C, CONDUIT
13, 782278, 462067678, 2275210, 36099477, 573, 585110919142, 0/C, CONDUIT
14, 782377, 724779453, 2275216, 13781253, 573, 68911881914, 0/C, CONDUIT
15, 782377, 805558843, 2275231, 21362848, 573, 118688672682, CONC, COY
16, 782312, 781072194, 2275259, 89891992, 572, 823710690819, CONC, COY
17, 782384, 823558451, 2275277, 96118823, 573, 865097334823, CONC, COY
18, 782346, 592211294, 2275262, 61957227, 573, 894897965533, CONC, COY
19, 782351, 847810373, 2275284, 63082009, 573, 188396667034, CONC, COY
20, 782368, 891819889, 2275277, 32543843, 573, 181642797183, CONC, COY
21, 782413, 436614815, 2275277, 82973580, 573, 602841655186, CONC, COY
22, 782412, 398964229, 2275254, 18584339, 573, 594683299258, CONC, COY
23, 782364, 369822739, 2275254, 83708852, 573, 118646664148, CONC, COY
24, 782358, 852703436, 2275251, 86362781, 573, 11894762143, CONC, COY
25, 782339, 514247482, 2275298, 68014576, 573, 118252423278, CONC, COY
26, 782379, 152168872, 2275253, 26204572, 572, 78698962464, CONC, COY
27, 782358, 666436296, 2275251, 55527711, 572, 609987548711, CONC, COY
28, 782365, 601261553, 2275255, 43408829, 572, 649189806911, CONC, COY
29, 782398, 646873738, 2275254, 88289553, 572, 886478717380, CONC, COY
30, 782394, 647079544, 2275276, 66828279, 572, 530115868848, CONC, COY
31, 782378, 628136312, 2275277, 12202280, 572, 765284178545, CONC, COY
32, 782346, 715842993, 2275291, 80881484, 572, 78233922715, CONC, COY
33, 782344, 183668145, 2275285, 92387382, 572, 561781778888, CONC, COY
34, 782285, 618249899, 2275218, 82638394, 572, 256891398867, CONC, COY
35, 782282, 579823615, 2275288, 78878612, 572, 259643888139, CONC, COY
36, 782316, 363944258, 2275255, 65543651, 572, 453869618851, CONC, COY
37, 782317, 284821185, 2275253, 33721174, 572, 732889528655, CONC, COY
38, 782295, 653667242, 2275160, 88899235, 573, 95793595842, CONC, COY
39, 782277, 135986761, 2275169, 25287746, 573, 838289222889, CONC, COY
40, 782276, 411853958, 2275218, 67606815, 573, 185363627969, CONC, COY
41, 782285, 828393806, 2275218, 95338862, 576, 899881375093, CONC, COY
42, 782285, 827978941, 2275224, 22283680, 573, 89511576811, CONC, COY
43, 782254, 339603791, 2275224, 48738398, 573, 133798941741, CONC, COY
44, 782241, 892493378, 2275219, 28321765, 573, 166642415879, CONC, COY
45, 782278, 468648898, 2275281, 11452594, 573, 14877371455, CONC, COY
46, 782294, 891196529, 2275275, 88351122, 573, 789161734049, CONC, COY
47, 782354, 525118295, 2275219, 58828881, 573, 426248489799, CONC, COY
48, 782354, 622586676, 2275244, 77453804, 574, 911431922978, CONC, COY
49, 782355, 689879412, 2275283, 19946849, 574, 455546684298, CONC, COY
50, 782355, 361494346, 2275216, 40162801, 574, 189218498818, CONC, COY
51, 782388, 754534973, 2275281, 28238936, 574, 274163732328, CONC, COY
52, 782389, 492228881, 2275289, 97463803, 573, 886473748121, CONC, COY
53, 782366, 256323754, 2275244, 95359359, 574, 488178510674, CONC, COY
54, 782339, 168482148, 2275289, 68225485, 572, 813818738188, CONC, COY
55, 782339, 149084318, 2275162, 37332474, 573, 846984674126, CONC, COY
56, 782348, 647664815, 2275132, 85519829, 573, 897218885784, CONC, COY
57, 782349, 792486488, 2275158, 95963737, 573, 784889469543, CONC, COY

```

Figure 7-3. Typical ASCII file

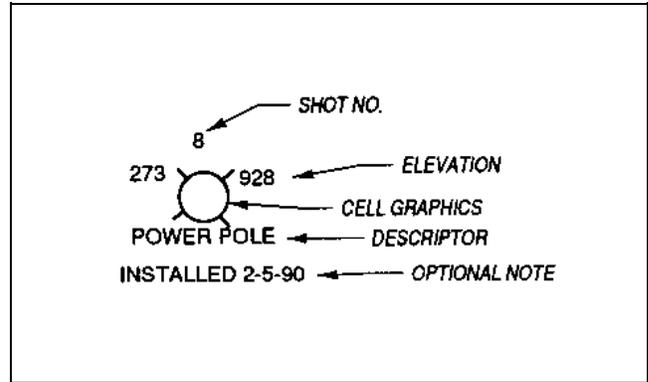


Figure 7-4. Information provided by field shot

c. CIVSUR.cel. Cell Library containing Corps of Engineers standardized cells.

d. ASCII Coordinate File. Input for CVTPC and the output of the coordinate file of the software specific to the particular instrument/data collector.

7-4. Overview of Topographic Survey Data Flow

Figure 7-5 outlines the various routes by which topographic data are processed to a final site plan map form. Note that this figure includes digital topographic data collected from different sensors (e.g., aerial, hydrographic sonar/acoustic). Figures 7-6, 7-7, and 7-8 depict USACE standard feature level assignments, USACE civil/site level and element symbology, and USACE surveying and mapping level and element symbology, respectively. Consult the USACE CADD Manual for details.

7-5. Typical Point Descriptors Used in Topographic Surveying

CONTROL

- 2X2 HUB/TACK
- PK NAIL
- RR SPIKE
- PIPE
- REBAR
- 1X2 STAKE
- BRASS CAP
- NAIL
- FILED X
- HAND DRILL HOLE
- CHISLED X
- BOLT
- REBAR/CAP

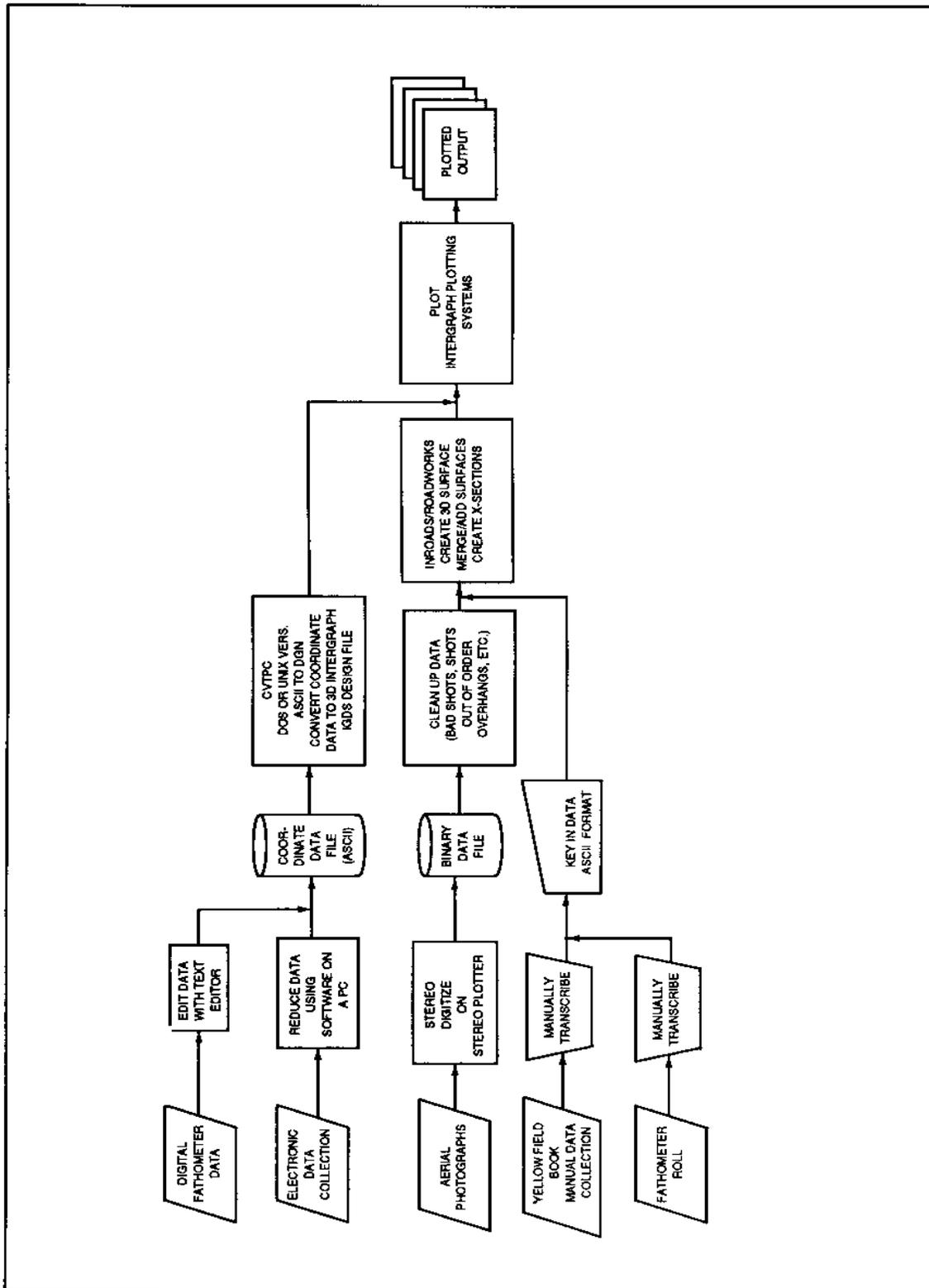


Figure 7-5. Overview of survey data flow

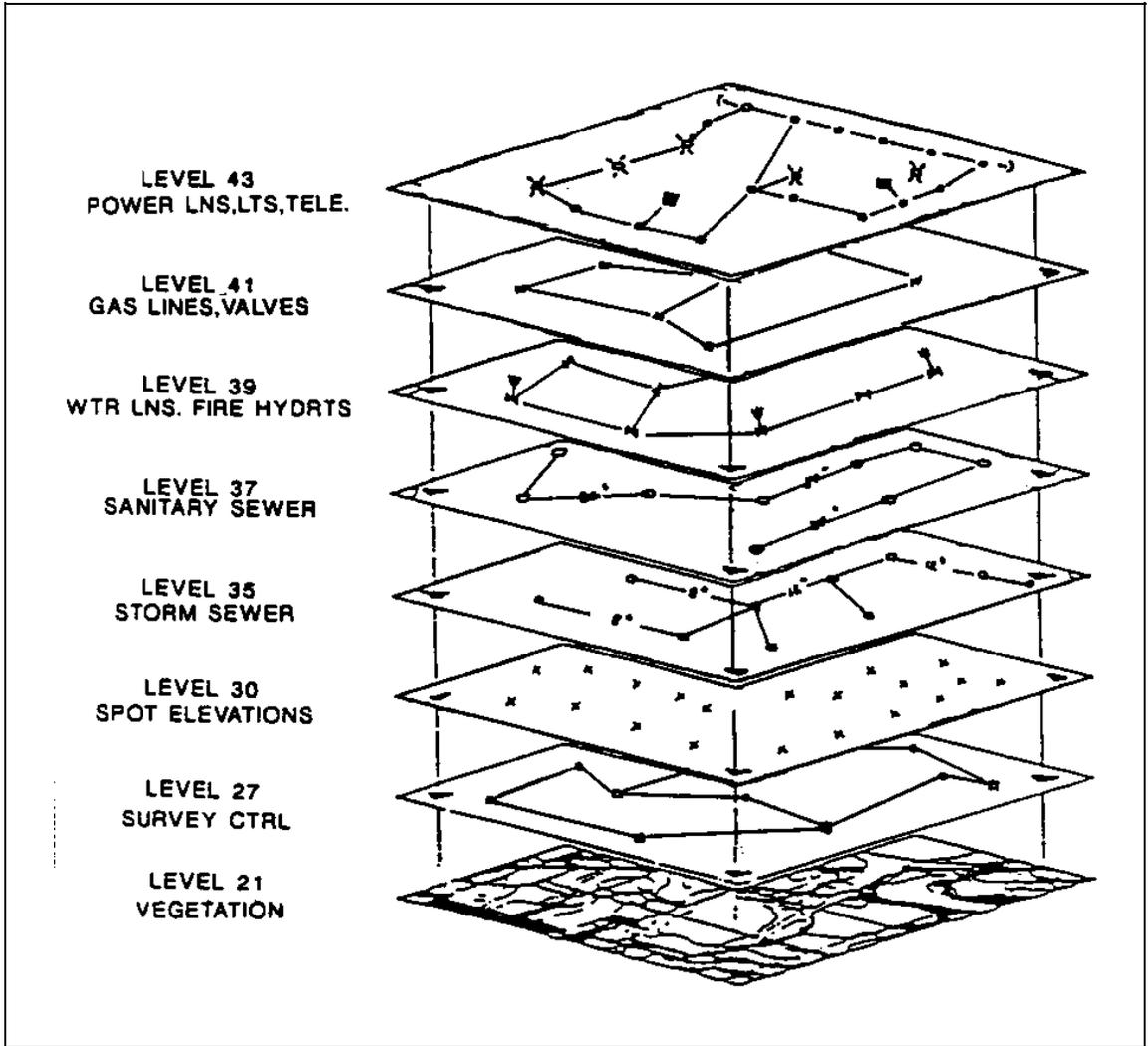


Figure 7-6. Feature level assignments

MON	TBM	
ALUM MON	PBM	
CONC MON		
COE MON		<u>TOPOGRAPHIC</u>
NGS MON		
USGS MON	GROUND SHOT	
GPS MON	BLDG CORNER	
REFERENCE POINT	U/G CABLE MARKER	
PICTURE POINT	CURB	
SIXTEENTH CORNER	PAD	
SECTION CORNER	ASPHALT	
QUARTER CORNER	TOP/RIPRAP	
CLOSING CORNER	TOE/RIPRAP	
MEANDER CORNER	SLOPE	
WITNESS CORNER	WE/WS	
HOMESTEAD CORNER	TOP	
BENCHMARK	CROWN	

PLANIMETRIC		MISCELLANEOUS	
GEOMETRY	TEXT	SHEET DEPENDENT INFO	
2	COORDINATE GRID	3	COORDINATE GRID
4	BUILDINGS	5	BUILDINGS
6	ROADS, RR CENTER LINES	7	ROADS, RR CENTER LINES
		8	ROADS, RR SIDEWALKS
		9	CONCRETE JOINTS
		10	CONCRETE JOINT ELEV
11	RUNWAY TAXIWAY APRONS	12	RUNWAY TAXIWAY APRONS
13	STRUCTURES	14	STRUCTURES
15	CULVERTS	16	CULVERTS
17	WATER FEATURES	18	WATER FEATURES
19	VEGETATION	20	VEGETATION
21	FENCE	22	FENCE
23	BOUNDARIES CADASTRAL	24	BOUNDARIES CADASTRAL
25	CONTROL POINTS	26	CONTROL POINTS
27		28	BREAKLINE
		29	MAJOR CONTOUR
		30	SPOT ELEVATIONS
		31	CONTOUR ANNOTATION
		32	BORE HOLES & TEXT
		33	MINOR CONTOUR
UTILITIES			
GEOMETRY		TEXT	
35	STORM SEWER	36	STORM SEWER
37	SANITARY SEWER	38	SANITARY SEWER
39	WATER	40	WATER
41	GAS	42	GAS
43	ELECTRICAL TELEPHONE	44	ELECTRICAL TELEPHONE
45	STEAM	46	STEAM
		47	CROSS-SECTION 7 PROFILES
		48	DETAILS INSERTS
		49	SOUNDINGS
50	CHANNEL LINES DISP. AREAS	51	CHANNEL LINES DISP. AREAS
		52	NAVIGAT. AID & TEXT
54	PIPELINES STRUCTURES	55	PIPELINES STRUCTURES
		56	STATIONING & MILE MARKERS
		57	REVETMENTS & TEXT
		58	BORDER M. ARROW LEGEND
		59	
		60	
		61	
		62	
		63	PROJECT SUMMARY REPORT

CIVSUR .CEL

Figure 7-7. USACE civil/site levels and element symbology

TOE
C/L
B/L
DRIVEWAY
SIDEWALK
PORCH
ROCK
STEPS
AC@PCC JOINT
CUT-OFF FENCE POST
STEEL GUARD POST
WOOD GUARD POST
PAINT STRIPE
RETAINING WALL
SIGN
TOP STRUCTURE
HEADWALL
FLOODWALL
EXPANSION JOINT
BUILDING LINE
DRAIN
TREE LINE
CONIFEROUS
DECIDUOUS
ORNAMENTAL
HAZARDOUS WASTE VAULT
C/L RR TRACK
TOP OF RAIL
O/H PIPE
CHAIN LINK
BARBED WIRE
WOOD FENCE
GROUNDING ROD
AIRCRAFT TIE-DOWN
ASPHALT PATCH
CONC. PATCH
TOWER LEG

ROAD WORK

SHOULDER ROAD
C/L ROAD
EDGE ROAD
RAMP

BRIDGES

END OF BRIDGE
PIER TOP

EM 1110-1-1005
31 Aug 94

PIER TOE
ARCH START
ARCH CREST
ARCH END
ARCH TOE

WATER MH
WATER LINE
SPRINKLER CONTROL VALVE
FIRE HYDRANT
WATER VALVE
WATER METER
WATER STANDPIPE

ELECTRICAL

U/G STREET LIGHTING BOX
TRAFFIC SIG CONTROL BOX
ELECTRICAL OUTLET
BREAKER BOK
SWITCH BOX
ELECTRICAL VAULT
ELECTRICAL SPLICE
O/H POWER LINE
POWER POLE
POWER POLE/TRANS
GUY POLE
DOWN GUY
U/G CONDUIT
LIGHT POLE
ELECTRICAL MH
TRANSFORMER
RWY LIGHT
POWER @ BLDG

COMMUNICATION

TELEPHONE POLE
PHONE BOOTH
FIRE ALARM
U/G COMM BOX
TELEPHONE MH
U/G COMM
O/H COMM
TELE SPLICE BOX
TELE @ BLDG
CABLE TV

FUEL

FILLER PIPE U/G TANK
A/G FUEL TANK
FUEL TANK VENT PIPE
FUEL PIT

SANITARY

SANITARY MH
SANITARY CLEANOUT
SANITARY LINE
EXPOSED SEWER PIPE

GAS

GAS PAINT MARK
GAS VALVE
GAS METER
GAS LINE

STORM

TOP CONC DRAIN TROUGH
TOE CONC DRAIN TROUGH
GRATED STORM MH
STORM MH
CATCH BASIN
DRAIN PIT
CULVERT
FLOW DITCH
CURTAIN DRAIN

HEATING

STEAM PIT
STEAM MH
A/G STEAM LINE

GEOTECH

PVC PIEZOMETER
PVC SLOPE INDICATOR
TEST WELL
MONITORING DEVICE
CDHU
CDHD
WELL HEAD

WATER

A/G WATER VALVE
AIR RELIEF VALVE
RISER

HYDRO

BUOY
DOLPHIN
PILING
SOUNDING

BREAKLINES

C/L ROAD
EDGE ROAD
SLOPE BREAK
BREAKLINE

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TREE	CSHRUB	DTREE	CTREE	NRFARM	LSPMSM	LSPMLG	HSWAMP	TREELN
LSWAMP	SWAMP	CMP02	CMPU2	DEPCON	DEPCI	CULV	SDOWL	CONC
PORUS	LCONC	GROUT	GRAVL	EARTHX	ROCKX	RIPSEC	CUT	FLSEC
RIPRAP	FLL	DNR	PDATA	TAB	DNL	VCDATA	HVSCCL	MON
GPS	BM	RBM	WH	PH	SEC	SC85	NSC	SC
SC86	SC88	PRJBD	ROW	FENCE	MWELL	CDHU	CDHD	ARROW
PL	BREAK	CL	TDOT	CATBSN	RNOBSN	MH	EMH	TELEMH
STMPIT	VAL	PWRPOL	GUY	PPLT	FLO	FREHD	SL	REG
LITPOL	TRANS	TOWER	ARSYM	STHSYM	NTSYM	USSYM	TURN	STAROW
STATRN	HANDI	SIGN	GUARDR	PARARR	RR	DITCH	WTRLN	ORMM
SRMM	PUMPST	EYEH	PLE	FLO	DAROW	FLOWLT	FLOWRT	DOLPHI
WER	JETTY	PPEO	TYPSEC	RAEX	FLEBB	FLGATE	CABCR	DEBY
FLREDB	LREDB	REDBU	CANBU	BN	LBN	REDDAY	GRDAY	RASTAR

Figure 7-8. USACE surveying and mapping level and element symbology