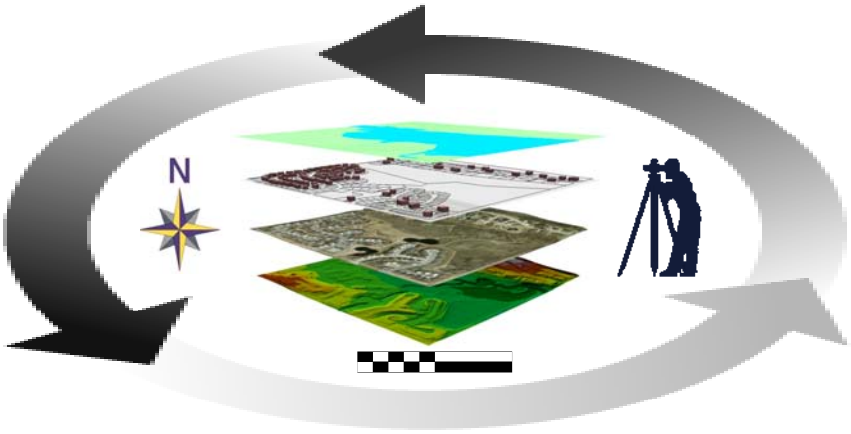
dallas water utilities
city of dallas

DRAFTING STANDARDS FOR WATER/WASTEWATER PIPELINE PROJECTS



October, 2011

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PREFACE

P.1 BACKGROUND

The intent of this manual is to provide a consistent graphic management guideline for design and drafting of all water and wastewater main projects owned and operated by Dallas Water Utilities (DWU). This manual replaces the second edition of "Drafting Standards for Pipeline Projects" by DWU dated January, 1998. The chronological list of events in developing this manual is summarized as follows:

JAN, 1988 FIRST EDITION: Compilation of drafting instructions into first edition of the manual.

JAN, 1998 SECOND EDITION: Revision of the 1988 manual to include standard plan format, computer aided drafting and design (CADD) settings and sample drawings.

OCT, 2010 THIRD EDITION: Revision of the 1998 manual to incorporate updated general requirements, drafting conventions, drawing configurations, CADD settings and custom seed file with predefined levels, text style, cell library and other features.

OCT, 2011: Revision of the 2010 manual to correct minor errors in the text, add illustrations, update the cell library and revise the level library so the colors for underground utilities correspond with the American Public Works Association Uniform Color Code for Marking Underground Utility Lines.

This October 2011 of "Drafting Standards for Water/Wastewater Pipeline Projects" is written by Engineering Services, Dallas Water Utilities. Any questions or suggestions regarding to this manual should be forwarded to Engineering Services, Dallas Water Utilities.

P.2 ABBREVIATIONS

AC	Asbestos Cement	CATV	Cable TV
ANSI	American National Standards Institute	CAV	Combination Air Valve
		CB	Construction Book
ARV	Air Release Valve	C/C	Center to Center
ASPH	Asphalt	CI	Cast Iron
ASTM	American Society for Testing Materials	CIPP	Cured-in-Place Pipe
		C/L	Center Line or Class
AV	Air Valve	CO	Cleanout
AVV	Air/Vacuum Valve	COD	City of Dallas
AWWA	American Water Works Association	CONC	Concrete
		CONN	Connection
BBF	Bell X Bell X Flange	CONST	Construction
BC	Back of Curb	CONT	Contract
BFP	Backflow Preventer	CP	Control Point
BFV	Butterfly Valve	CTS	Corrosion Test Station
BH	Bud Holcomb or Bore Hole	D or DIA	Diameter
BK	Backward	DART	Dallas Area Rapid Transit
BLDG	Building	DI	Ductile Iron
BLK	Block	DR	Dimension Ratio
BLVD	Boulevard	DTM	Digital Terrain Model
BM	Bench Mark	DWG	Drawing
BOP	Bottom of Pipe	DWU	Dallas Water Utilities
BOTOC	By Other Than Open Cut	E	East
BOV	Blowoff Valve	ECI	Enamel Lined Cast Iron
BTWN	Between	EL or ELEV	Elevation
CAD	Computer Aided Drafting	EL UNK	Elevation Unknown
CADD	Computer Aided Drafting and Design	EMB	Embedment
		ESMT	Easement
CALC	Calculate	EST	Estimate

ETJ	Extra Territorial Jurisdiction	IR	Iron Rod
EW	Each Way	LB	Ledger Book
EX	Existing	LF	Linear Feet
F or FLG	Flange	LL	Liquid Limit
FB	Field Book	LN	Lane
FF	Finish Floor	LT	Left
FH	Fire Hydrant	MB	Mail Box
FL	Flow Line	MJ	Mechanical Joint
FM	Farm-to-Market (Road)	MH	Manhole
FO	Fiber Optic	MSL	Mean Sea Level
FORF	Flange Outlet Reducing Flange	N	North
FT	Feet	NA or N/A	Not Applicable
FWY	Freeway	NAD83	North American Datum of 1983
FWD	Forward	NTS	Not to Scale
G	GAS	OD	Outside Diameter
GIS	Geographic Information System	OE	Overhead Electric
GM	Gas Meter	P	Petroleum
GPS	Global Positioning System	PACP	Pipeline Assessment and
GV	Gate Valve		Certification Program
H or HORZ	Horizontal	PC	Point of Curvature
HB	Horizontal Bend	PCCP	Pre-Stressed Concrete Cylinder
HDD	Horizontal Directional Drilling		Pipe
HDPE	High Density Polyethylene	PG	Page
HOE	Home Owner's Extension	PE	Plain End or Professional Engineer
HWY	Highway	PI	Plasticity Index or Point of
ID	Inside Diameter		Intersection
IH	Interstate Highway	PID	Project Identification Number
I/I	Inflow/Infiltration	P/L	Property Line
IN	Inch	PO	Pitot Outlet
INV	Invert	PP	Power Pole
IP	Iron Pin	PR	Pressure

PROP	Proposed
PRV	Pressure Reducing Valve
PSI	Pounds Per Square Inch
PT	Point of Tangent
PVI	Point of Vertical Intersection
PVC	Polyvinyl Chloride
PVMT	Pavement
PW&T	Public Works & Transportation
QL	Quality Level
QTY	Quantity
RCCP	Reinforced Concrete Cylinder Pipe
RCP	Reinforced Concrete Pipe
RD	Road
ROW	Right of Way
RPMP	Reinforced Polymer Mortar Pipe
RR	Rail Road
RT	Right
RTRP	Reinforced Thermosetting Resin Pipe
NCTCOG	North Central Texas Council of Governments
SD	Storm Drain
SDR	Standard Dimension Ratio
S	South
SH	State Highway or Sheet
S/L	Survey Line
ST	Street
STA	Station
STA. EQ.	Station Equation
STD	Standard
S/W	Side Walk
SW3P	Storm Water Pollution Prevention Plan
SUE	Subsurface Utility Engineering
T	Telephone
TOP	Top of Pipe
TH	Test Hole
TIN	Triangulated Irregular Network
TAC	Texas Administrative Code
TBM	Temporary Bench Mark
TCEQ	Texas Commission on Environmental Quality
TORF	Threaded Outlet Reducing Flange
TXDOT	Texas Department of Transportation
UE	Underground Electric
UG	Underground
V or VERT	Vertical
VB	Vertical Bend
VCP	Vitrified Clay Pipe
VCT	Vitrified Clay Tile
VOL	Volume
W	Water or West
WDBM	Water Department Bench Mark
WW	Wastewater
W/WW	Water/Wastewater
WWAD	Wastewater Access Device
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

CHAPTER 1

GENERAL REQUIREMENTS

1.1 INTRODUCTION

This chapter outlines the general drafting standards to be adopted in all water and wastewater pipeline design projects for Dallas Water Utilities (DWU).

1.2 SOFTWARE APPLICATION

MicroStation V8 XM or the latest edition shall be used for design and drafting of all DWU water and wastewater main projects. All drawings used by or provided to DWU shall be in "dgn" format. In addition, the latest version of InRoads or equivalent software(s) as approved by DWU, shall be used to perform survey data import, surface modeling, horizontal and vertical alignment, and other related tasks for water and wastewater main design.

1.3 DATA COLLECTION AND DRAWING CHECKLIST

All survey for design and subsequent various forms of drawings shall be prepared in accordance with DWU standards as specified in this section.

1.3.1 SURVEY

Survey shall be conducted prior to initiation of any detailed design. The majority of the existing topographic features shall be obtained from the survey. Existing and proposed utility information shall initially be obtained from the utility records supplied by each utility company. In addition, the location of existing utilities shall be confirmed by survey or field investigation as necessary. A general checklist for water and wastewater main survey is included under **APPENDIX A.1.**

1.3.2 BASEMAP

A basemap shall be prepared to create a design basis for water and wastewater main projects. A general checklist for water and wastewater main basemap is included under **APPENDIX A.2.**

1.3.3 DESIGN PLAN

All water and wastewater pipeline drawings shall be prepared in accordance with the DWU Water and Wastewater Pipeline Design Manual, Latest Edition. A typical checklist for water and wastewater main design plans is included under **APPENDIX A.3.**

1.3.4 AS-BUILT DRAWING

As-built drawings shall consist of handwritten notes demonstrating any field changes during construction. A general checklist for water and wastewater main as-built drawings is included under **APPENDIX A.4.**

1.3.5 RECORD DRAWING

Record drawings shall be prepared by the designer showing any field changes as marked on the as-built drawings. A typical checklist for water and wastewater main record drawings is included under **APPENDIX A.5.**

1.4 FILE MANAGEMENT

All MicroStation files associated with water and wastewater design shall be properly named as described in this section.

1.4.1 NAMING CONVENTIONS

A typical water and wastewater drawing file shall be named as follows:

"Drawing Type-Project Identifier.File Extension"

Where, "**Drawing Type**" shall include abbreviation for DWU 3D Seed File (DWUSeed3D), DWU 2D Seed File (DWUSeed2D), 3D Base Map (Basemap3D), 2D Base Map (Basemap2D), Cover Sheet (C), General Sheet (G), Design Sheet (D), Traffic Control Sheet (T), or other relevant drawings. "**Project Identifier**" includes project identification (PID) number, construction contract (CONT) number, street name, project area name, or unique DWU Water/Wastewater file number. In addition, "**File Extension**" typically denotes to "DGN" for all MicroStation drawings.

Accordingly, a preferred naming convention for drawing files is shown in **Table 1.4:**

TABLE 1.4: FILE NAMING CONVENTION

File Type	File Name	Note
DWU 3D Seed File (Read Only)	DWUSeed3D-xx.dgn	"xx" refers to date created or revised: DWUSeed3D-Sept2010
DWU 2D Seed File (Read Only)	DWUSeed2D-xx.dgn	"xx" refers to date created or revised: DWUSeed2D-Sept2010
3D Basemap	Basemap3D-xx.dgn	"xx" refers to project identification number (PID), street or project area name: Basemap3D-PID763_MainSt.dgn Basemap3D-PID764_ParkMainAlley.dgn
2D Basemap	Basemap2D-xx.dgn	"xx" refers to project identification number (PID), street or project area: B2D-PID763_MainSt.dgn B2D-PID764_ParkMainAlley.dgn
Cover Sheet	C-xx.dgn	"xx" refers to construction contract or file sheet number* as assigned: C-CONT05633_634F.dgn C-411Q1023_Sh001.dgn C-685W0116_Sh013.dgn
General Sheet (General Note, Survey Control Sheet etc.)	G-xx.dgn	"xx" refers to construction contract or, file sheet number* as assigned: G-CONT05633_634F.dgn G-411Q0012_Sh112.dgn G-685W0016_Sh013.dgn
Design Sheet (Plan, Profile, or Miscellaneous Details)	D-xx.dgn	"xx" refers to unique file number*: D-411Q0002_Sh001.dgn D-685W0016_Sh013.dgn
Traffic Control Sheet	T-xx.dgn	"xx" refers to unique file number*: T-411Q0009_Sh006.dgn T-685W1016_Sh112.dgn

**Note: All file and sheet numbers shall consist of 4 and 3 digits, respectively, to allow proper sorting and to be compatible DWU vault numbering system (Example: 411Q0001 and Sh001)*

1.4.2 SEQUENCE OF FILING

The preliminary base map as submitted by the surveyor must be based on DWU 3D seed file entitled "DWUSeed3D-xx.dgn" and shall be saved as a 3D base map file "Basemap3D-xx.dgn". This file shall consist of the survey data along with triangulation, break lines, contours, pavements, and other required drafting by the surveyor(s) as necessary.

The 3D base file "Basemap3D-xx.dgn" as obtained from the surveyor may be further referenced to a 2D base file as "Basemap2D-xx.dgn" by the designer prior to detailed design. All final design sheets shall be saved as individual files and to be named as "C-xx.dgn", "G-xx.dgn" or "D-xx.dgn" for cover, general or design sheets, respectively, as necessary. In addition, all final design sheets shall be stand alone drawings without any references or attachment. A typical sequence of filing naming is shown in **Figure 1.4.2:**

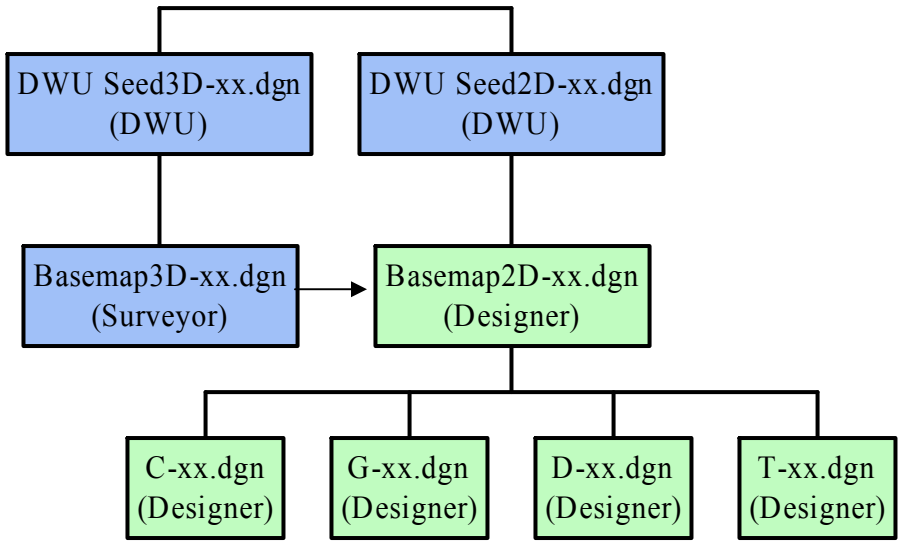


FIGURE 1.4.2: SEQUENCE OF FILING

CHAPTER 2

DRAFTING CONVENTIONS

2.1 GENERAL

This Chapter describes basic drafting conventions to be used for water and wastewater main projects.

2.2 DRAFTING BASE POINTS

All DWU projects shall use City of Dallas Benchmarks for vertical control. The list of City of Dallas Benchmarks is available at the City of Dallas Website. In addition, all survey coordinates shall be tied to State Plane Coordinates, North Central Zone, North American Datum of 1983 (NAD83). This will facilitate use of various design elements into the City of Dallas Geographical Information System (GIS) system.

The coordinate system used for design shall match that used by the surveyor for data collection and these coordinates shall not be rotated or translated. MicroStation X, Y base point of 0, 0 should match a Northing, Easting of 0, 0.

2.3 MASTER MODEL AND SHEET MODEL

All drafting shall be done at 1:1, in engineering units, in the MicroStation "master model" environment. The design along with standard border shall be referenced in a "sheet model" prior to plotting using appropriate scale factor, as necessary.

2.4 REFERENCES

References shall be used wherever a part of the basemap or other information will be used in more than one drawing, so that any changes are automatically updated in all of the associated drawings. However, upon completion of final design, each design sheet shall be a stand alone drawing without any references or attachments and shall be named as per **Table 1.4**. This will provide assured future retrieval of all information that is contained on the engineer's sealed hard copy.

2.5 TEXT FONT AND ORIENTATIONS

The standard text font for water and wastewater design plans shall be MicroStation Text Font 23. This style of lettering has been the standard for the civil engineering field and produces a neat and legible text. This can also be accomplished quickly by free hand using inclined Gothic lettering templates, if necessary.

The orientation of design plans requires the placement of call out notes at various angles skewed to the horizontal position. The standard text or lettering orientation shall be as per **Figure 2.5**.

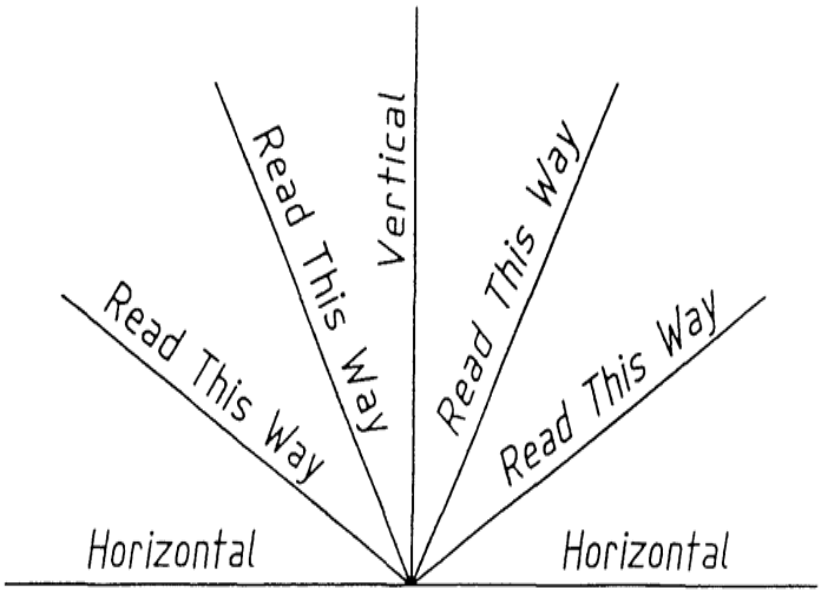


FIGURE 2.5: TEXT FONT AND ORIENTATION CONVENTIONS

2.6 ANNOTATIONS

Unusually large text shall not be used, except decorative fonts on cover sheet. Annotation associated with any feature shall be at line style 0 (solid) and weight of 0. Center left justification shall be used for blocks of text. In addition, following guideline shall be used for annotations associated with features:

- Move annotation away from feature
- Line up annotation if possible
- Avoid odd abbreviations and squeezing text to fit
- Break leader lines at conflicts only
- Multiple leader lines may not intersect
- Group leader lines at about the same angle for neatness

2.7 EXISTING, PROPOSED AND FUTURE FEATURES

All existing, proposed or future features shall be clearly distinguishable from each other. Following guidelines shall be used except otherwise predefined by DWU:

2.7.1 Existing Features:

All the existing features shall be depicted with relatively thinner lines than proposed or future features of the same type. Grey scales are generally not allowed because of their tendency to be lost during typical reproduction or photocopying processes.

2.7.2 Proposed Features:

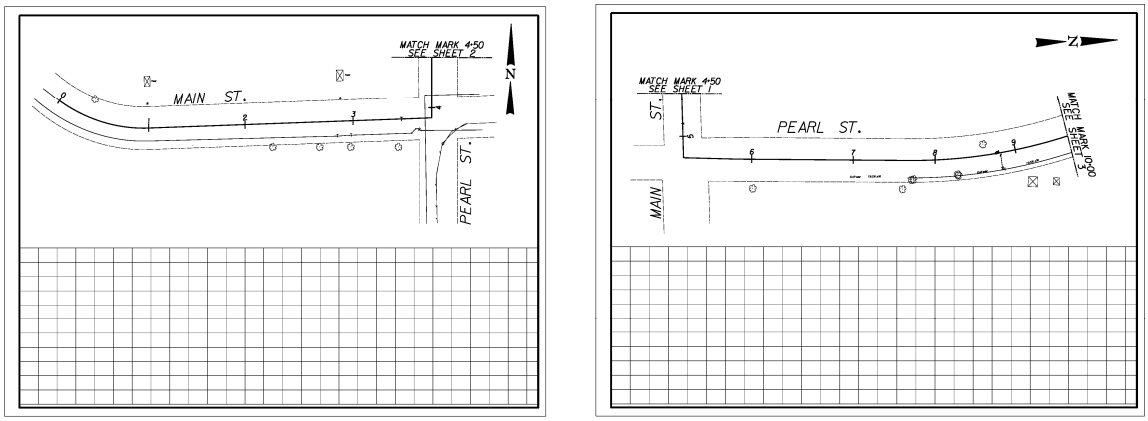
All proposed features shall be more prominently depicted than existing features for the same type.

2.7.3 Future Features:

All future features shall be more prominently depicted than existing features for the same type. Typically, future features shall be at line style of 5 (short dash) and minimum weight of 2 (0.024 in) unless otherwise predefined by DWU.

2.8 DRAWING ORIENTATIONS

The orientation of the plan view should allow the placement of the design lengthwise along the plan sheet while orientating north generally towards the top or right side of the sheet (**FIGURE 2.8**).



Option 1: North towards Top **Option 2: North towards Right**

FIGURE 2.8: DRAWING ORIENTATION CONVENTIONS

2.9 STATIONS

All water and wastewater pipeline stations shall be to the tenth of a foot (Ex. STA. 1+90.5). The pipeline alignment shall be developed with a continuous one hundred foot stationing format. This station format provides the means of referencing pertinent points of construction and proposed appurtenances along with providing a reference between the plan and profile views. Typically, projects will begin with a zero station point (0+00.0) and then proceed to the project ending point.

The beginning station (0+00.0) for proposed wastewater mains shall be at the down stream connection point typically a manhole, and then proceed up stream. When not dictated by a down stream connection point, stationing should begin from west to east, or south to north. The west to east and south to north stationing configuration typically provides left to right reading of plans with north directed to the top or to the right. A typical stationing for water and wastewater project is shown under **Figure 2.9**.

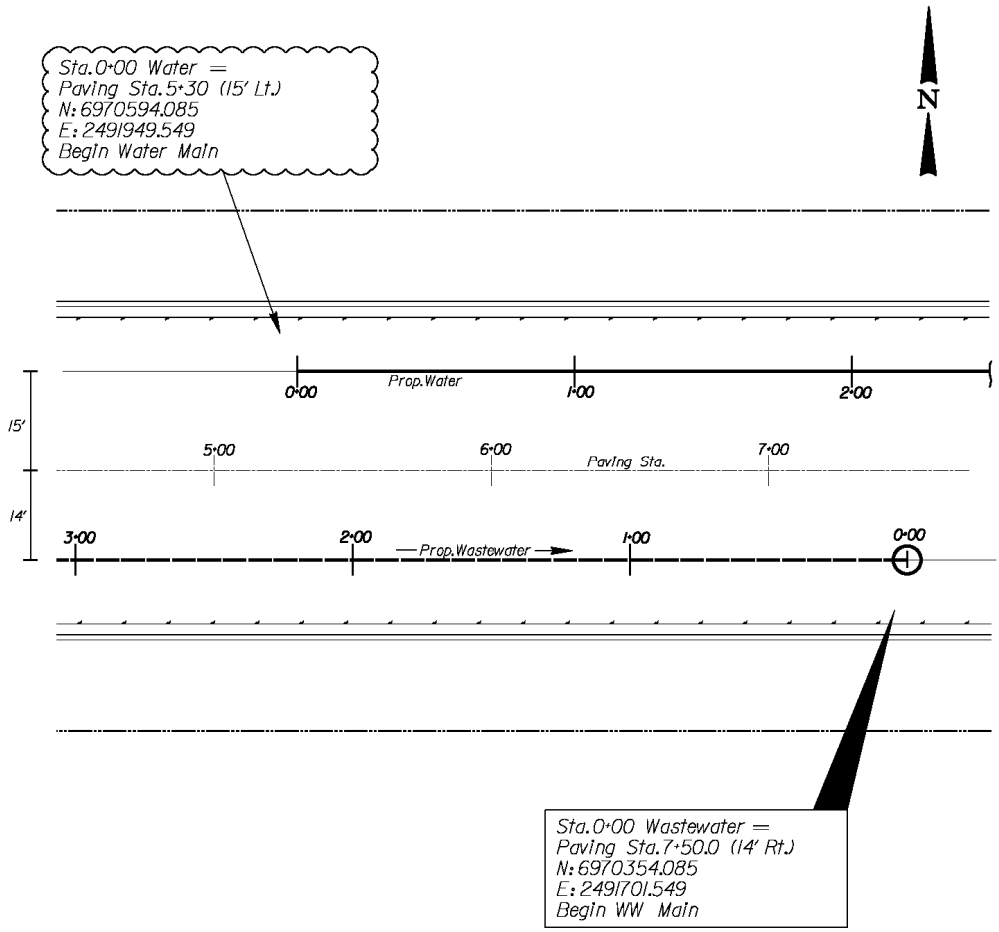


FIGURE 2.9: STATIONING CONVENTION AND CROSS-REFERENCING

2.10 COORDINATES:

Texas State Plane Coordinates (Northing and Easting) shall be shown at beginning, ending, points of intersection (PI), points of curvature (PC), points of tangency (PT) and other station points of major appurtenances (manhole, cleanout, wastewater access device). The station 0+00.0 may also be tied to the survey control points, as necessary. Ties to easily locatable objects such as valve caps or manhole covers may be used to locate the station 0+00.0.

2.11 CROSS AND PARALLEL UNDERGROUND UTILITIES

All underground cross utilities shall be shown in the profile with elevations as available. All parallel underground utilities within minimum 10 feet are to be shown in the profile.

2.12 SLOPE

Design slopes for all water and wastewater shall be nearest hundredth of a percent (Example: Slope 5.20%). All proposed mains shall include the proposed slope and all existing mains shall include the existing slope, if it is known.

2.13 ELEVATIONS

All proposed elevations shall be to the nearest hundredth of a foot (Example: El. 495.95)

2.14 FLOWLINES/ INVERT ELEVATIONS

All water and wastewater flowlines shall be to the nearest hundredth of a foot (Example: FL 495.95). All existing wastewater mains shall be shown with hatching in the profile view as shown in **FIGURE 2.14.** Typically, left and top flowlines in the plan view shall be placed at the left side of the manhole in the profile view. Similarly, right and bottom flowlines are to be placed at the right side of the manhole in the profile view.

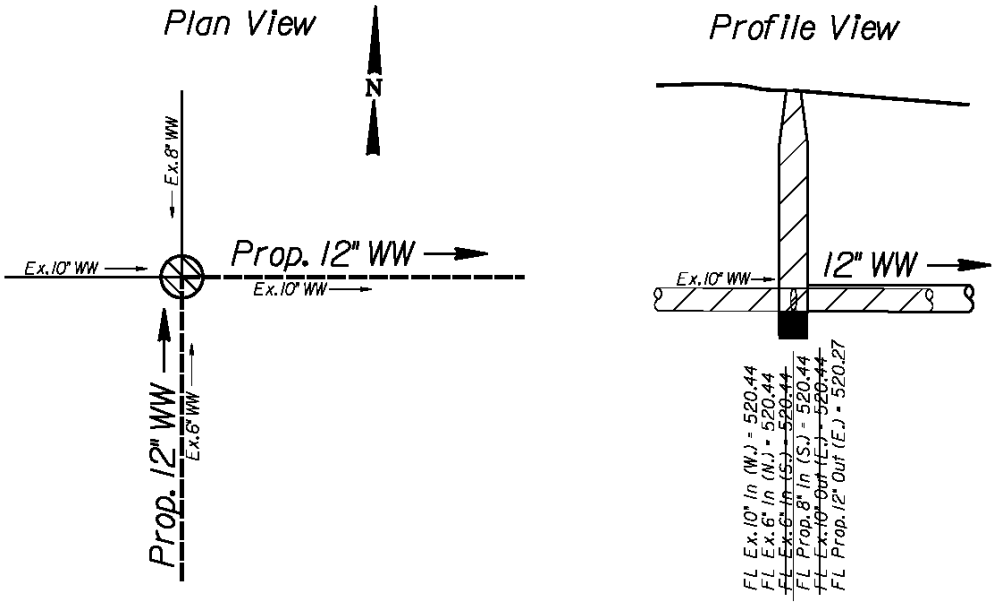


FIGURE 2.14: FLOWLINE CONFIGURATIONS AT WASTEWATER MANHOLE

2.15 DRAWING SCALES

CAD drawings shall be developed at a 1:1 ratio and then plotted to the following scale unless otherwise approved by DWU.

2.15.1 Horizontal Scale:

All plans shall be plotted at a horizontal scale of 1" = 20' to show sufficient plan details for congested project locations such as alleys, easements, or street right-of-ways with numerous underground facilities. Generally, 1" = 20' scale is most preferable; however, 1" = 40' may also be used for projects where the utilities are less congested.

2.15.2 Vertical Scale:

All profiles are to be plotted on the vertical scale of 1" = 6' with major horizontal lines at five (5) foot intervals and to the same horizontal scale as the plan view.

2.15.3 Variance:

Special details, such as structures, may require the use of a scale which can provide greater detail than those available on the standard civil engineer scale. For these instances, the use of an appropriate architectural scale which provides greater detail is acceptable.

2.16 MATCH MARKS

When a design spans more than one plan sheet, a design match mark must be established to reference the continuation of the design from one sheet to another. The following guidelines should be followed when establishing the location of match marks:

- Match Marks are to be placed at half or full station points (e.g. 10+00.0 or 10+50.0). A quarter and three-quarter station points (e.g. 10+25.0 or 10+75.0) may also be acceptable, if necessary.
- Match Marks are to be perpendicular to the design alignment at the station referenced as the match mark point.

- When at all possible, place match marks outside of street intersections, highway crossings, railroad crossings and areas of proposed construction by other than open cut.
- Place match marks to maximize the use of the available plan and profile space while considering any space requirements of location maps, general notes, construction details, etc.
- Analyze the profile section at the proposed match mark and ensure that the location of the match mark will not create any confusion in the profile view.

2.16.1 Match Marks for Single Utility Projects:

A typical match mark for single utility project (water or wastewater main) is shown in **FIGURE 2.16.1** as follows:

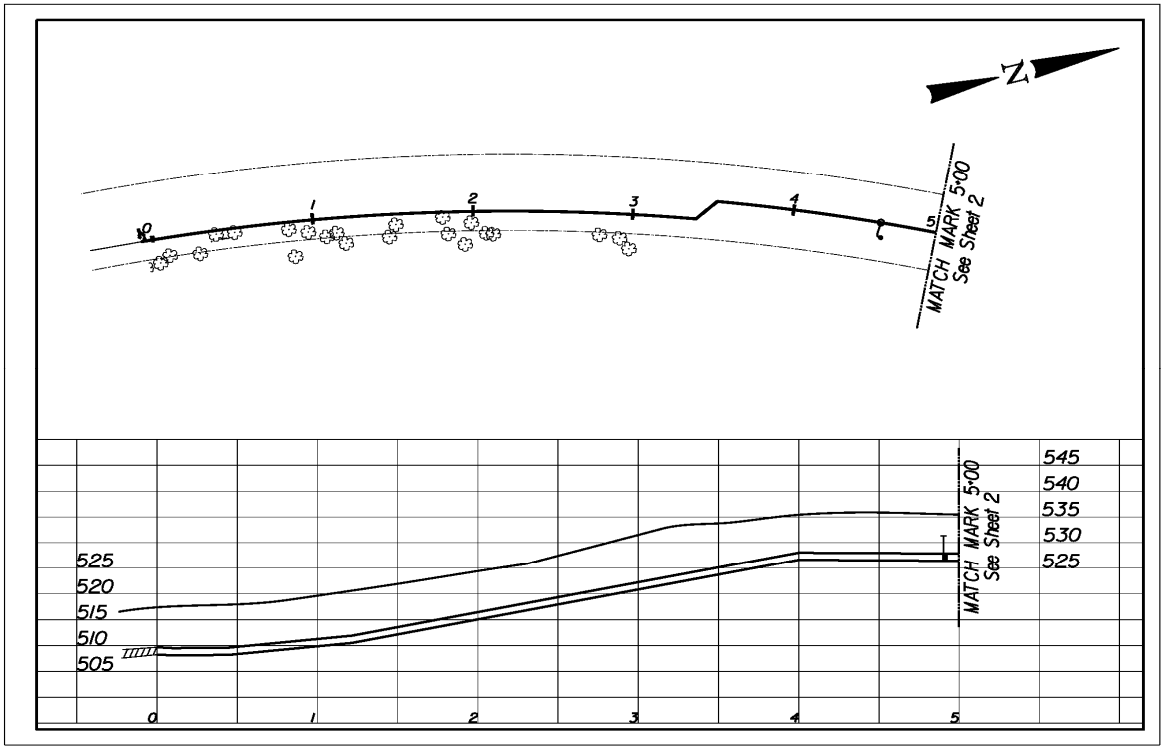


FIGURE 2.16.1: TYPICAL MATCH MARKS FOR A SINGLE UTILITY PROJECT

2.16.2 Match Marks for Combined Utility Projects:

When a design has both water and wastewater, the match mark shall be based on the wastewater stationing while water station may not conform to typical match mark guidelines as shown in (**FIGURE 2.16.2**).

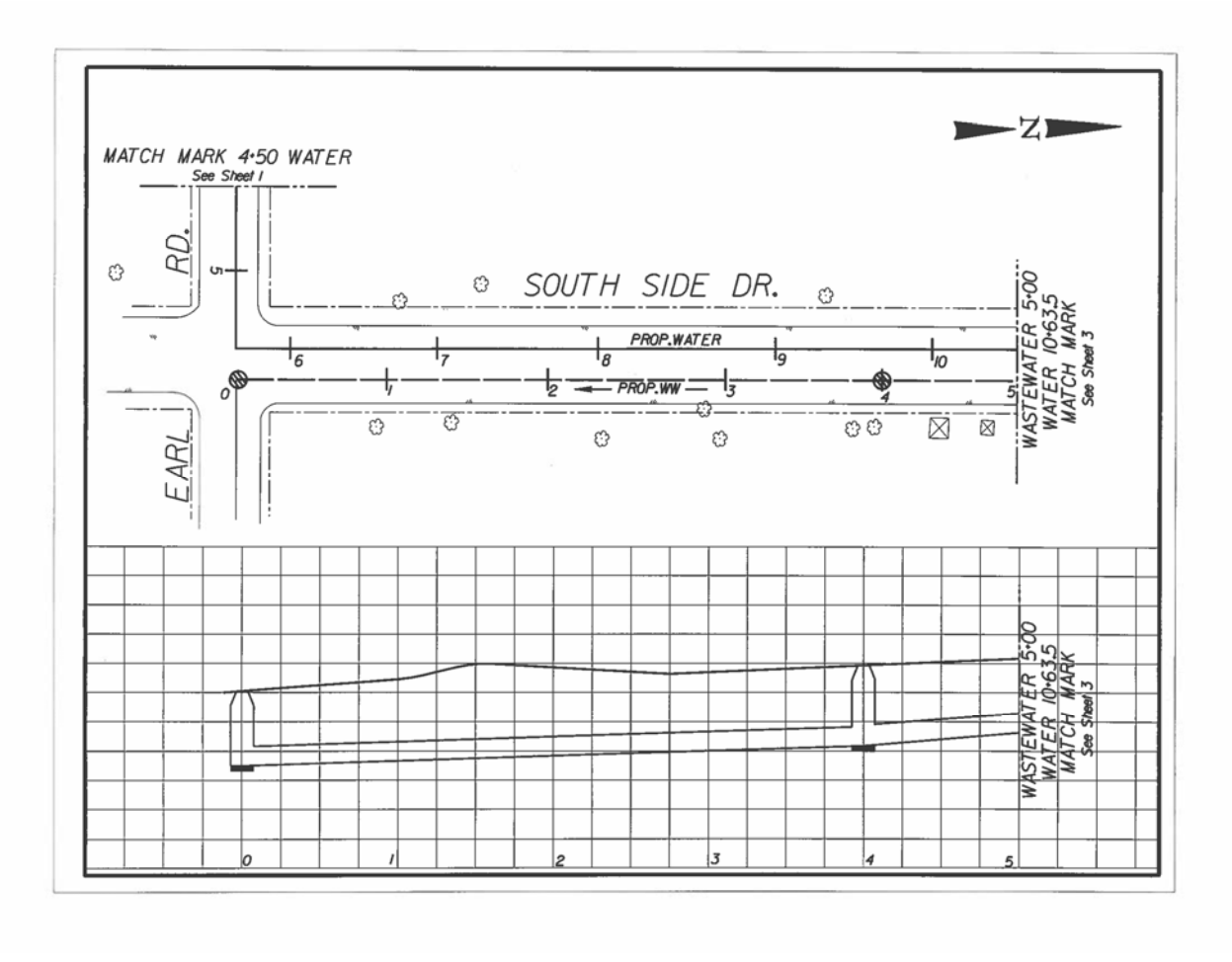


FIGURE 2.16.2: TYPICAL MATCH MARKS FOR A COMBINED UTILITY PROJECT

2.16.3 Match Marks for Vertical Shift:

When an extensive vertical drop occurs in the profile view, a profile vertical shift match mark may be required. This type of match mark allows the vertical shifting of the design so it can be fitted into the profile view. The profile vertical shift match mark should be placed at full or half station points (e.g. 7+00.0 or 7+50.0) and the elevations clearly indicated in each shift area.

A typical match mark for vertical shift of water main is shown in **FIGURE 2.16.3** as follows:

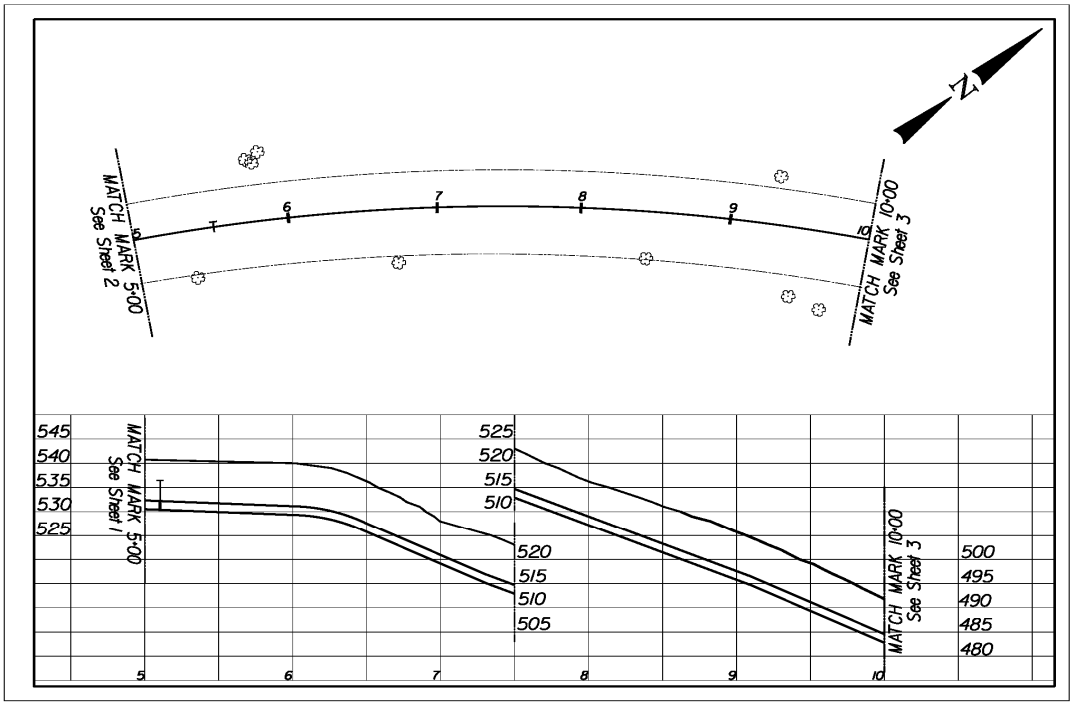


FIGURE 2.16.3: TYPICAL MATCH MARK A FOR VERTICAL SHIFT

CHAPTER 3

DRAWING CONFIGURATION

3.1 GENERAL

This chapter summarizes the basic configuration and various elements in the drawings to be used for all DWU water and wastewater projects.

3.2 PLAN AND PROFILE CONFIGURATION

Three plan and profile configurations are available for developing design plans.

3.2.1 Combined Plans with Profile Sheet:

The combined plan and profile sheet is recommended for general use as it allows the placement of the design plan view and profile view on the same sheet.

3.2.2 Full Plan Sheet:

The full plan sheet may be used when a combined plan and profile sheet does not provide sufficient plan space or when a design can be developed independently of a profile or when developing structural details. When a design requires a full plan sheet and also needs a profile, then a full profile sheet must be included with the design. The design must be thoroughly referenced to file, sheet, and line designation between the plan sheet and the profile sheet.

3.2.3 Full Profile Sheet:

Full profile sheets may be used to provide supplemental profile space, if necessary.

3.3 COVER SHEET

All major single utility, multiple location, and outside agency's joint projects must have individual project cover sheets. The cover sheet shall incorporate project name, contract number, project location map, design sheet index, and other information as described in this section.

3.3.1 Major Single Utility Project:

A major transmission or an interceptor pipeline projects having six or more plan view sheets shall have a sheet index map incorporated into the cover sheet. The map is to show the overall layout of the project and indicate the limits of each design sheet. A typical cover sheet for a major single utility project as shown under **FIGURE 3.3.1** will be available in City of Dallas website.

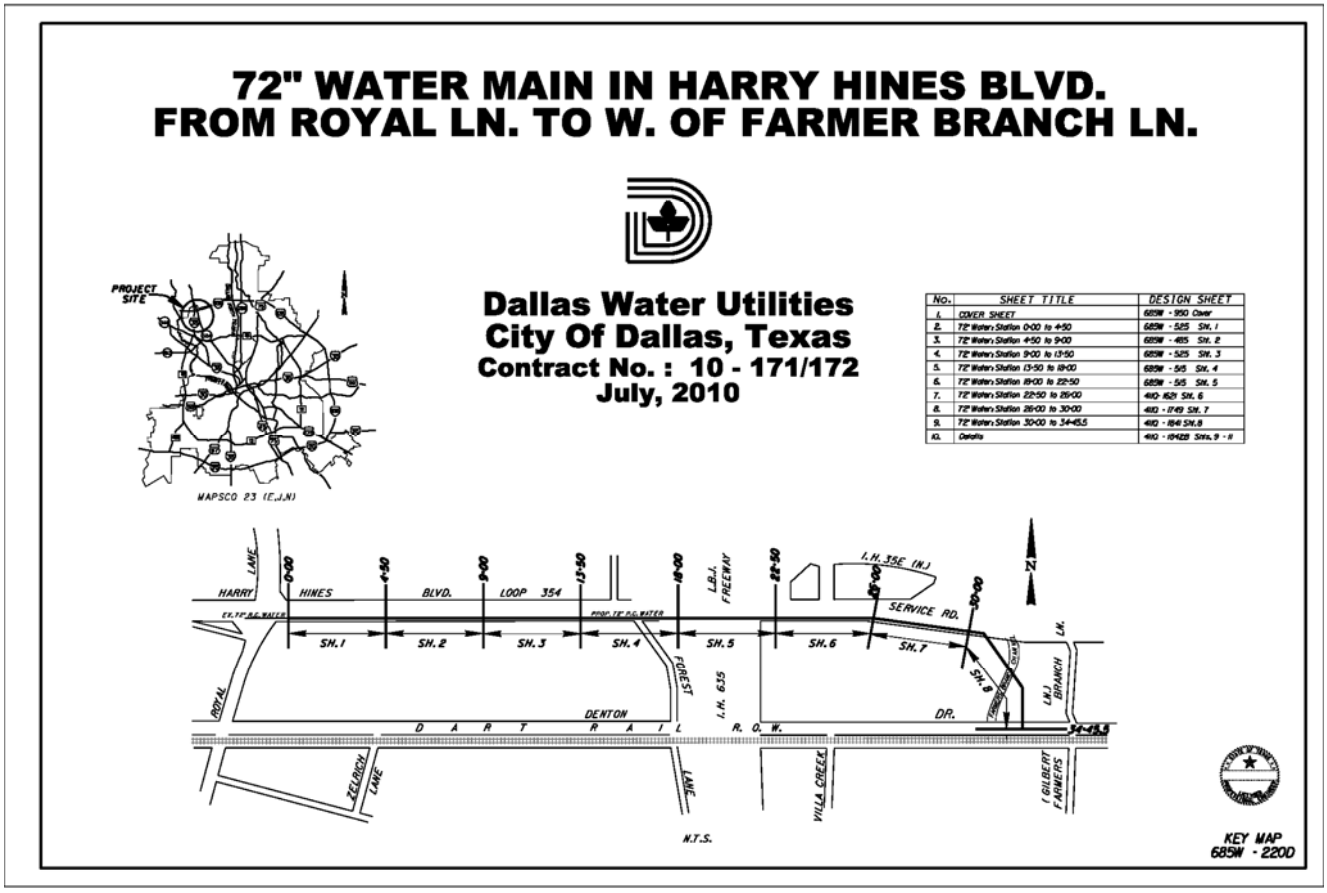
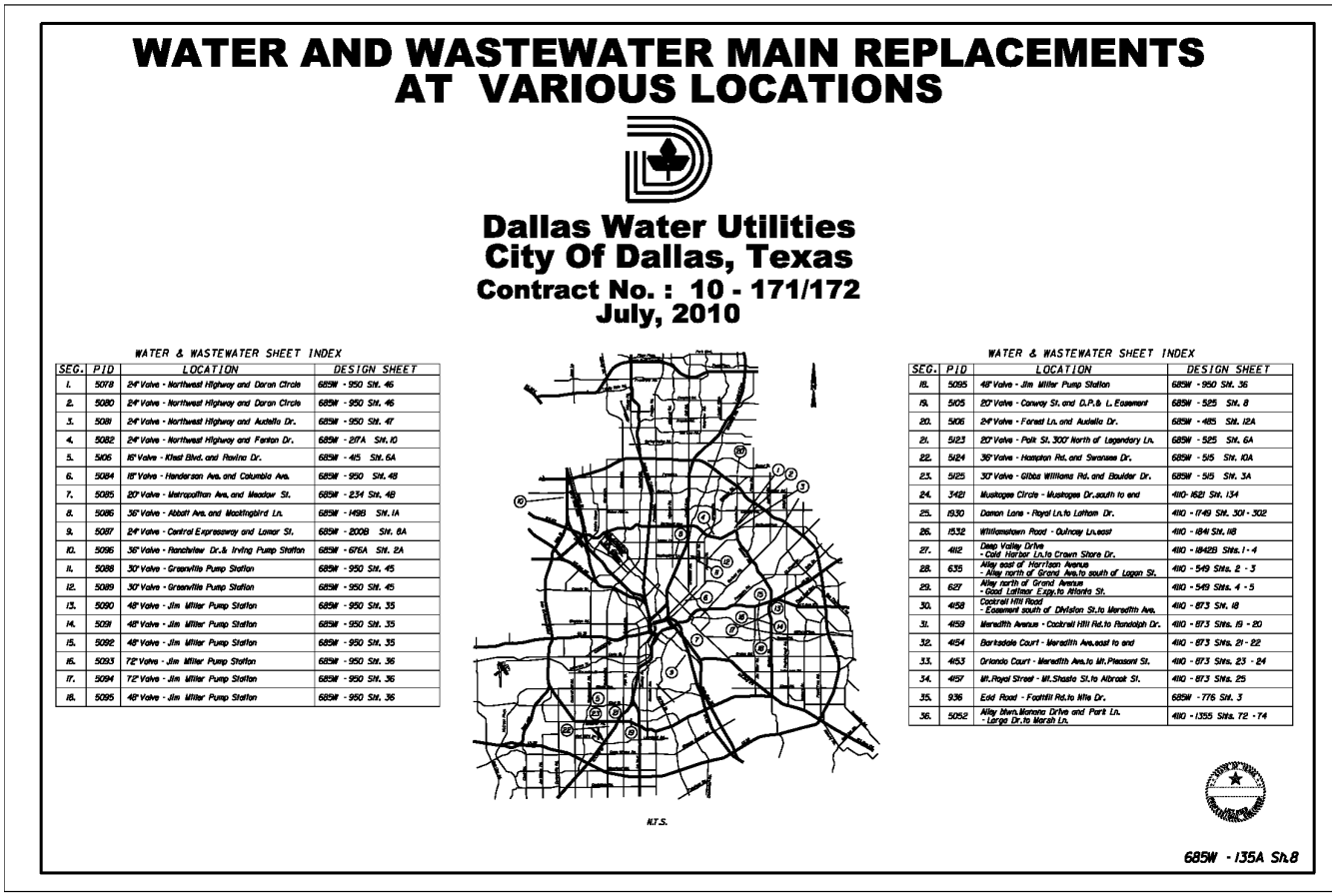


FIGURE 3.3.1: TYPICAL COVER SHEET FOR A MAJOR SINGLE UTILITY PROJECT

3.3.2 Multiple Location Project:

A multiple location replacement or rehabilitation projects at various locations shall have a general location map and sheet key index incorporated into the cover sheet. In addition, each project shall include an individual location map on the first design sheet. A typical cover sheet for a multiple location project as shown under **FIGURE 3.3.2** will also be available in the City of Dallas website.



WATER AND WASTEWATER MAIN REPLACEMENTS
AT VARIOUS LOCATIONS

Dallas Water Utilities
City Of Dallas, Texas
Contract No. : 10 - 171/172
July, 2010

WATER & WASTEWATER SHEET INDEX

SEG.	PID	LOCATION	DESIGN SHEET
1.	5078	24" Valve - Northwest Highway and Doran Circle	685W - 950 Sht. 46
2.	5080	24" Valve - Northwest Highway and Doran Circle	685W - 950 Sht. 46
3.	5081	24" Valve - Northwest Highway and Audella Dr.	685W - 950 Sht. 47
4.	5082	24" Valve - Northwest Highway and Fenton Dr.	685W - 297A Sht. 10
5.	5106	16" Valve - Kiest Blvd. and Ravina Dr.	685W - 415 Sht. 6A
6.	5084	18" Valve - Henderson Ave. and Columbia Ave.	685W - 950 Sht. 48
7.	5085	20" Valve - Metropolitan Ave. and Meadow St.	685W - 234 Sht. 48
8.	5086	36" Valve - Abbott Ave. and Mockingbird Ln.	685W - 498 Sht. 1A
9.	5087	24" Valve - Central Expressway and Lamar St.	685W - 200B Sht. 8A
10.	5096	36" Valve - Ranchview Dr. & Irving Pump Station	685W - 676A Sht. 2A
11.	5088	30" Valve - Greenville Pump Station	685W - 950 Sht. 45
12.	5089	30" Valve - Greenville Pump Station	685W - 950 Sht. 45
13.	5090	48" Valve - Jim Miller Pump Station	685W - 950 Sht. 35
14.	5091	48" Valve - Jim Miller Pump Station	685W - 950 Sht. 35
15.	5092	48" Valve - Jim Miller Pump Station	685W - 950 Sht. 35
16.	5093	72" Valve - Jim Miller Pump Station	685W - 950 Sht. 36
17.	5094	72" Valve - Jim Miller Pump Station	685W - 950 Sht. 36
18.	5095	48" Valve - Jim Miller Pump Station	685W - 950 Sht. 36

WATER & WASTEWATER SHEET INDEX

SEG.	PID	LOCATION	DESIGN SHEET
19.	5095	48" Valve - Jim Miller Pump Station	685W - 950 Sht. 36
19.	5105	20" Valve - Conway St. and D.P.& L. Easement	685W - 525 Sht. 8
20.	5106	24" Valve - Forest Ln. and Audella Dr.	685W - 485 Sht. 12A
21.	5123	20" Valve - Polk St. 300' North of Legendary Ln.	685W - 525 Sht. 6A
22.	5124	36" Valve - Hampton Rd. and Swansea Dr.	685W - 515 Sht. 10A
23.	5125	30" Valve - Gibbs Williams Rd. and Boulder Dr.	685W - 515 Sht. 3A
24.	3421	Muskogee Circle - Muskogee Dr. south to end	410- 1621 Sht. 134
25.	1930	Damon Lane - Royal Ln. to Latham Dr.	410 - 1749 Sht. 301 - 302
26.	1532	Williamstown Road - Quincy Ln. east	410 - 1841 Sht. 18
27.	4112	Deep Valley Drive - Cold Harbor Ln. to Crown Store Dr.	410 - 18429 Shts. 1 - 4
28.	635	Alley east of Harrison Avenue - Alley north of Grand Ave. to south of Logan St.	410 - 549 Shts. 2 - 3
29.	627	Alley north of Grand Avenue - Glad Latimer Expy. to Atlanta St.	410 - 549 Shts. 4 - 5
30.	4158	Cockrell Hill Road - Easement south of Division St. to Meredith Ave.	410 - 873 Sht. 18
31.	4159	Meredith Avenue - Cockrell Hill Rd. to Randolph Dr.	410 - 873 Shts. 19 - 20
32.	4154	Barksdale Court - Meredith Ave. east to end	410 - 873 Shts. 21 - 22
33.	4153	Orlando Court - Meredith Ave. to Mt. Pleasant St.	410 - 873 Shts. 23 - 24
34.	4157	Mt. Royal Street - Mt. Shasta St. to Abrook St.	410 - 873 Shts. 25
35.	936	Edd Road - Foothill Rd. to Mile Dr.	685W - 776 Sht. 3
36.	5052	Alley btwn. Manana Drive and Park Ln. - Large Dr. to Marsh Ln.	410 - 1355 Shts. 72 - 74

N.T.S.

685W - 135A Sh.8

FIGURE 3.3.2: TYPICAL COVER SHEET FOR A MULTIPLE LOCATIONS PROJECT

3.4 GENERAL NOTES

A major single utility or multiple location projects must have a separate general note sheet. The general note sheet is to incorporate construction notes regarding traffic control, pavement replacement, water, wastewater and other miscellaneous utilities. In addition, a list of standard symbols and abbreviations may also be incorporated as necessary. A typical general notes sheet as shown under **FIGURE 3.4** will also be available in the City of Dallas website.

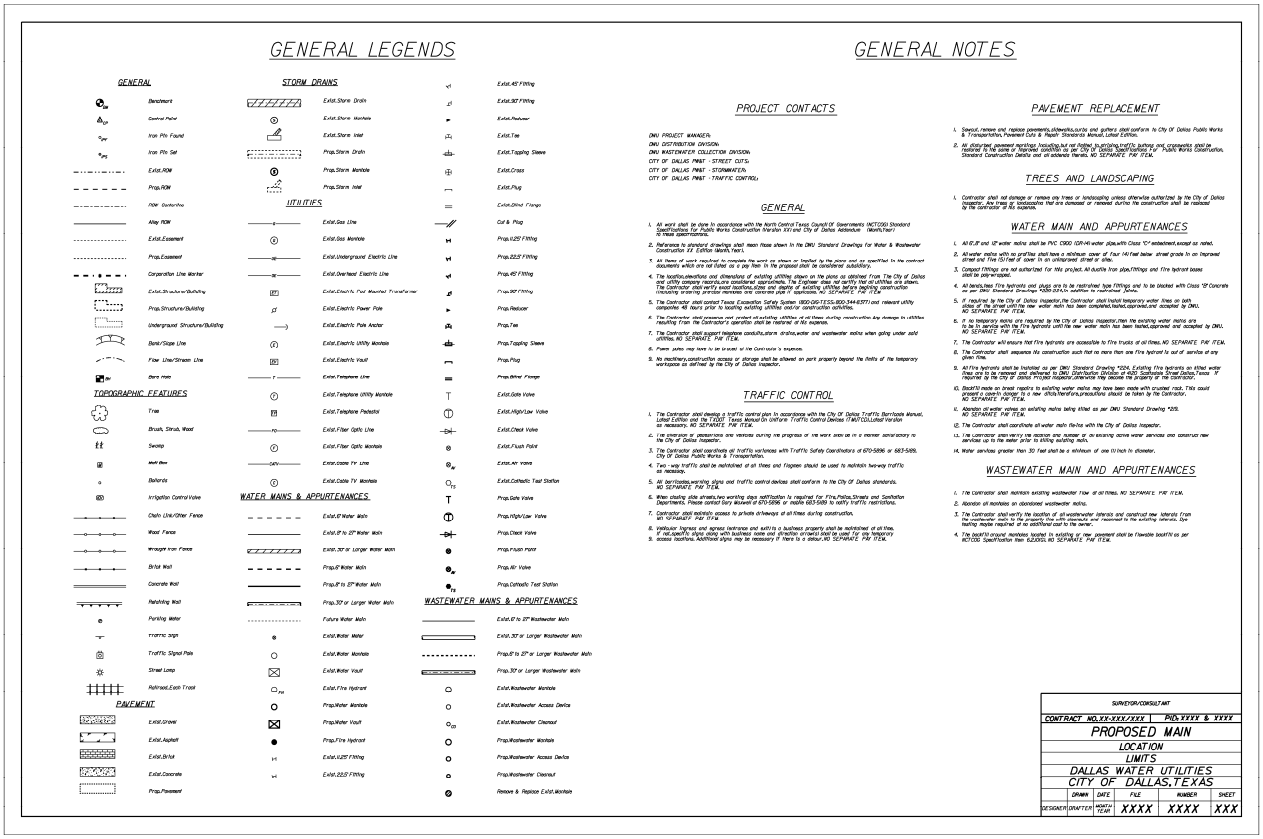


FIGURE 3.4: GENERAL NOTES SHEET

3.5 STANDARD DESIGN SHEET

All water and wastewater design sheets shall be prepared strictly in accordance with DWU standard format. The standard design sheet as shown in **FIGURE 3.5** will also be available in the City of Dallas website.

MAP003.109 X & Y14
CAUTION - ELECTRIC !
Underground Electrical Cables In Area
Contact Oncor Electric Delivery
Dial 811 Prior To Excavation.
Texas 1-800-344-8377
CAUTION - GAS !
Underground Gas Mains In Area
Contact ATMOS Energy Corp, Texas Working
Dial 811 Prior To Excavation.
Texas 1-800-344-8377 / 1-800-568-8005
CAUTION - TELEPHONE !
Underground Telephone Cables In Area
Contact AT&T Texas Working
Dial 811 Prior To Excavation.
Texas 1-800-344-8377
CAUTION - FIBER OPTIC !
Underground Fiber Optic Cables In Area
Contact Fiber Optic Co. Texas Working
Dial 811 Prior To Excavation.
Texas 1-800-344-8377
N
REVISIONS
REV. NO.
DATE
DESCRIPTION
BY
BENCHMARKS & CONTROL POINTS
Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 8'
REFERENCES
WATER
WASTEWATER
SURVEYOR/CONSULTANT
PROJ. XXXX & XXXX
CONTRACT NO.XX-XXX/XXX
PROPOSED MAIN
LOCATION
LIMITS
DALLAS WATER UTILITIES
CITY OF DALLAS, TEXAS
DESIGN
DRAWN
DATE
FILE
NUMBER
SHEET
SCALE
DRAFTER
MONTH YEAR
XXXX
XXXX
XXX
XXX
XXX
XXX
XXX
XXX
XXX
XXX
XXX
XXX

FIGURE 3.5 STANDARD DESIGN SHEET

3.5.1 Drawing Border:

Final design plans are to be plotted on 4 mil, double matte, mylar sheets. The standard design sheet shall be 24"x36" with 23"x34.5" border on the sheet consisting of clear spacing of 1" at the left and ½" at the right, top and bottom from the edge of the sheet (**FIGURE 3.5.1**). However, a 22"x34" sheet with 21"x32.5" border sheet may be acceptable upon prior approval by DWU. This size may generally be required for TXDOT or other outside agency projects.

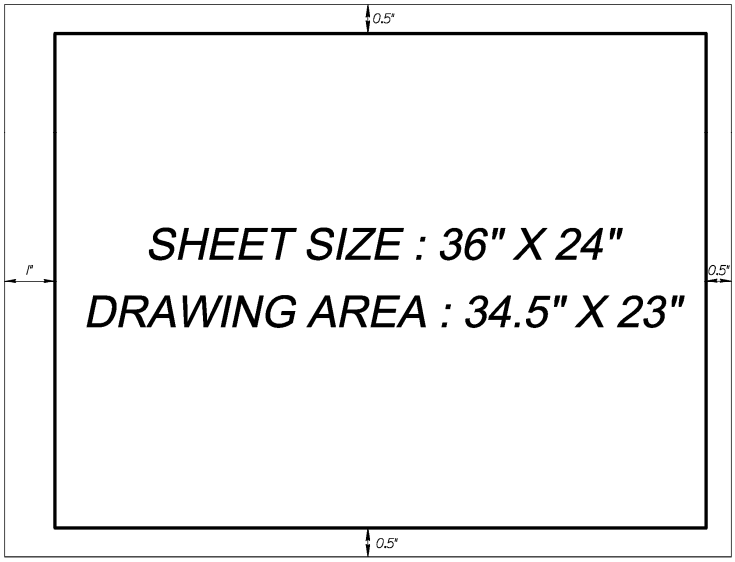


FIGURE 3.5.1 STANDARD DESIGN SHEET BORDER

3.5.2 Title Block:

Each sheet shall have a standard title block which shall include an area to conveniently list the pertinent project reference information as shown **FIGURE 3.5.2**.

(1) SURVEYOR/CONSULTANT: Firm name(s) of surveyor and design consultant with registration numbers as applicable

(2) CONTRACT NUMBER: Construction contract number as assigned

(3) PID NUMBERS: Project identification number(s), if applicable

(4) PROJECT TITLE: Size and/or type of the project

Example 1: 8" Water Main

Example 2: 12" Water and 8" Wastewater Mains

(5) LOCATION: Location of the projects

Example: MAIN ST.

(6) LIMITS: Project limit

Example: FROM PEAL ST. TO ERVAY ST.

(7) DESIGN: First initial and last name of the designer

(8) DRAWN: First initial and last name of the drafter

(9) DATE: Month and Year plan were sealed

Example: Jan, 2010

(10) FILE: File Prefix number as assigned

Example: 685W

(11) NUMBER: File Number as assigned

(12) SHEET NUMBER: Sheet number as assigned

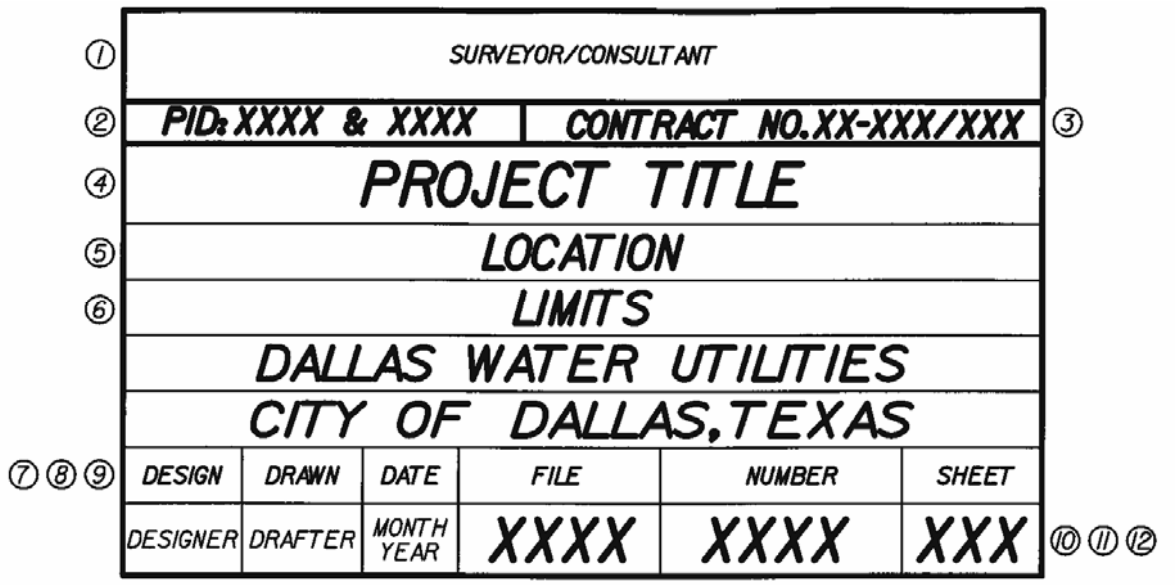


FIGURE 3.5.2 STANDARD TITLE BLOCK

3.5.3 Bar Scale:

Each sheet shall have standard horizontal and vertical bar scales for plan and profile as applicable.

3.5.4 Water/Wastewater References:

All the pertinent water and wastewater as-built map reference numbers shall be mentioned.

3.5.5 Engineer's Seal/Disclaimer

3.5.5.1 Preliminary Plan:

All preliminary plans submitted for review shall contain a disclaimer by an assigned profession engineer (PE) as shown in **FIGURE 3.5.5.1.**

PRELIMINARY PLAN

FOR REVIEW ONLY

This document is released for the purpose of interim review and markup under the authority of_____, State License Number_____ on Month/Day/Year. This document is not to be used for construction, bidding or permit purposes.

FIGURE 3.5.5.1 PE DISCLAIMER FOR PRELIMINARY PLANS

3.5.5.2 Final Plan:

All final plans must be sealed and dated replacing the PE disclaimer from the preliminary plan.

3.5.5.3 Record Drawing:

A record drawing disclaimer shall be posted upon completion of a record drawing showing any field changes as marked by the city inspector.

RECORD DRAWING

This record drawing is prepared based on the information furnished by the City inspector:

☐ Prop. Water Built Per Plan
☐ Prop. Wastewater Built Per Plan
☐ Prop. Water Built With Field Change
☐ Prop. Water Built With Field Change

City Inspector:

Contractor:

Prepared by: Date:

FIGURE 3.5.5.3 RECORD DRAWING DISCLAIMER

3.5.6 Bench Marks and Control Points:

A minimum of two benchmarks (BM) per project and one benchmark per sheet are required. The list of City of Dallas Benchmarks can be accessed through the City of Dallas Website. In addition, control points along with northings and eastings can also be shown as necessary.

3.5.7 Revision Block:

Any revision(s) along with number, date, and description can be shown within this area.

3.5.8 Caution Notes:

Special caution notes shall be used as necessary. This may include, but not be limited to, caution notes for underground gas, electrical, telephone, fiber optic, and other utilities as necessary.

3.5.9 Project Location Map:

Each project shall have a project location map either on the cover sheet or the first sheet after the cover sheet. Location maps, not placed on cover sheets, shall be positioned at the upper right hand corner on the first plan view sheet of each project and oriented with a north arrow pointing to the top of the sheet. It shall be of sufficient detail and size (3.5" x 5") to convey the project location in reference to the local thoroughfares. The project location and its limit are to be identified. It is not necessary to include the location map on subsequent design sheets within the same project.

3.5.10 North Arrow:

Each design sheet and location map shall have a standard arrow typically pointing up or to the right.

3.6 STANDARD CALLOUTS

All water and wastewater main callouts shall be in accordance with the standards as stipulated in this section. Typically, plan callouts shall be listed in order of construction sequences.

3.6.1 Water and Wastewater Main Title Callouts:

Callouts summarizing total length, size, material, and embedment for water and wastewater to be installed are typically known as "Title Callouts". Design sheets containing plan and profile shall include title callout at both plan and profile view as per **Table 3.6.1:**

TABLE 3.6.1: WATER/WASTEWATER TITLE CALLOUTS

Drawing Configuration	Plan/ Profile	Sample Title Callouts
Water Main Plan and Profile	Plan	**INSTALL 12" WATER PIPE** **(KILL EX 8" CI WATER, BUILT 1950)**
	Profile	**400 LF 12" PVC C900 (DR-14) WATER PIPE** **CLASS C+ EMB.**
Water Main Plan Only	Plan	**425 LF 8" PVC C900 (DR-14) WATER PIPE** **CLASS C+ EMB.** **(KILL EX 6" CI WATER, BUILT 1945)**
Wastewater Main Plan and Profile	Plan	**CONSTRUCT 8" WASTEWATER PIPE** **(IN SAME TRENCH OF EX 6" BUILT 1965)**
	Profile	**400 LF 8" PVC- PRESSURE RATED WASTEWATER PIPE** **ASTM D2241 (SDR 26)** **CLASS B1a EMB.**

3.6.2 Water Main Plan Callouts:

All water main callouts in the plan view shall be within a "cloud box" with a single arrow. A sample callout format can be found under **Table 3.6.2 and Exhibits C.5.**

TABLE 3.6.2: TYPICAL WATER MAIN CALLOUTS

Type	Sample Callouts	Notes
Commonly Used	0+00.0 N. 6970594.085 E. 2491949.549 Install: 1- 8" x 6" Tee (E) 1- FH as Per DWU Std Dwg# 224 1- 10 LF of 6" PVC C900 (DR-14) Water Pipe w/ Class C+ Emb Connect to Ex. 12" Water (N) Begin Water Main	Northing and Easting to be shown at beginning, ending, PIs and at major appurtenances.
Callout Referencing Paving Station or Survey Station	2+00.0 Line W-1= 0+00.0 Line W-2= 93+31.5 Pav. Sta. (70' Rt) Install: 1- FH as Per DWU Std Dwg# 224 1- 10 LF of PVC C900 (DR-14) Water Pipe w/ Class C+ Emb Connect to Ex. 12" Water (N) 2+00.0 (N) = 0+00.0 (S) = 93+31.5 Survey (70' Rt) Install: 1- FH as Per DWU Std Dwg# 224 1- 10 LF of PVC C900 (DR-14) Water Pipe w/ Class C+ Emb Connect to Ex 12" Water (N)	Where prop. water to be located at the right side of both survey and paving stations
Callout Referencing Wastewater Main or Paving Station	2+00.0 Water= 0+00.0 Wastewater (40.5' Lt) 93+31.5 Pav. Sta. (70' Lt) Install: 1- 8" Gate Valve	Where prop. water to be located at the left side of both wastewater and paving stations
Callout at PI	P.I. 0+55.0 Water, Δ= 42°30" Lt N. 6970588.156 E. 2491946.129 Install: 1- 8" 45° Bend, Pull Pipe	Coordinates to be shown at beginning, ending, PIs and major appurtenances
Callout at Station Equation	Station Equation PI 66+00.0 Bk Δ, 42°30" Lt = 65+00.0 Fwd	

3.6.3 Wastewater Main Plan Callouts:

Typically wastewater main callouts in the plan view shall be within a "rectangular or square" box callout with a solid arrow. A sample callout format can be found under **Table 3.6.3 and Exhibits C.5.**

TABLE 3.6.3: TYPICAL WASTEWATER MAIN CALLOUTS

Callout Type	Sample	Notes
Commonly Used	0+00.0 N. 6970585.108 E. 2491946.556 Remove Ex 4' Dia. MH Construct: 1- 4' Dia. MH Begin 12" Wastewater	Northing and Easting to be shown at beginning, ending, PIs and at major appurtenances (MH, CO, WWAD)
Callout Referencing Paving, Survey or Base Line	2+00.0 Line 1= 0+00.0 Line 2 = 93+31.5 Pav. Sta. (70' Lt) N. 6970593.158 E. 2491946.159 Remove Ex CO Construct: 1- 4' Dia. M.H. Conn. Ex. 10" WW In (S) Conn. Ex. 12" WW Out (N)	Connections to existing wastewater mains (not proposed) needed to be called out only.
Callout Referencing Wastewater Main	2+00.0 Wastewater = 0+00.0 Water (40.5' Rt) = 93+31.5 Survey (70' Rt) N. 6970597.156 E. 2491958.156 Construct: 1- WWAD As Per DWU Std. Dwg# 328	Where prop. wastewater to be located at the right side of water and paving stations
Callout at P.I.	PI 0+55.0, Δ= 42°30" Lt N. 6970579.169 E. 2491947.159 Remove Ex. 4' Dia. M.H. Construct: 1- 4' Dia. M.H. Conn. Ex. 10" W.W. In (S) Conn. Ex. 12" W.W. Out (N)	
Callout at Station Equation	Station Equation P.I. 66+00.0 Bk, Δ= 42°30" Lt. = 65+00.0 Fwd.	

CHAPTER 4

WORKING UNITS, COLOR, STYLE AND WEIGHT

4.1 GENERAL

This chapter addresses various computer aided drafting and design (CADD) elements, settings and attributes as applicable to DWU water and wastewater main design in MicroStation DGN file format.

4.2 WORKING UNITS

The measurable limits of the design cube change in a MicroStation file when differing values are assigned to the working units. Typically, the design cube represents a 3D DGN file's total volume, in which points are defined with X, Y, and Z values, or coordinates. DWU has established the following working units which should not be changed (**Table 4.2**):

TABLE 4.2: WORKING UNITS

Item	Unit	Parameter
Linear Units	Working Units	1:12:1000
	Master Units (MU)	Survey Foot (‘)
	Sub Units (SU)	Survey Inch (‘’)
	Position Units (PU)	Thousandth of a Foot
Advance Settings	Unit of Resolution (UOR)	12000 per Distance Survey Foot
	Working Area	1.42159E +008 Miles
	Solid Area	67.7869 Miles
	Solids Accuracy	3.57914 -006 Survey Feet
Angles	Format	DD.DDDD
	Mode	Conventional
	Accuracy	0.1234

4.3 GLOBAL ORIGIN (GO)

The default Global Origin (GO) for a 2D file in MicroStation is set to the center of the design plane with coordinate values of 0, 0. Since the design plane functions like the Cartesian coordinates system, all coordinates left of or below the default global origin are negative and all coordinates to the right or above are positive.

Global Origin for DWU Mapping System:

2D: 0, 0

3D: 0, 0, 0

4.4 COLOR

Standard color table available in MicroStation shall be utilized, as necessary. Accordingly, most commonly used colors are summarized under **TABLE 4.4.**

TABLE 4.4: LIST OF STANDARD COLORS

Number	Line Style
0	White
1	Blue
2	Green
3	Red
4	Yellow
5	Magenta
6	Orange
7	Cyan

**** Note: Ref. Figure 7.2 for details***

4.5 LINE STYLE

Predefined and standard line styles available in MicroStation shall be utilized, as necessary. Accordingly, most commonly used line style is summarized under **TABLE 4.5.**

TABLE 4.5: LIST OF STANDARD LINE STYLES

Number	Line Style
0	Solid
1	Dot
2	Medium Dash
3	Long Dash
4	Dot-Dash
5	Short-Dash
6	Dash-Dot-Dot
7	Long Dash-Short Dash

**** Note: Ref. Figure 7.2 for details***

4.6 LINE WEIGHT

Standard line weight available in MicroStation shall be utilized, as necessary. Accordingly, most commonly used line weight is summarized under **TABLE 4.6**

TABLE 4.6: LIST OF STANDARD LINE WEIGHTS

Number	Line Weight (in)
0	0.009
1	0.016
2	0.024
3	0.032
4	0.040
5	0.048
6	0.056
7	0.064

**** Note: Ref. Figure 7.2 for details***

CHAPTER 5

LEVEL MANAGEMENT

5.1 GENERAL

This Chapter discusses standard levels along with predefined attributes, consisting of specific colors, line styles, and line weights to be used for any project.

5.2 LEVEL NAMING CONVENTION

A typical MicroStation level shall be named as:

"Major Category_Sub Category_Item Name_Feature Description

Where, "**Major Category**" is the abbreviation for General (G), Civil (C), Architectural (A), Mechanical (M), Electrical (E), Surveying (V) or other major categories.

Accordingly, a typical example of a predefined level can be shown as follows:

V_PROPERTY_ BLOCK_NUM
V_PROPERTY_LOT_LINE

5.3 STANDARD LEVEL CATEGORIES:

A list of standard level categories with allocated levels is summarized under **TABLE 5.3**.

TABLE 5.3: LIST OF STANDARD LEVEL CATEGORIES

General Type	Major Category	Category Designator	Levels Allocated
Design	General	G	0- 99
	Civil	C	100-499
	Structure	S	500-599
	Architectural	A	600-699
	Mechanical	M	700-799
	Electrical	E	800-899
	Unassigned	-	900-999
Survey	Survey	V	1000- 9999

5.4 PREDEFINED LEVELS:

A list of standard level categories with allocated levels is summarized under **TABLE 5.4**. A detailed description of all the assigned levels with predefined attributes consisting of specific color, line style, and line weight, is also included under **APPENDIX B.** All DWU projects shall be designed utilizing the predefined levels.

TABLE 5.4: LIST OF PREDEFINED LEVELS

General Type	Category (Primary and Sub)	Category Designator	Allocated Level
Design	General	G_XXX	1- 99
	Civil- Water Civil- Wastewater Civil- Traffic Civil- Pavement Civil- Storm Civil- Misc	C_WATER C_WW C_TRAFFIC C_PVMT C_STORM C_MISC	100- 199 200- 299 300- 349 350- 399 400- 449 450- 499
Survey	Survey- Survey	V_GENERAL	1000- 1999
	Survey- Property	V_PROPERTY	2000- 2999
	Survey- Pavement	V_PVMT	3000- 3999
	Survey-Topography	V_TOPO	4000- 4999
	Survey- Water	V_WATER	5000- 5999
	Survey- Wastewater	V_WW	6000- 6999
	Survey- Storm, Utility	V_STORM V_UTILITY	7000-7999
	Survey- CAD	V_CAD V_CAD	8000- 8999
	Survey- Unassigned	V_XXX	9000- 9999

*Note: * Level predefined by DWU which should not be renamed or deleted*

*** Level ranges designated for additional levels as required by designer.*

CHAPTER 6

DRAFTING RESOURCE LIBRARIES

6.1 GENERAL

This chapter addresses various parameters of standard DWU seed files and project interface drawings to be used for water and wastewater main design in MicroStation format.

6.2 PREDEFINED FILES

DWU has developed customized seed files along with predefined level, cell and text style resource libraries in order to facilitate a consistent drafting standard. **TABLE 6.2** lists all the required files to be used by the surveyors and the designers:

TABLE 6.2: LIST OF PREDEFINED FILES

File Type (Read Only)	File Name	Note
Seed File-3D	DWUSeed3D-xx.dgn	"xx" refers to date created or revised: DWU Seed3D-Oct2010.dgn
Seed File-2D	DWUSeed2D-xx.dgn	"xx" refers to date created or revised: DWU Seed2D-Oct2010.dgn
Level Library	DWULevel-xx.dgnlib	"xx" refers to date created or revised: DWU Level-Oct2010.dgn
Cell Library	DWUCell-xx.cel	"xx" refers to date created or revised: DWU Cell-Oct2010.cel
Text Style Library	DWUText-xx.dgnlib	"xx" refers to date created or revised: DWU Text-Oct2010.rsc

6.3 SEED FILE

MicroStation based 2D and 3D seed files have been developed by DWU Engineering Services to incorporate various elements of the DWU drafting standards. These files can be obtained from City of Dallas or DWU website.

6.4 LEVEL LIBRARY

DWU standard seed file with predefined levels will assist the CAD user to place design elements with the correct color, style and weight. These levels have been divided into major categories and can be manipulated by using a set of filters:

- Survey General Items
- Ex. Water
- Ex. Wastewater
- Prop. Water
- Prop. Wastewater
- Used Levels

6.5 CELL LIBRARY

The DWU cell library consists of standard symbols conform to DWU standards. Most cells are developed with predefined attributes consisting of specific color, style, and weight.

6.6 TEXT STYLE RESOURCE LIBRARY

A text resource library consisting of predefined text attributes has been developed in accordance with DWU standards. This text style library shall be loaded within the DWU standard seed files. A list of various text styles and standards of annotation are shown under **EXHIBITS C.1- C.5**, **G.1- G.2, I-5** and **J-3**.

6.7 MISCELLANEOUS DRAWING FEATURES

All drawings consisting of existing and proposed features shall be prepared in accordance with the DWU Standards:

6.7.1 Standard Symbols:

A list of standard symbols is included under **EXHIBITS A.1- A.6.** In addition, standard arrowheads are shown in **EXHIBITS B.1.**

6.7.2 Plan View: Property, Pavement and Utilities

Plan view of various existing and proposed property, pavement, storm drains, utilities, and water and wastewater features are demonstrated under following **EXHIBITS D.1- D.4, E.1- E4** and **F.1- F.4**

6.7.3 Profile View: Property, Pavement and Utilities

Plan view of various existing and proposed property, pavement, storm drains, utilities, and water/wastewater features are demonstrated under following **EXHIBITS H.1- H.2, I.1- I.5** and **J.1- J.3.**

6.8 REFERENCE SCHEMATICS

Several example schematic are included under **EXHIBITS K.1- K.9.**

CHAPTER 7

PLOT CONFIGURATION

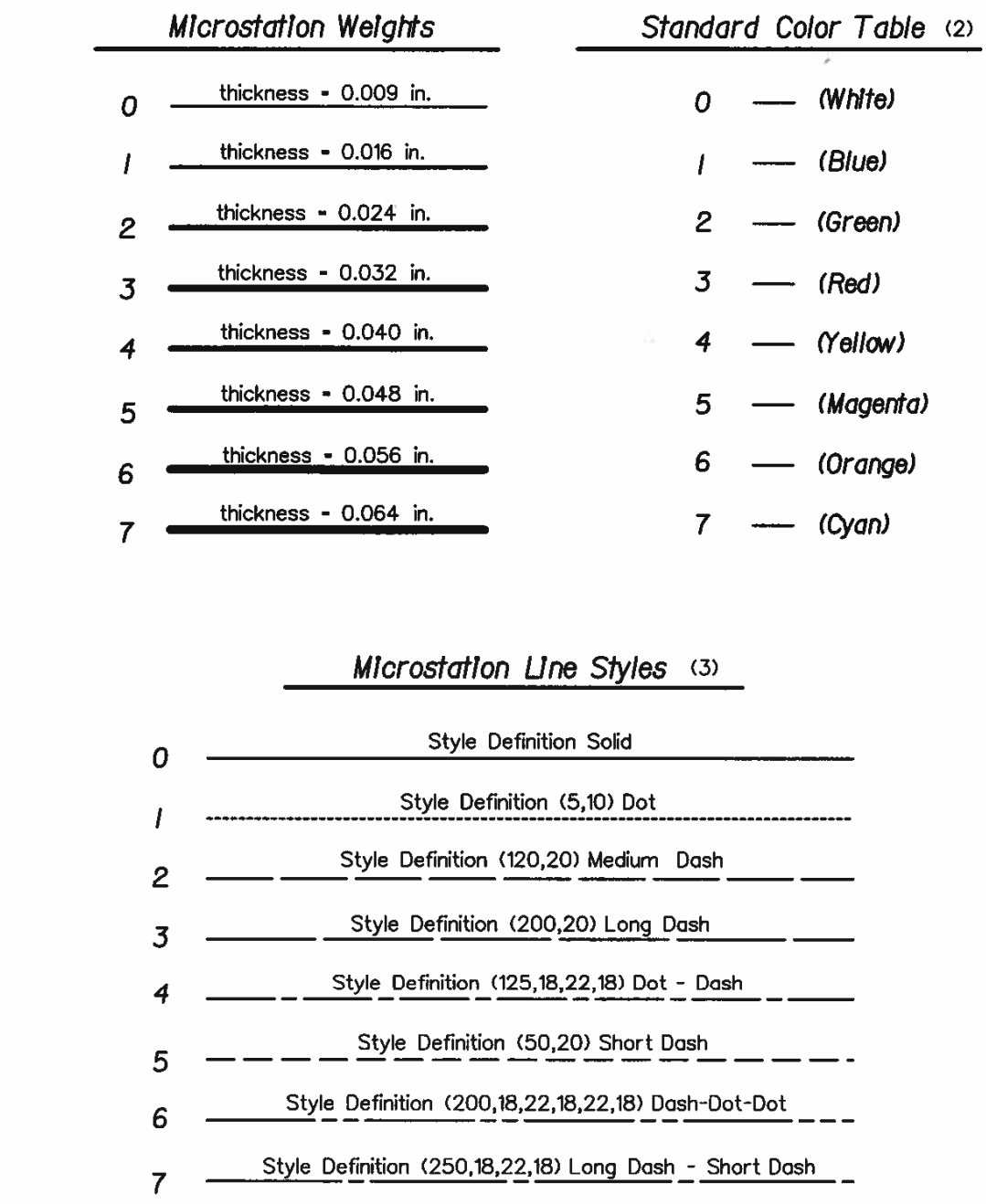
7.1 GENERAL

This chapter addresses plot configuration for DWU water and wastewater main design in MicroStation DGN file format.

7.2 ATTRIBUTE DEFINITIONS

MicroStation files are to be developed at 1:1 "full scale" and then set to the appropriate 1"= 40' or 1"= 20' scale when plotting. However, it is imperative to establish the plot scale of the MicroStation file prior to any placement of text or cells. Font size and active scale settings for cells will dictate their appearance when plotted to the desired final drawing scale.

FIGURE 7.2 depicts lines attributes as per Hewlett Packard Graphics Language (HPGL2) format. This information shall be used in setting up consisting printing output as necessary.



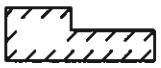
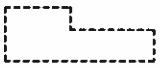
NOTE:
1. Please configure your platter drivers to meet these Line Weights and Line Styles.
2. The Color Table is the Microstation Standard Default Color Table. This document only lists the first seven colors of the Default Table.
3. The Line Styles are the Microstation Standard Default Line Styles.

FIGURE 7.2: STANDARD COLOR, STYLE AND WEIGHT DESIGNATIONS

EXHIBITS

Category	Feature	Symbol
General	Bar Scale: Horizontal: 1" = 20'	Horizontal Scale: 1" = 20' 
General	Bar Scale: Horizontal: 1" = 40'	Horizontal Scale: 1" = 40' 
General	Bar Scale: Vertical: 1" = 6'	Vertical Scale: 1" = 6' 
General	North Arrow: Design Plan	
General	North Arrow: Location Map	
General	Arrowhead	
General	Logo: City of Dallas	
General	Logo: Dallas Water Utilities	
General	Benchmark	
General	Control Point	

Dallas Water Utilities	SYMBOLS: GENERAL	Exhibit A.1 1 of 2

Category	Feature	Symbol
General	Iron Pin Found	IPF
General	Iron Pin Set	IPS
General	Bore Hole	BH
General	Existing Contour	452 451 450
General	Proposed Contour	452 451 450
General	Existing Building/Structure	
General	Proposed Building/Structure	
General	Underground Building/Structure	
General	Bank/Slope Line	
General	Flow Line/Stream Line	

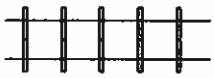
Dallas Water Utilities	SYMBOLS: GENERAL	Exhibit AJ 2 of 2

Category	Feature	Symbol
Topographic Features	Tree	
Topographic Features	Brush, shrub, Wood	
Topographic Features	Swamp	
Topographic Features	Mail Box	
Topographic Features	Bollards	
Topographic Features	Fence	
Topographic Features	Wood Fence	
Topographic Features	Wrought Iron Fence	
Topographic Features	Chain Link/Other Fence	
Topographic Features	Brick Wall	

Dallas Water Utilities

SYMBOLS: TOPOGRAPHIC FEATURES

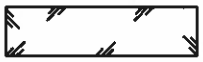
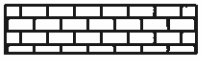
Exhibit A.2

Category	Feature	Symbol
Topographic Features	Retaining Wall	
Topographic Features	Concrete Wall	
Topographic Features	Parking Meter	
Topographic Features	Traffic Sign	
Topographic Features	Traffic Signal	
Topographic Features	Street Light Pole	
Topographic Features	Electric Transmission Tower	
Topographic Features	Railroad, Each Track	

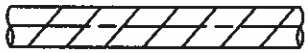
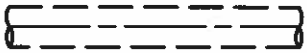
Dallas Water Utilities

SYMBOLS: TOPOGRAPHIC FEATURES

Exhibit A.2

Category	Feature	Symbol
Paving	Gravel Pavement	
Paving	Asphalt Pavement	
Paving	Brick PAvement	
Paving	Concrete	
Paving	Sand	
Paving	Proposed Pavement	

Dallas Water Utilities	SYMBOLS: PAVING	Exhibit A.3 1 of 2

Category	Feature	Symbol	
		Existing	Proposed
Storm Drain	Storm Manhole		
Storm Drain	Storm Inlet		
Storm Drain	Storm Drain		

Dallas Water Utilities	SYMBOLS: STORM DRAIN	Exhibit A.3 2 of 2

Category	Feature	Symbol	
		Existing	Proposed
Utilities	Gas Line	——G——	
Utilities	Gas Manhole	(G)	(G)
Utilities	Underground Electric Line	——UE——	
Utilities	Overhead Electric Line	——OE——	
Utilities	Power Pole		
Utilities	Pole Anchor		
Utilities	Electric Manhole	(E)	(E)
Utilities	Electric Vault	[EV]	
Utilities	Electric Transformer	[ET]	
Utilities	Telephone Line	——T——	

Dallas Water Utilities

SYMBOLS: UTILITIES

Exhibit A.4

1 of 2

Category	Feature	Symbol	
		Existing	Proposed
Utilities	Telephone Manhole	(T)	(T)
Utilities	Telephone Pedestal	TP	
Utilities	Fiber Optic Line	——FO——	
Utilities	Fiber Optic Manhole	(F)	(F)
Utilities	Cable TV Line	——CATV——	
Utilities	Cable TV Manhole	(C)	(C)

Dallas Water Utilities	SYMBOLS: UTILITIES	Exhibit A.4 2 of 2

Category	Feature	Symbol	
		Existing	Proposed
Water Appurtenances	Water Meter	⊗	
Water Appurtenances	Water Manhole	○	○
Water Appurtenances	Water Vault	⊠	⊠
Water Appurtenances	Fire Hydrant	○ FH	●
Water Appurtenances	11.25° Fitting		
Water Appurtenances	22.5° Fitting		
Water Appurtenances	45° Fitting		
Water Appurtenances	90° Fitting		
Water Appurtenances	Reducer	▶	▶
Water Appurtenances	Tee		

Dallas Water Utilities	SYMBOLS: WATER APPURTENANCES	Exhibit A.5 1 of 2

Category	Feature	Symbol	
		Existing	Proposed
Water Appurtenances	Tapping Sleeve		
Water Appurtenances	Cross		
Water Appurtenances	Plug		
Water Appurtenances	Blind Flange		
Water Appurtenances	Gate Valve		
Water Appurtenances	High/Low Valve		
Water Appurtenances	Flush Point		
Water Appurtenances	Air Valve		
Water Appurtenances	Cathodic Test Station		
Water Appurtenances	Check Valve		

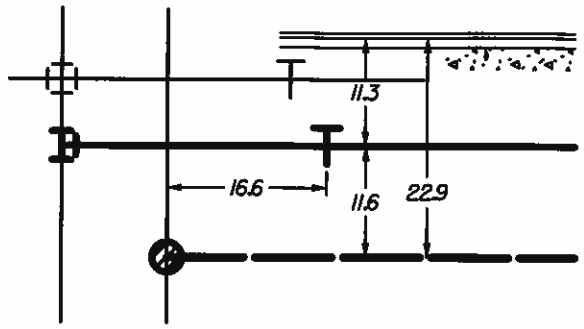
Dallas Water Utilities	SYMBOLS: WATER APPURTENANCES	Exhibit A.5 2 of 2

Category	Feature	Symbol	
		Existing	Proposed
Wastewater Appurtenances	Manhole	○	●
Wastewater Appurtenances	Access Device	○	●
Wastewater Appurtenances	Cleanout	○CO	●
Wastewater Appurtenances	Remove & Replace Manhole		⊘

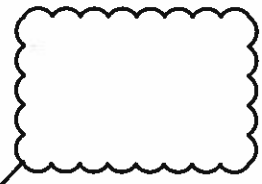
Dallas Water Utilities	SYMBOLS: WASTEWATER APPURTENANCES	Exhibit A.6

Plan View Dimensions
Use DWU Dimension Style
For Water Or Wastewater
And Appropriate Scale

20 Scale Water
40 Scale Water
20 Scale Wastewater
40 Scale Wastewater



Level No.	Color No.	Line Style	Weight
114	0	0	0
211	0	0	0



Plan View Callout Cloud
20 Scale - 20
40 Scale - 40

Plan View Callout Arrowhead
20 Scale - 40
40 Scale - 80

Title Install Cloud
20 Scale - 60
40 Scale - 120

Title Callout Arrowhead
20 Scale - 80
40 Scale - 160

INSTALL 16" DJ.WATER

Title K111 Cloud
20 Scale - 40
40 Scale - 80

K111 Ex.8" Water
Built 1965

Design Sheet
North Arrow
20 Scale - 20
40 Scale - 40

Locator Map
North Arrow
20 Scale - 20
40 Scale - 40

Profile Utility
Leader Arrowhead
20 Scale - 20
40 Scale - 40

TOP - 567.45

BOP - 567.45

Plan View Utility
Leader Arrowhead
20 Scale - 20
40 Scale - 40

Ex.8" VCT Wastewater

Dallas Water Utilities	NORTH ARROW, ARROWHEADS, DIMENSIONS & LEADER LINES	Exhibit B.1

①	SURVEYOR/CONSULTANT					
②	PID: XXXX & XXXX			CONTRACT NO. XX-XXX/XXX		
③	PROJECT TITLE					
④	LOCATION					
④	LIMITS					
⑤	DALLAS WATER UTILITIES					
⑥	CITY OF DALLAS, TEXAS					
⑦	DESIGN	DRAWN	DATE	FILE	NUMBER	SHEET
⑧	DESIGNER	DRAFTER	MONTH YEAR	XXXX	XXXX	XXX ⑨

TEXT ATTRIBUTES

Item	Scale	Height	Width	Ln. Spc.	Justif.	Weight	Color
①	20	Not Defined					
	40	Not Defined					
②	20	3.00	3.00	1.50	C-C	3	0
	40	6.00	6.00	3.00	C-C	3	0
③	20	5.00	5.00	2.50	C-C	4	0
	40	10.00	10.00	5.00	C-C	4	0
④	20	4.00	4.00	2.00	C-C	3	0
	40	8.00	8.00	4.00	C-C	3	0
⑤	20	4.00	4.50	2.00	C-C	3	0
	40	8.00	9.00	4.00	C-C	3	0
⑥	20	4.00	5.00	2.00	C-C	3	0
	40	8.00	10.00	4.00	C-C	3	0
⑦	20	2.00	2.00	1.00	C-C	1	0
	40	4.00	4.00	2.00	C-C	1	0
⑧	20	2.00	2.00	1.00	C-C	0	0
	40	4.00	4.00	2.00	C-C	0	0
⑧	20	5.00	5.00	2.50	C-C	4	0
	40	10.00	10.00	5.00	C-C	4	0

Dallas Water Utilities	TEXT STYLE: STANDARD TITLE BLOCK	Exhibit CJ

REVISIONS

REV NO.	DATE	DESCRIPTION	BY
1	07/32/2010	Wastewater Realignment Sta.10+00.0 to 12+00.0	TRK
2			

BENCHMARKS & CONTROL POINTS

BENCHMARK #1
STD.WDBM on concrete curb center of radius of northwest corner of the intersection of Cascade Dr.and Polk St.
ELEV - 593.41

CONTROL POINT #1
X-cut on concrete curb center of radius corner of the southeast corner of the intersection of Main St.and Pearl Ave.
N.7008461.080; E.2471702.703; ELEV - 593.41

Horizontal Scale: 1" - 20'

Vertical Scale: 1" - 6'

WATER REFERENCES
43W-21,43W-22 & 44W-22

WASTEWATER REFERENCES
BH-4,43S-21 & 43S-22

PRELIMINARY PLAN
For Review Only

This document is released for the purpose of interim review and markup under the authority of _____, State License Number _____ on Month/Day/Year. This Document is not to be used for construction, bidding or permit purposes.

CAUTION ~ POWER !
Underground Electrical Cables In Area
Contact TXU Two Working
Days Prior To Construction.
Tele: 1-800-344-8377

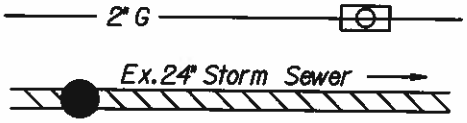
TEXT ATTRIBUTES

Text Style	Scale	Height	Width	Ln. Spc.	Justif.	Weight	Color
1	20	2.50	2.50	1.25	C-C	1	0
	40	5.00	5.00	2.50	C-C	1	0
2	20	2.00	2.00	1.00	C-C	1	0
	40	4.00	4.00	2.00	C-C	1	0
3	20	2.00	2.00	1.00	C-C	0	0
	40	4.00	4.00	2.00	C-C	0	0
4	20	4.00	4.00	2.00	C-C	3	0
	40	8.00	8.00	4.00	C-C	3	0
5	20	2.00	2.00	1.00	L-C	1	19
	40	4.00	4.00	2.00	L-C	1	19
6	20	2.50	2.50	1.25	C-C	1	69
	40	5.00	5.00	2.50	C-C	1	69
7	20	2.00	2.00	1.00	C-C	0	69
	40	4.00	4.00	2.00	C-C	0	69

Dallas Water Utilities

TEXT STYLE: STANDARD DESIGN SHEET MISCELLANEOUS ITEMS

Exhibit C.2

Text Style	Sample	Level No.	Color No.	Height	Width	Line Space	Just.	Weight
				SCALE		20/40		
Match Mark With Stationing	MATCH MARK 5+00.0	12	24	4.0 8.0	4.0 8.0	2.0 4.0	C/C	3
Match Mark Next Sheet	See Sheet 3	12	24	3.5 7.0	3.5 7.0	1.75 3.5	C/C	2
Pavement Label	Concrete Pavement	*By Level*	0	1.75 3.5	1.75 3.5	0.875 1.75	C/C	0
General Notes Title	GENERAL NOTES	9	0	5.0 10.0	5.0 3.5	2.5 5.0	C/C	3
General Notes Text Body	1. All work shall be done in accordance with the North Central Texas Council Of Governments (NCTCOG) Standard Specifications for Public Works Construction and Dallas Water Utilities Addendum (Oct, 2010) to these specifications.	9	0	2.0 4.0	2.0 4.0	1.0 2.0	L/C	0
Topo Annotation	18" Pecan Tree 	*By Level*	0	1.5 3.0	1.5 3.0	0.75 1.5	C/C	0
Utility Annotation Plan View		*By Level*	*By Level*	1.75 3.5	1.75 3.5	0.875 1.75	C/C	0

By Level Utility annotation is to be on the same level and the same color as the utility it defines.

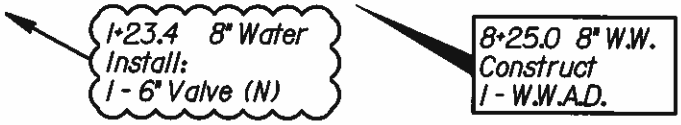
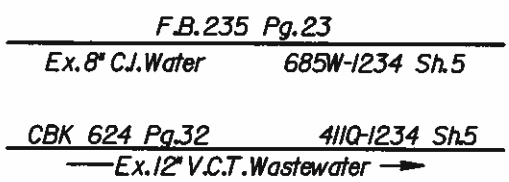
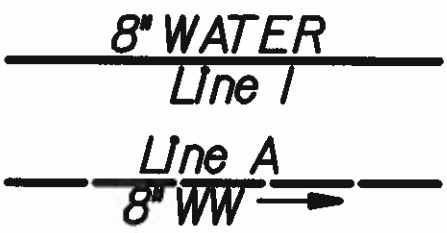
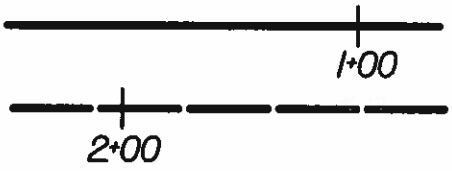
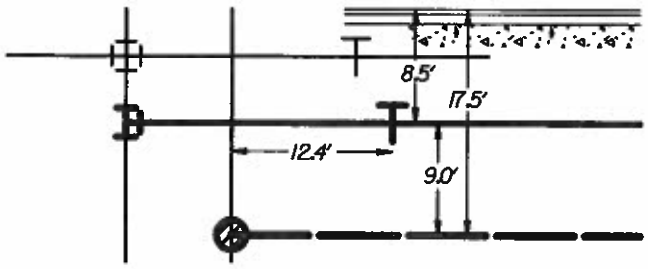
Dallas Water Utilities	TEXT STYLE: GENERAL PLAN VIEW	Exhibit C.3

Text Style	Sample	Level No.	Color No.	Height / SCALE	Width	Line Space 20/40	Just.	Weight
Property Street, Railroad, Creek Name	MAIN ST.	2003	0	5.0 / 10.0	5.0 / 10.0	2.5 / 5.0	C/C	4
Property Block Number	BLK 2/1005	2011	0	3.0 / 6.0	3.0 / 6.0	1.5 / 3.0	C/C	2
Property Lot Number	LOT 12	2012	0	2.0 / 4.0	2.0 / 4.0	1.0 / 2.0	C/C	1
Property Lot Dimensions	100'	2013	0	1.50 / 3.0	1.50 / 3.0	0.75 / 1.50	C/C	0
Property Addresses	2121 Main St.	2010	0	1.50 / 3.0	1.50 / 3.0	0.75 / 1.50	C/C	0
Property City Names At Corporation Line	CITY OF DALLAS / CITY OF GARLAND	2014	84	5.0 / 10.0	5.0 / 10.0	2.5 / 5.0	C/C	4

Dallas Water Utilities

TEXT STYLE:
PROPERTY PLAN VIEW

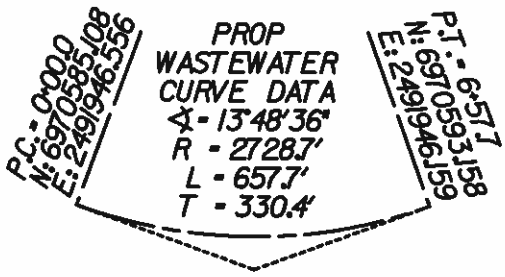
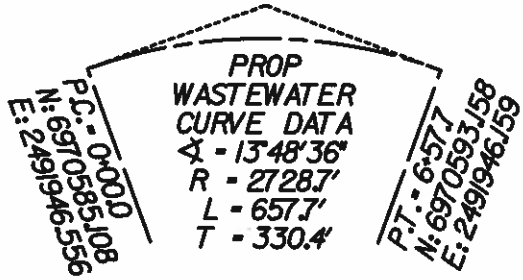
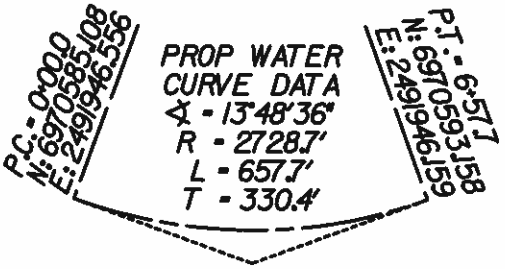
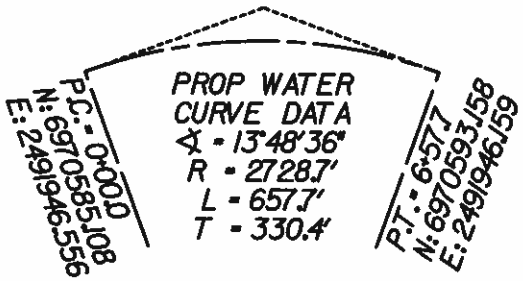
Exhibit C.4

Text Style	Sample	Level No.	Color No.	Height	Width	Line Space	Just.	Weight
				SCALE		20/40		
Water/W.W. Install & Construct Title Water/W.W. Kill & Abandon Title		112	7	3.5 7.0	3.5 7.0	1.75 3.5	C/C	3
		113	7	3.0 6.0	3.0 6.0	1.5 3.0	C/C	2
		208	11	3.5 7.0	3.5 7.0	1.75 3.5	C/C	3
		209	11	3.0 6.0	3.0 6.0	1.5 3.0	C/C	2
Water/W.W. Plan Callout		111	7	2.0 4.0	2.0 4.0	1.0 2.0	L/C	0
		210	11	2.0 4.0	2.0 4.0	1.0 2.0	L/C	0
Water/W.W.(Ex) Annotation - Plan		By Level	1	1.75 3.5	1.75 3.5	0.875 1.75	C/C	0
		By Level	130	1.75 3.5	1.75 3.5	0.875 1.75	C/C	0
Water/W.W. Line Label		110	7	3.5 7.0	3.5 7.0	1.75 3.5	C/C	2
		207	11	3.5 7.0	3.5 7.0	1.75 3.5	C/C	2
Water/W.W. Stationing (Plan & Profile)		109 120	7	2.5 5.0	2.5 5.0	1.25 2.5	C/C	1
		206 217	11	2.5 5.0	2.5 5.0	1.25 2.5	C/C	1
Water/W.W. Dimensioning		211	7	1.50 3.0	1.50 3.0	0.75 1.50	C/C	0
		114	11	1.50 3.0	1.50 3.0	0.75 1.50	C/C	0

Dallas Water Utilities

TEXT STYLE:
WATER/WASTEWATER PLAN VIEW

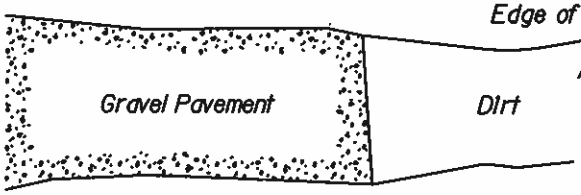
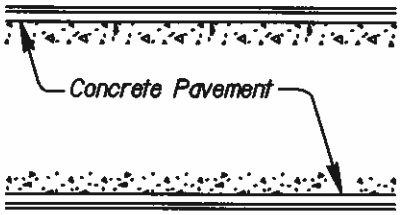
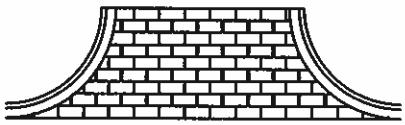
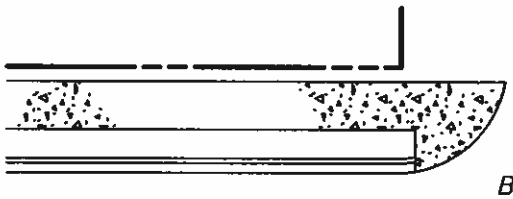
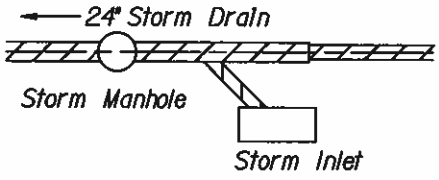
Exhibit C.5
1 of 2

Text Style	Sample	Level No.	Color No.	Height	Width	Line Space	Just.	Weight
				SCALE		20/40		
Proposed Wastewater Curve Data (Down)		213	11	2.0 4.0	2.0 4.0	1.0 2.0	C/C	1
Proposed Wastewater Curve Data (Up)								
Proposed Water Curve Data (Down)		116	7	2.0 4.0	2.0 4.0	1.0 2.0	C/C	1
Proposed Water Curve Data (Up)								

Dallas Water Utilities	TEXT STYLE: WATER/WASTEWATER PLAN VIEW	Exhibit C.5 2 of 2

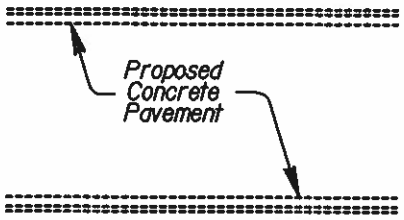
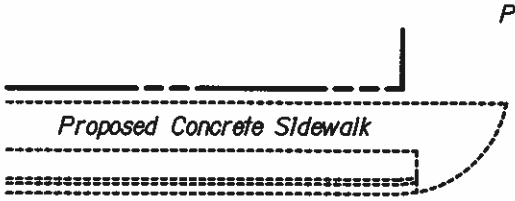
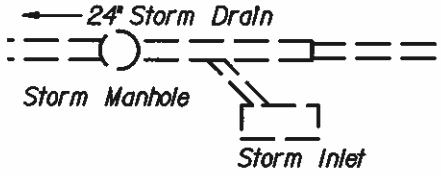
Element	Symbol	Level No.	Color No.	Line Style	Weight
Existing ROW Line (Street, Highway, Railroad)		2000	2	6	2
Proposed ROW Line (Street, Highway, Railroad)		2001	2	3	3
ROW Centerline		2002	4	7	0
Alley ROW		2004	0	0	1
Block Line		2005	0	0	2
Lot Line		2006	0	0	0
Existing Easement		2007	0	5	0
Proposed Easement		2008	0	5	1
Subdivision Replat Perimeter		2010	2	0	4
City Boundary Line		2015	84	0	3
Survey Line		1006	3	0	0

Dallas Water Utilities	PLAN VIEW: EXISTING & PROP. PROPERTY LINES	Exhibit DJ

Element	Symbol		Level No.	Color No.	Line Style	Weight
Existing Gravel Pavement		Edge of Pavement	3000	4	0	0
		Annotation		4	0	0
		Gravel Cell Pattern	3009	0	0	0
Existing Asphalt Pavement		Edge of Pavement	3000	4	0	0
		Annotation		4	0	0
		Asphalt Cell	3006	0	0	0
Existing Concrete Pavement		Curb	3002	4	0	0
		Gutter	3003	4	0	0
		Annotation		4	0	0
		Concrete Cell Pattern	3008	0	0	0
Existing Brick Pavement		Edge of Pavement	3000	4	0	0
		Annotation		4	0	0
		Brick Cell Pattern	3007	216	0	0
Existing Concrete Sidewalk		Sidewalk	3006	4	0	0
		Annotation		4	0	0
			3006	4	0	0
		Barrier Free Ramp	3004	4	0	0
Existing Storm Drain Lines, Annotation & Appurtenances		Storm Manhole	7000	68	0	0
		Storm Inlet	7001	68	0	0
		Storm Main	7002	68	0	0
		Storm Main Centerline	7003	68	4	0
		Annotation		68	0	0

Annotation to be on the same level as the feature it defines.

Dallas Water Utilities	PLAN VIEW: EXISTING PAVEMENT & STORM DRAINS	Exhibit D.2

Element	Symbol	Level No.	Color No.	Line Style	Weight
Proposed Pavement	 Proposed Pavement	350	4	1	1
	Annotation		4	0	0
Proposed Sidewalk	 Proposed Pavement	350	4	1	1
	Annotation		4	0	0
Proposed Storm Drain	 Proposed Storm Drain	400	68	5	1
	Annotation		68	0	0

Annotation to be on the same level as the feature it defines.

Dallas Water Utilities	PLAN VIEW: PROPOSED PAVEMENT & STORM DRAINS	Exhibit D.3

Element	Symbol		Level No.	Color No.	Line Style	Weight
Underground Cable T.V.	CATV	Conduit	7101	30	0	0
	Cable T.V. Manhole (TV)	Annotation		30	0	0
		Cable TV Appurtenances	7100	30	0	0
Underground Electric	UE	Conduit	7202	27	0	0
	Electric Vault (EV); Electric Manhole (E); Electric Transformer (ET)	Annotation		27	0	0
		Electric Appurtenances	7200	27	0	0
Overhead Electric	OE	Conduit	7201	27	0	0
	Pole Anchor; Power Pole	Annotation		27	0	0
		Electric Appurtenances	7200	27	0	0
Fiber Optic	FO	Conduit	7301	46	0	0
	Fiber Optic Manhole (F)	Annotation		46	0	0
		Fiber Optic Appurtenances	7300	46	0	0
Gas	2" G	Main	7401	20	0	0
	Gas Manhole (G); Gas Meter	Annotation		20	0	0
		Gas Appurtenances	7400	20	0	0
Underground Telephone	T	Conduit	7501	62	0	0
	Telephone Manhole (T); Telephone Pedestal (TP)	Annotation		62	0	0
		Telephone Appurtenances	7500	62	0	0
	Utility annotation every 50' or 100' for 20 or 40 scale, repsectively. 50' or 100' T T					
	Utility annotation on the same level as the utility it defines.					

Dallas Water Utilities

PLAN VIEW: EXISTING UTILITIES & APPURTENANCES

Exhibit D.4

Element	Symbol	Level No.	Color No.	Line Style	Weight
Water Service	Ex. 3/4" Service	5006	1	5	0
2" Water Main	Existing 2" CI Water	5000	1	0	0
4" Water Main	Existing 4" CI Water	5001	1	3	1
6" Water Main	Existing 6" CI Water	5002	1	0	1
8" To 27" Water Mains	F.B. 235 Pg. 23 Existing 8" CI Water	5003	1	0	1
Water Main Centerline		5004	1	0	0
30" & Larger Water Mains	685W - 535A Sh. 4 Ex. 48" RC Water				
	Water Main Centerline	5005	1	4	0
By Other Than Open Cut	By-Other-Than-Open-Cut Highway/Railroad Crossings 3+68.0 Encasement Limits 4+57.0				
	Encasement Limits	By Level	1	0	0
	All Annotation	By Level	1	0	0

Utility annotation on the same level as the utility it defines.
Bore and encasement placed on the same level as the main it encases.

Dallas Water Utilities

PLAN VIEW: EXISTING WATER MAINS

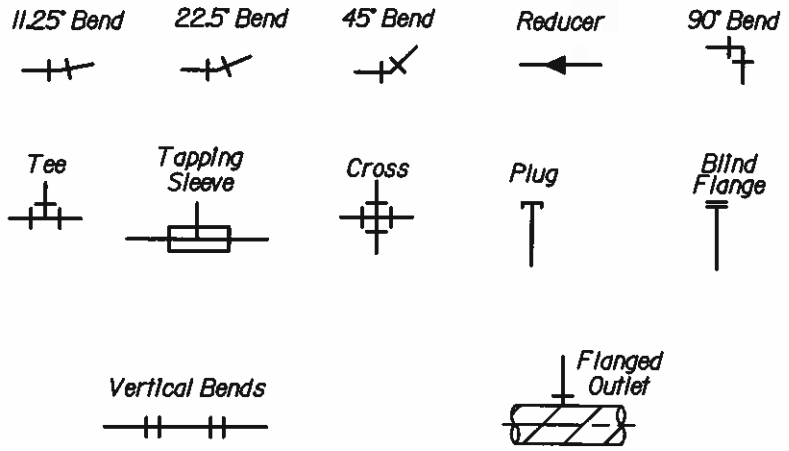
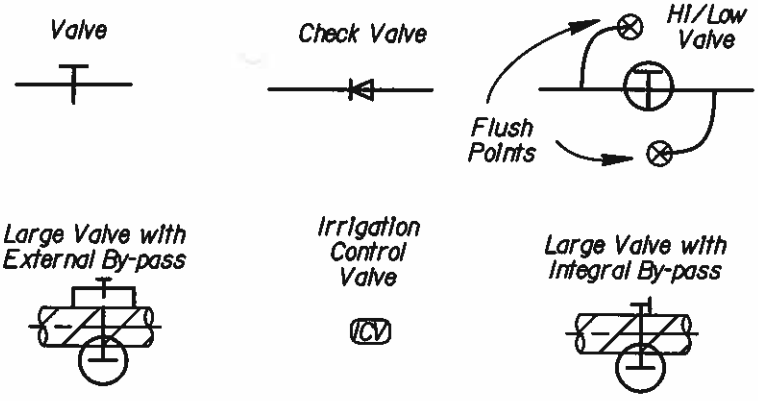
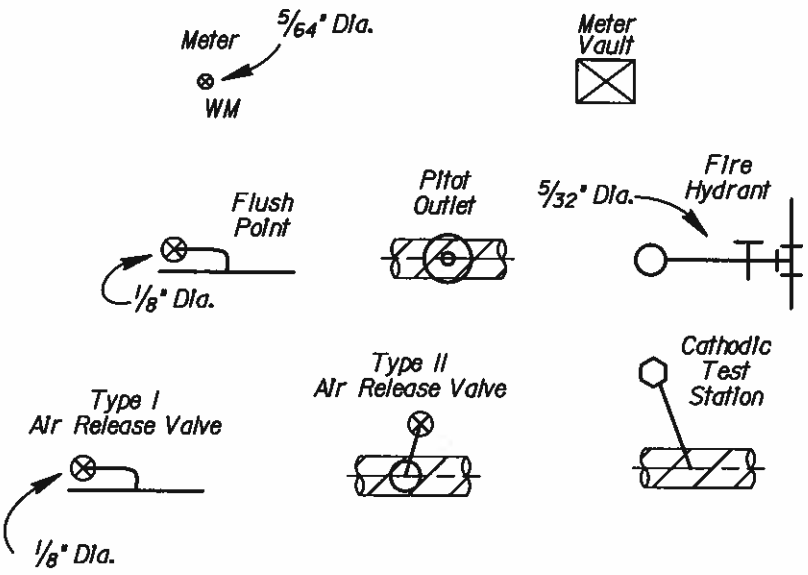
Exhibit E.1

Element	Symbol	Level No.	Color No.	Line Style	Weight
Water Service		107	7	5	2
2" Water Main		100	7	0	3
4" Water Main		101	7	2	4
6" Water Main		102	7	3	4
Water Main Annotation 8" To 27" Water Mains		103	7	0	4
Water Main Centerline 30" & Larger Water Mains		104	7	0	2
	Water Main Centerline	105	7	4	0
Water Main Other Sheet Or By Others		104	7	1	1
Future Water Main		106	7	5	0
By Other Than Open Cut	By-Other-Than-Open-Cut Highway/Railroad Crossings Bore Limits Encasement Limits 3+68.0 3+75.0 B.O.T.O.C.~ HIGHWAY CROSSING 4+50.0 4+57.0 ENCASEMENT PIPE LIMITS (When required)				
	Encasement Limits	115	67	0	1
	Bore Limits	115	67	5	1
	Annotation	115	67	0	0
	Bore limits to be placed on the same level as the encasement.				

Dallas Water Utilities

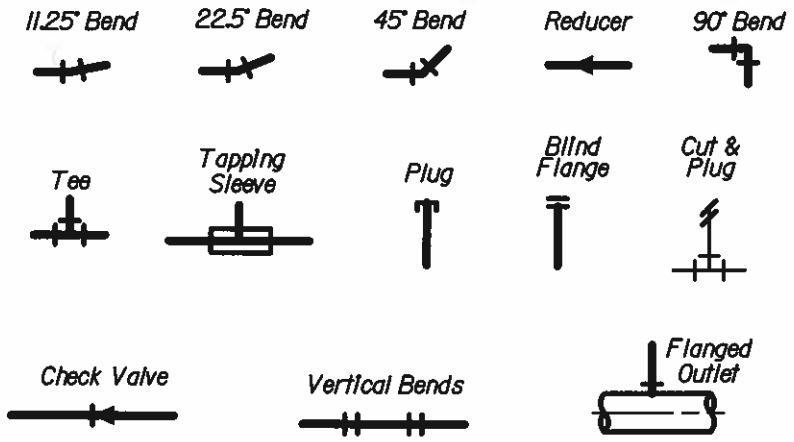
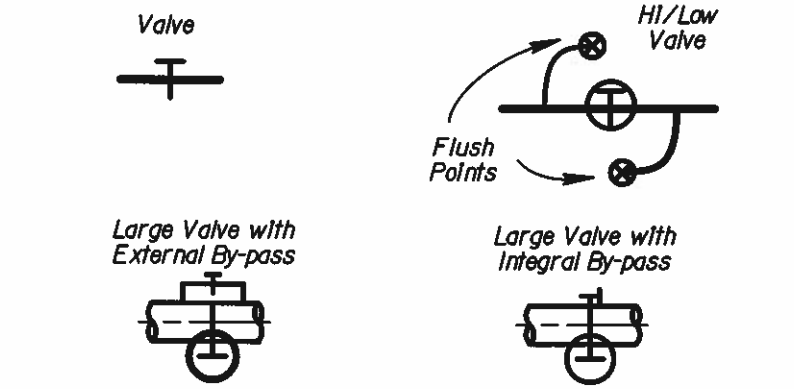
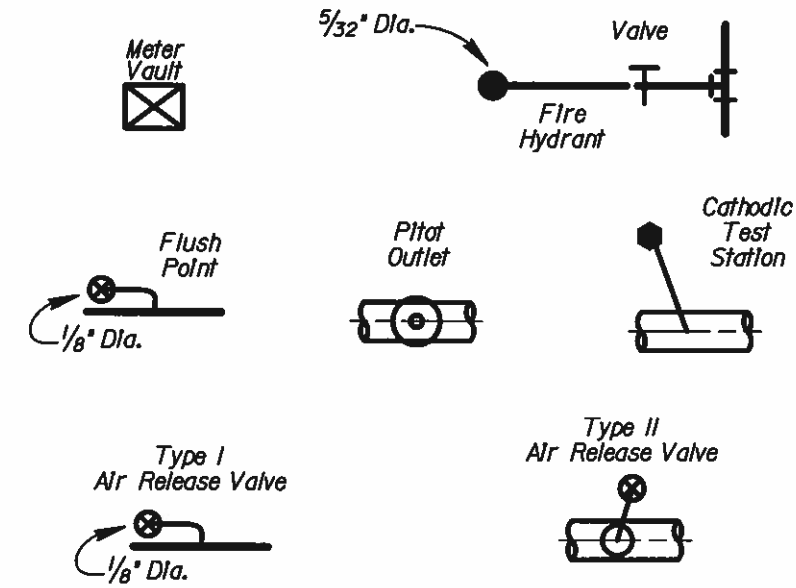
PLAN VIEW: PROPOSED WATER MAINS

Exhibit E.2

Element	Symbol	Level No.	Color No.	Line Style	Weight
Fittings					
Valves		5007	1	0	1
	All Annotation	5007	1	0	0
Appurtenances					

Utility annotation on the same level as the appurtenance it defines.

Dallas Water Utilities	PLAN VIEW: EXISTING WATER APPURTENANCES	Exhibit E.3

Element	Symbol	Level No.	Color No.	Line Style	Weight
Fittings		121	7	0	2
Valves					
Appurtenances					

Dallas Water Utilities	PLAN VIEW: PROPOSED WATER APPURTENANCES	Exhibit E.4

Element	Symbol	Level No.	Color No.	Line Style	Weight
Wastewater Lateral	Ex.4" WW Lat.	6004	130	0	0
8" To 27" Wastewater Mains	CBK 624 Pg.32 Ex.12" VCT Wastewater	6000	130	0	1
Wastewater Main Centerline	Wastewater Main Centerline	6002	130	4	0
	4110-1738 Sht.23 Ex.30" RC Wastewater	6001	130	0	1
30" & Larger Wastewater Mains	Hatching	6001	130	0	0
By Other Than Open Cut	By-Other-Than-Open-Cut Highway/Railroad Crossings 3+68.0 Encasement Limits 4+57.0				
	Encasement Limits	By Level	130	0	0
	All Annotation	By Level	130	0	0
	Utility annotation on the same level as the utility it defines. Encasement placed on the same level as the main it encases.				

Dallas Water Utilities	PLAN VIEW: EXISTING WASTEWATER MAINS	Exhibit F.1

Element	Symbol	Level No.	Color No.	Line Style	Weight
Wastewater Lateral		204	11	5	2
6" To 27" Wastewater Mains		200	11	2	4
Wastewater Main Centerline	Wastewater Main Centerline	202	11	4	0
30" & Larger Wastewater Mains		201	11	0	2
Wastewater Main Other Sheet Or By Others		215	11	1	1
Future Wastewater Main		203	11	5	0
By Other Than Open Cut	By-Other-Than-Open-Cut Highway/Railroad Crossings Bore Limits Encasement Limits 3+68.0 3+75.0 B.O.T.O.C.~ HIGHWAY CROSSING 4+50.0 4+57.0 ENCASEMENT PIPE LIMITS (When required)				
	Encasement Limits	212	67	0	1
	Bore Limits	212	67	5	1
	Annotation	212	67	0	0
	Bore limits to be placed on the same level as the encasement.				

Dallas Water Utilities

PLAN VIEW: PROPOSED WASTEWATER MAINS

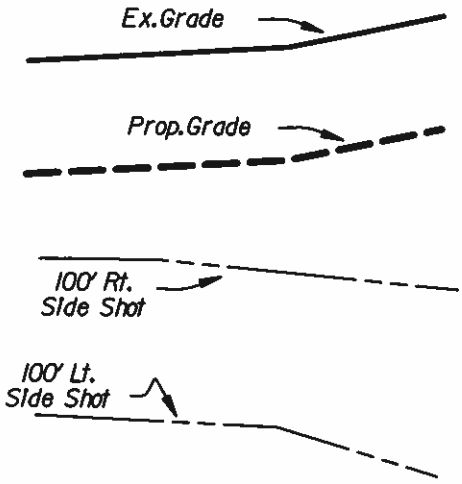
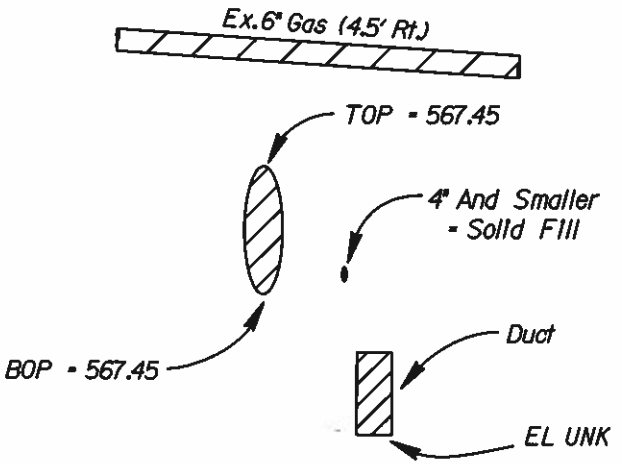
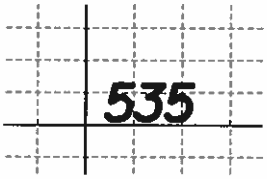
Exhibit F.2

Element	Symbol	Level No.	Color No.	Line Style	Weight
Appurtenances	Wastewater Manhole — 5/32" Dia. Wastewater Access Device — 1/8" Dia. Mainline Cleanout — 3/32" Dia. Lateral Cleanout — 3/32" Dia.	6004	130	0	1

Dallas Water Utilities	PLAN VIEW: EXISTING WASTEWATER APPURTENANCES	Exhibit F.3

Element	Symbol	Level No.	Color No.	Line Style	Weight
Appurtenances	Wastewater Manhole — 5/32" Dia. Wastewater Manhole Remove & Replace — 5/32" Dia. Mainline Cleanout — 1/8" Dia. Lateral Cleanout — 1/8" Dia. Wastewater Access Device — 3/32" Dia.	205	11	0	3

Dallas Water Utilities	PLAN VIEW: PROPOSED WASTEWATER APPURTENANCES	Exhibit F.4

Text Style	Sample	Level No.	Color No.	Height 20 / 40	Width 20 / 40	Line Space 20 / 40	Just.	Weight
Groundline Annotation		By Level	By Level	1.75 / 3.5	1.75 / 3.5	0.875 / 1.75	C/C	0
Utility Annotation Profile (Parallel & Cross)	 Annotation on the same level as the utility it defines.	By Level	By Level	1.75 / 3.5	1.75 / 3.5	0.875 / 1.75	C/C	0
Other Text No Specific Text Style	**Standard Rip Rap & Stabilized Backfill** Exception To Embedment/Backfill	By Level	By Level	2.00 / 4.00	2.00 / 4.00	1.00 / 2.00	C/C	1
	 Grid Elevations	2	104	3.50 / 7.00	3.50 / 7.00	1.75 / 3.50	C/C	3

Dallas Water Utilities

TEXT STYLE: GENERAL PROFILE VIEW

Exhibit GJ

Text Style	Sample	Level No.	Color No.	Height	Width	Line Space	Just.	Weight
				20	20	20		
				40	40	40		
Water/W.W. Profile Grade Label	+0.50% ←8" on 2.00%—	122	7	5.0	5.0	2.5	C/C	2
				2.5	2.5	1.25		
		219	11	5.0	5.0	2.5	C/C	2
				2.5	2.5	1.25		
Water/W.W. Pipe & Embedment	275 LF 16" PVC WATER PIPE Class "B" Embedment 263 LF 12" PVC W.W. PIPE Class "B-2a" Embedment	123	7	6.0	6.0	3.0	C/C	2
				3.0	3.0	1.5		
		220	11	6.0	6.0	3.0	C/C	2
				3.0	3.0	1.5		
Water/W.W. Profile Vertical Callouts & Flowlines	P.V.I. 4+76.3 Pr. 8" Water ∢ - 1°10'36" (Dn) Pull Pipe (Dn) Grade Break FL Pr. 8" Water - 539.45 I+05.5 Pr. 8" W.W. Remove Ex. W.W. Manhole Construct 1 - 4.0' Dia. W.W. Manhole FL Prop. 8" In (W) - 453.78 ~~FL Ex. 6" In (W) - 454.56~~ ~~FL Ex. 6" Out (E) - 453.70~~ FL Prop. 8" Out (E) - 453.70	121	7	3.5	3.5	1.75	L/C	0
				1.75	1.75	0.875		
		218	11	3.5	3.5	1.75	L/C	0
				1.75	1.75	0.875		

Dallas Water Utilities	TEXT STYLE: EX.& PROP. WATER & WASTEWATER PROFILE VIEW	Exhibit G.2

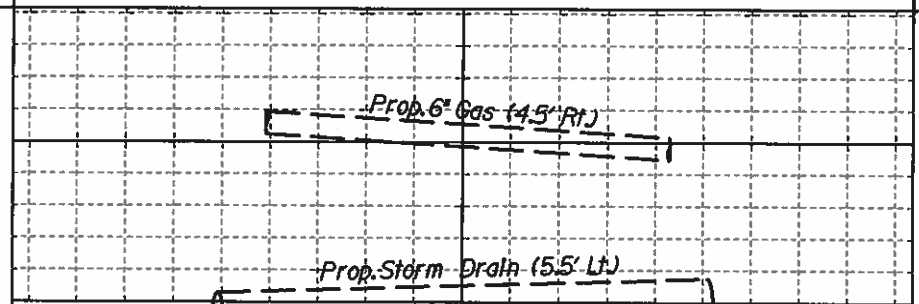
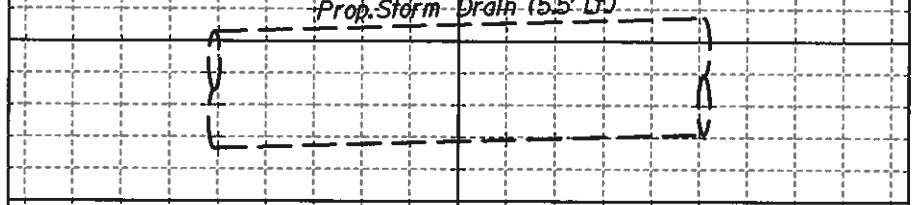
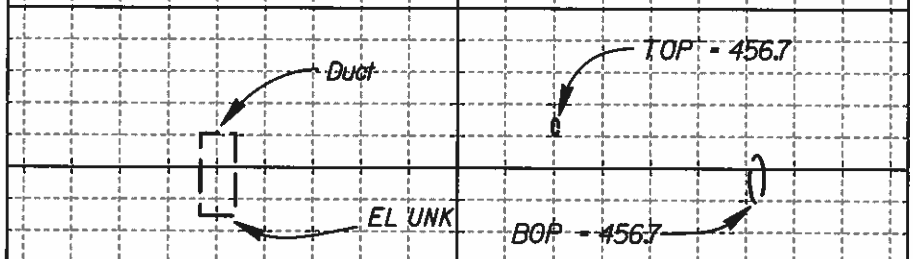
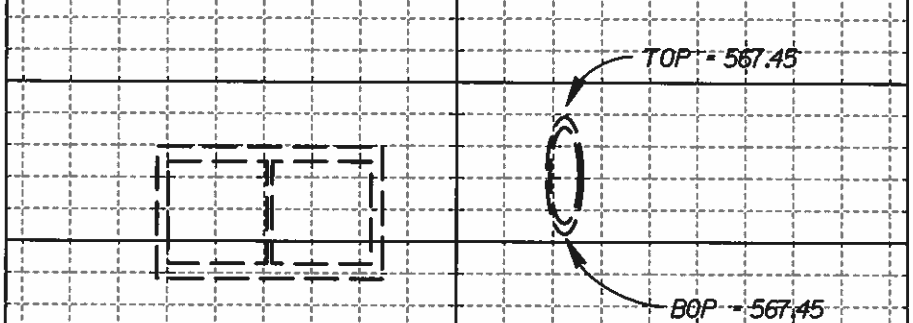
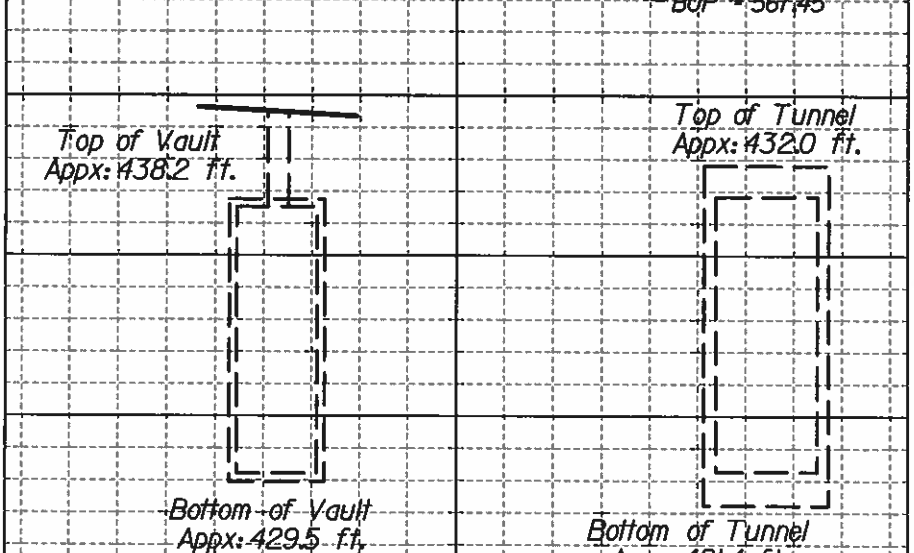
Element	Symbol	Level No.	Color No.	Line Style	Weight
Parallel Utilities	Ex.6" Gas (4.5' Rt.)	* By Level *	* By Level *	0	0
Parallel Storm Drain	Ex. Storm Drain (5.5' Lt.)	7004	68	0	0
Cross Utilities	TOP = 456.7, Duct, EL UNK, BOP = 456.7	* By Level *	* By Level *	0	0
Cross Storm Drain	TOP = 567.45, BOP = 567.45	7002	68	0	0
Underground Structures	Top of Vault Appx: 438.2 ft., Bottom of Vault Appx: 429.5 ft., Top of Tunnel Appx: 432.0 ft., Bottom of Tunnel Appx: 421.4 ft.	4041	0	0	0
	All Annotation	4041	0	0	0

Utility annotation on the same level as the utility it defines.

Dallas Water Utilities

PROFILE VIEW: EXISTING UTILITIES & APPURTENANCES

Exhibit HJ

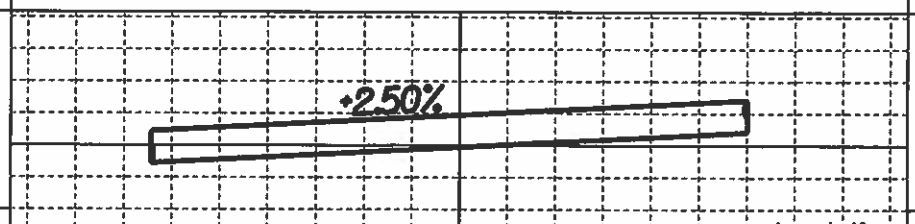
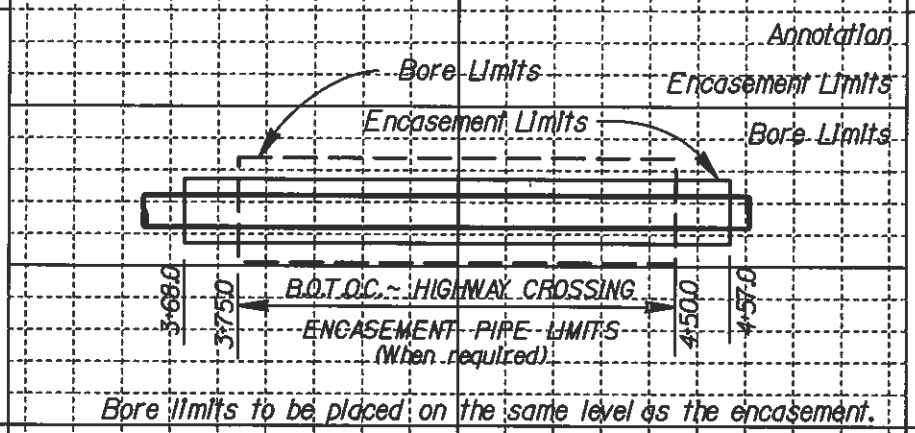
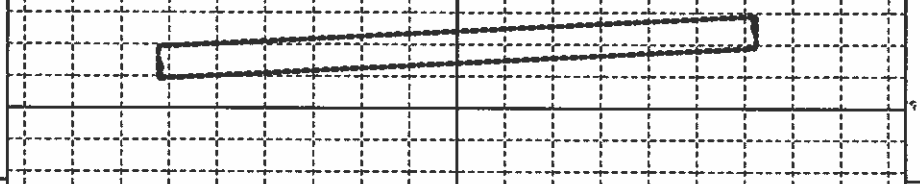
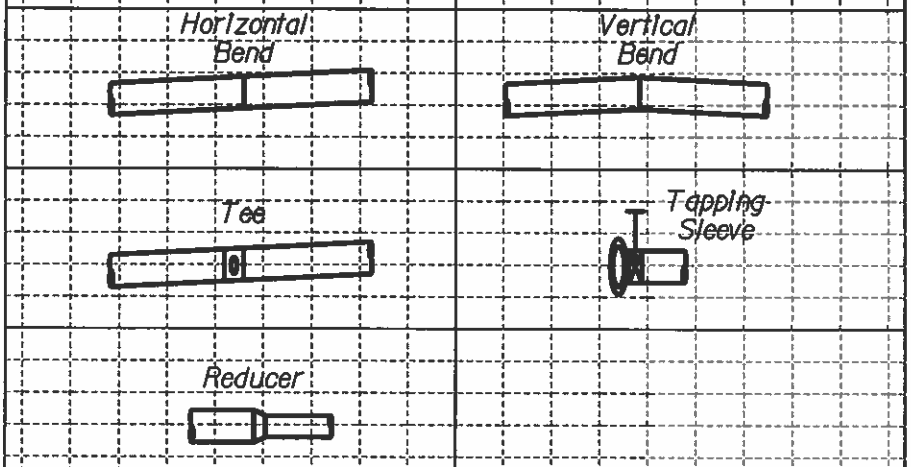
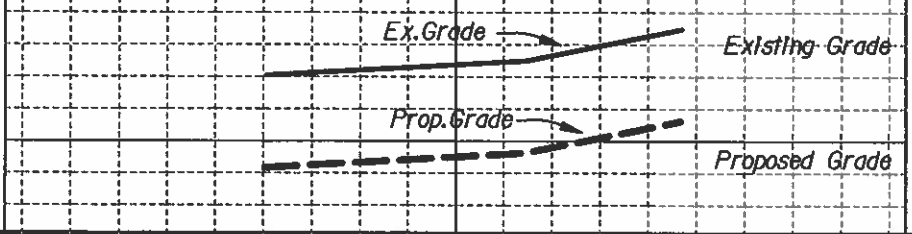
Element	Symbol	Level No.	Color No.	Line Style	Weight
Parallel Utilities		* By Level *	* By Level *	5	1
		400	68	5	1
Cross Utilities		* By Level *	* By Level *	5	1
		400	68	5	1
Underground Structures		450	0	5	1
	Utility annotation on the same level as the utility it defines.	450	0	0	0
				Annotation	

Dallas Water Utilities	PROFILE VIEW: PROPOSED UTILITIES & APPURTENANCES	Exhibit H.2

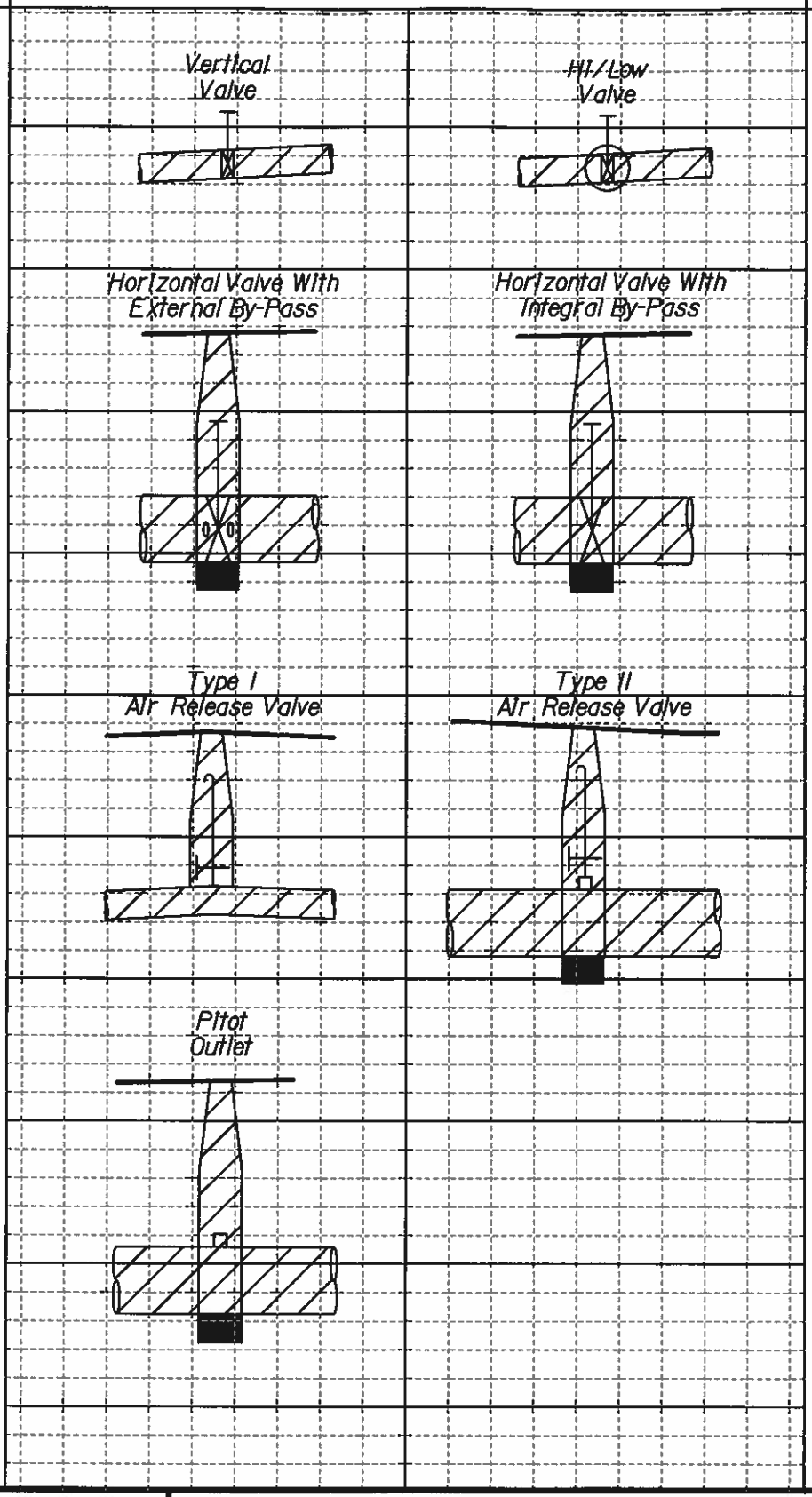
Element		Level No.	Color No.	Line Style	Weight
Main	Ex. 12" PVC Water At 2.50%	5009	1	0	0
By Other Than Open Cut	3.00' Encasement Limits 4.57'				
Fittings	Vertical Bend; Horizontal Bend; Tee; Tapping Sleeve; Reducer				
	All Annotation	5009	1	0	0

Utility annotation on the same level as the utility it defines.

Dallas Water Utilities	PROFILE VIEW: EXISTING WATER MAINS	Exhibit 1J

Element		Level No.	Color No.	Line Style	Weight
Main		118	7	0	2
By Other Than Open Cut		Annotation Encasement Limits Bore Limits	124 124 124	67 67 67	0 0 5	0 1 1
Water Main On Other Sheet Or By Others		125	7	1	1
Fittings		118	7	0	2
Existing & Proposed Groundlines		122 122	64 64	0 5	2 3

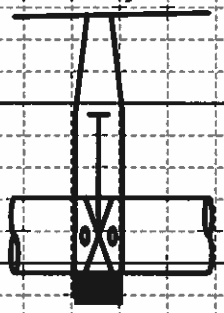
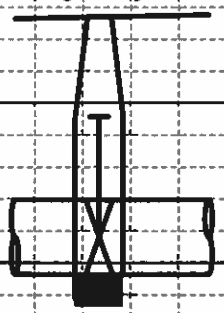
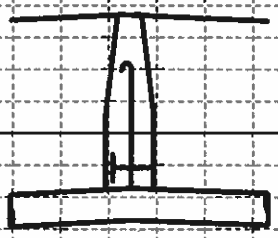
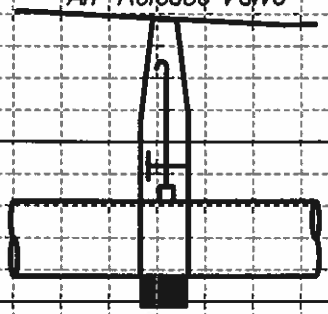
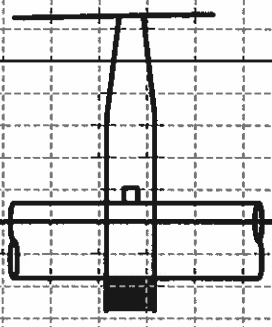
Dallas Water Utilities	PROFILE VIEW: PROPOSED WATER MAINS	Exhibit 1.2

Element		Level No.	Color No.	Line Style	Weight
Valves		5008	1	0	0
Appurtenances					

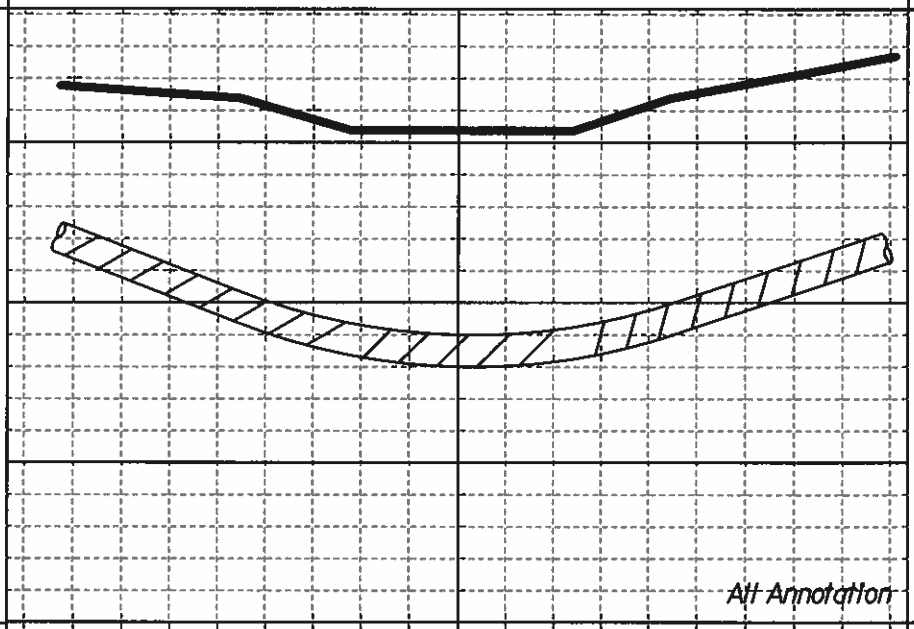
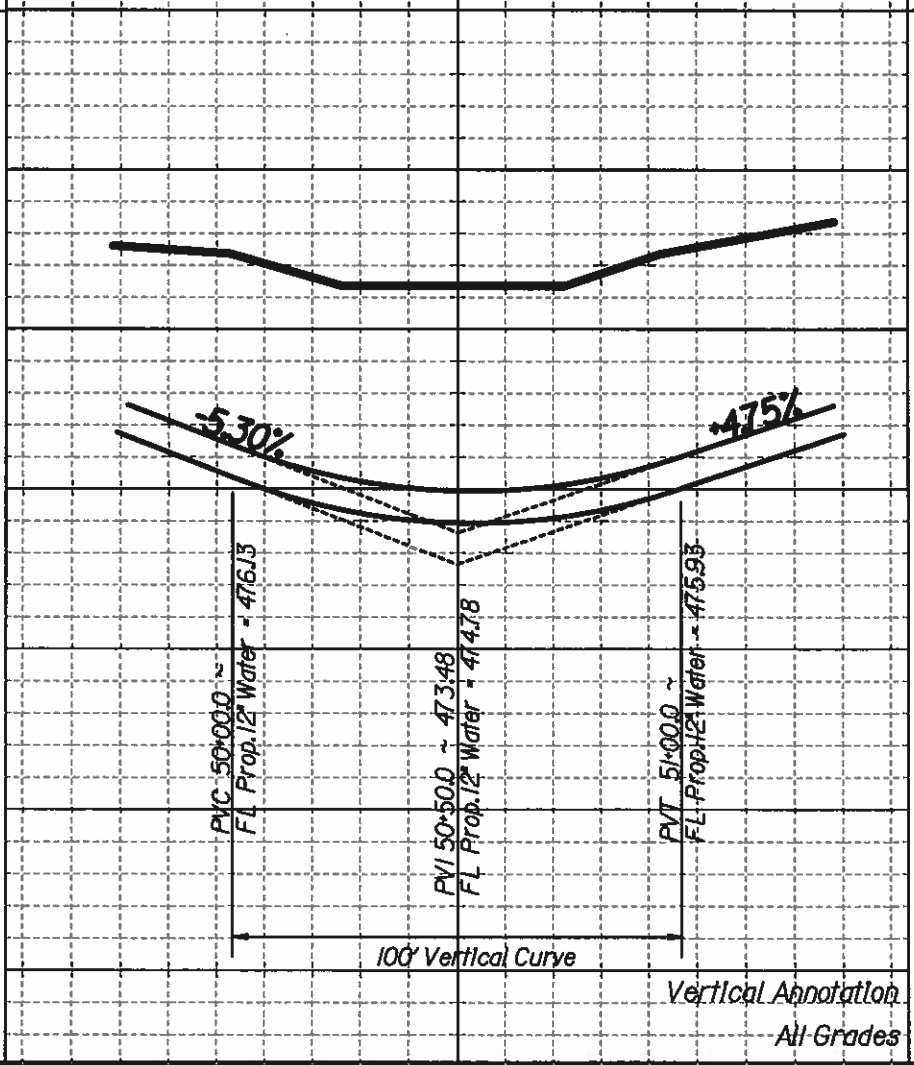
Dallas Water Utilities

PROFILE VIEW:
EXISTING WATER APPURTENANCES

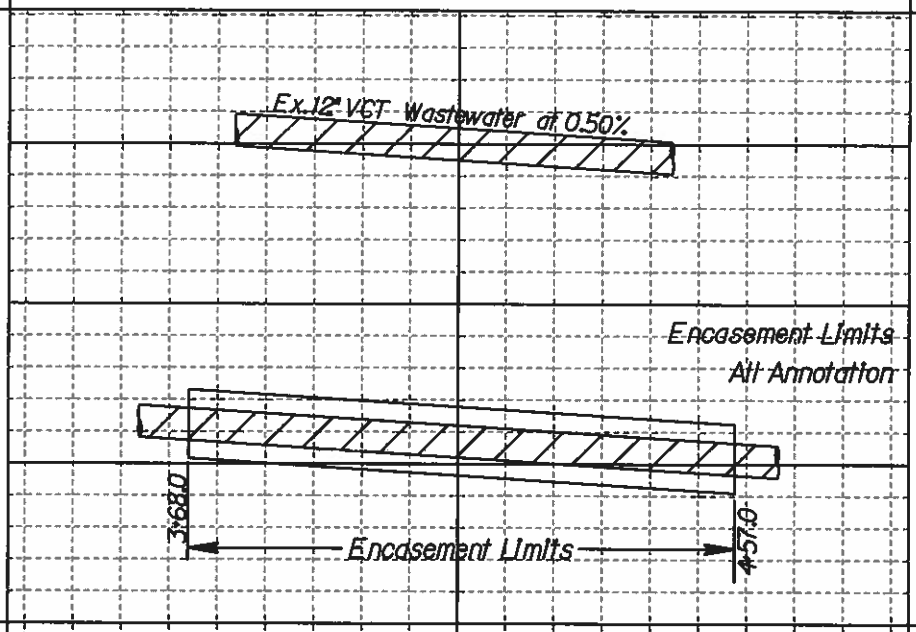
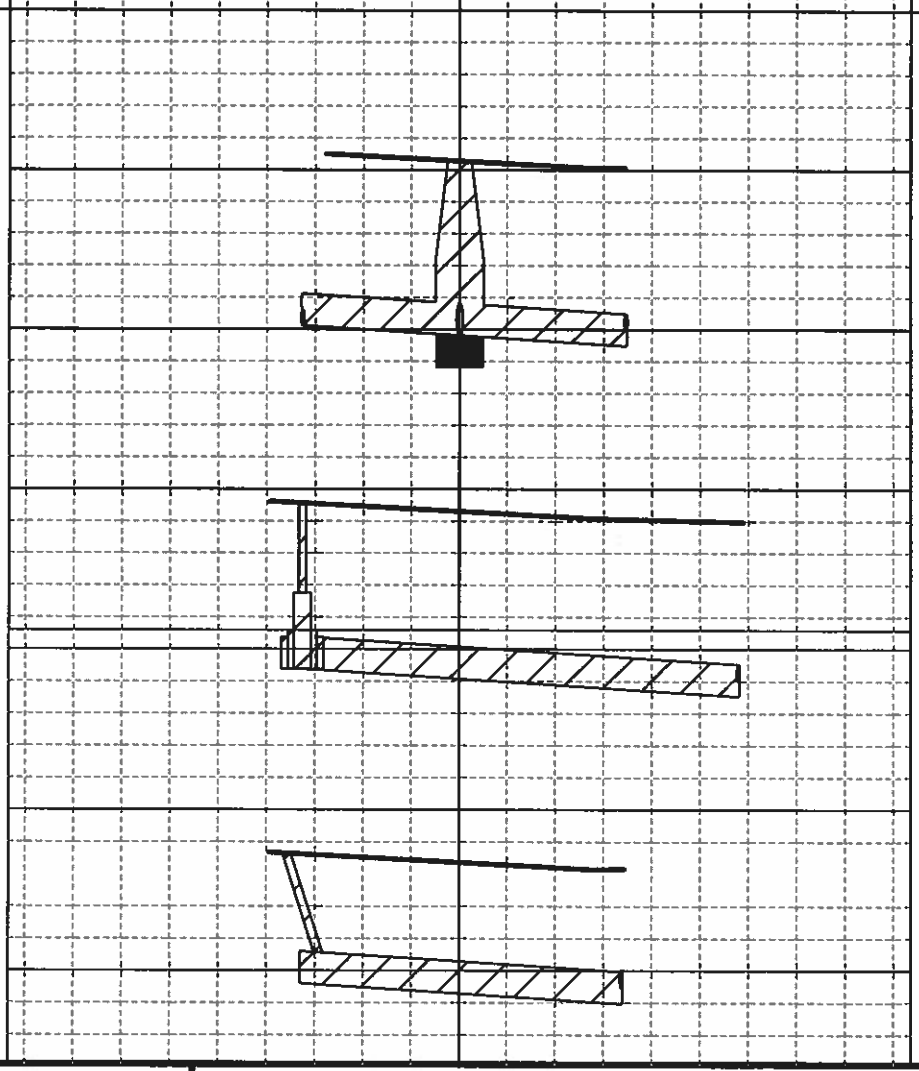
Exhibit 1.3

Element		Level No.	Color No.	Line Style	Weight
Valves	Vertical Valve 	119	7	0	2
	Hi/Low Valve 				
	Horizontal Valve With External By-Pass 				
	Horizontal Valve With Integral By-Pass 				
Appurtenances	Type I Air Release Valve 				
	Type II Air Release Valve 				
	Pitot Outlet 				

Dallas Water Utilities	PROFILE VIEW: PROPOSED WATER APPURTENANCES	Exhibit 1.4

Element		Level No.	Color No.	Line Style	Weight
Existing Water Vertical Curve		5009	1	0	0
	All Annotation	5009	1	0	0
Proposed Water Vertical Curve		118	7	0	2
		118	7	1	2
	Vertical Annotation	121	7	0	0
	All Grades	122	7	0	2

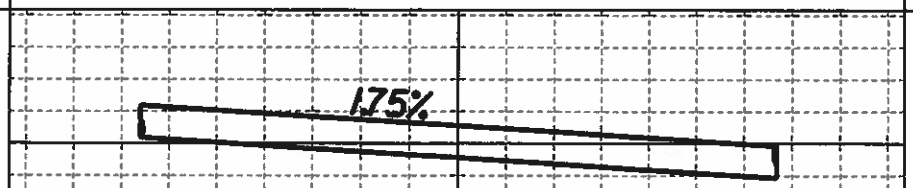
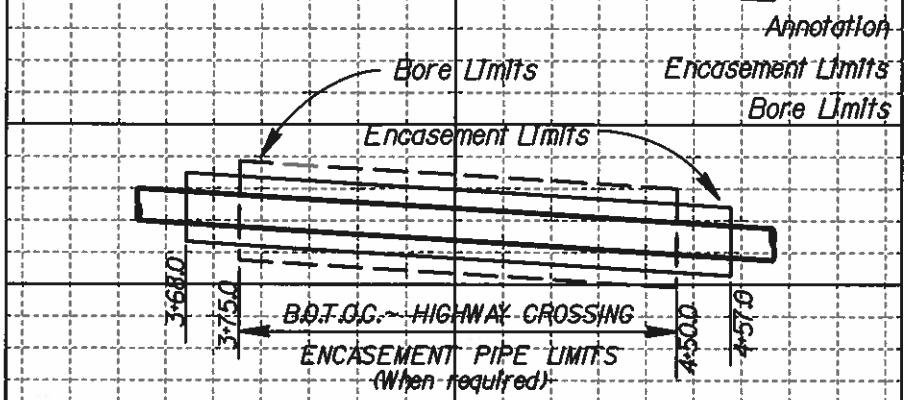
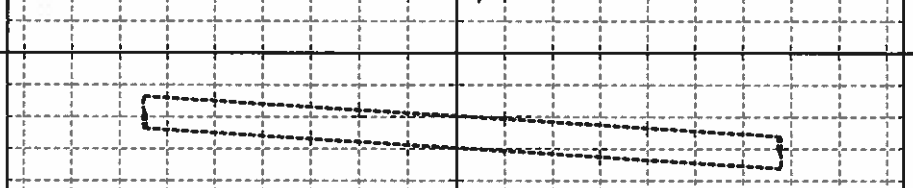
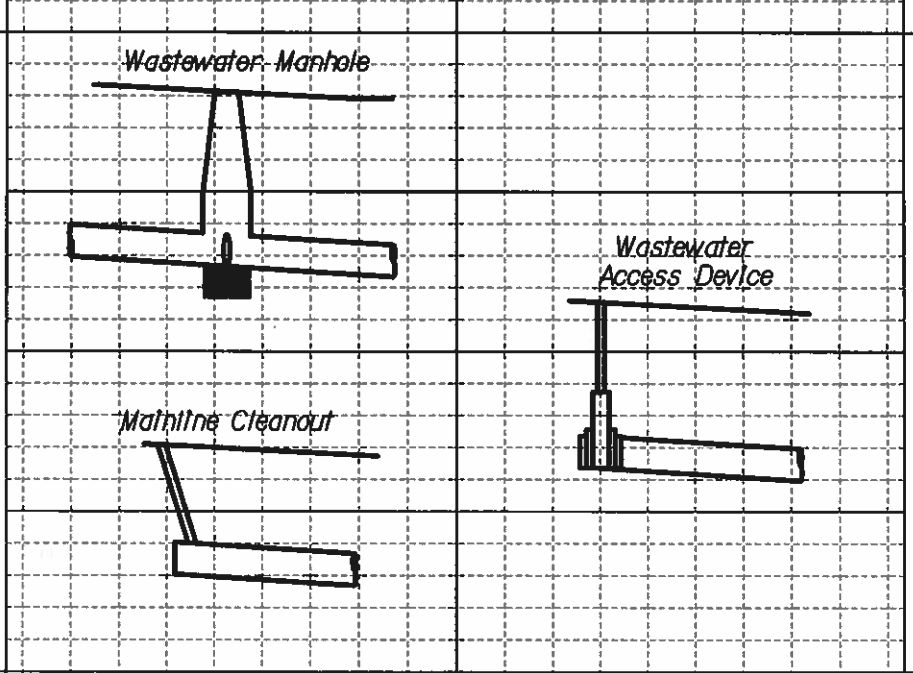
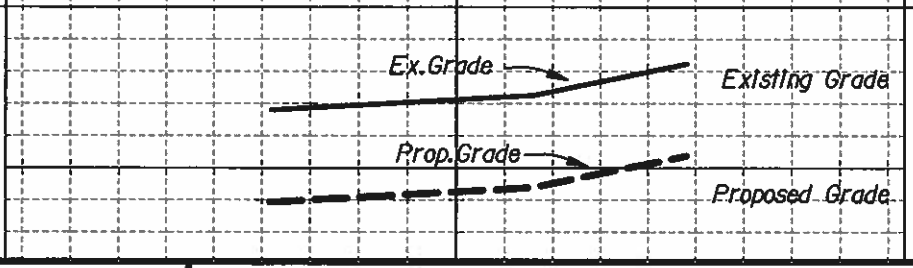
Dallas Water Utilities	PROFILE VIEW: VERTICAL CURVES EXISTING & PROPOSED WATER	Exhibit 1.5

Element	Symbol	Level No.	Color No.	Line Style	Weight
Wastewater Main		6006	130	0	0
		Encasement Limits 6006	130	0	0
		Alt Annotation 6006	130	0	0
Wastewater Manhole					
Wastewater Access Device		6005	130	0	0
Mainline Cleanout					

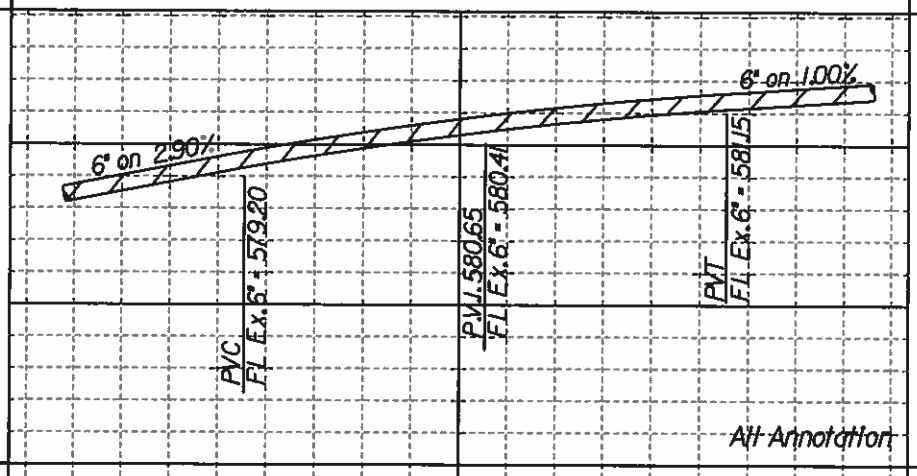
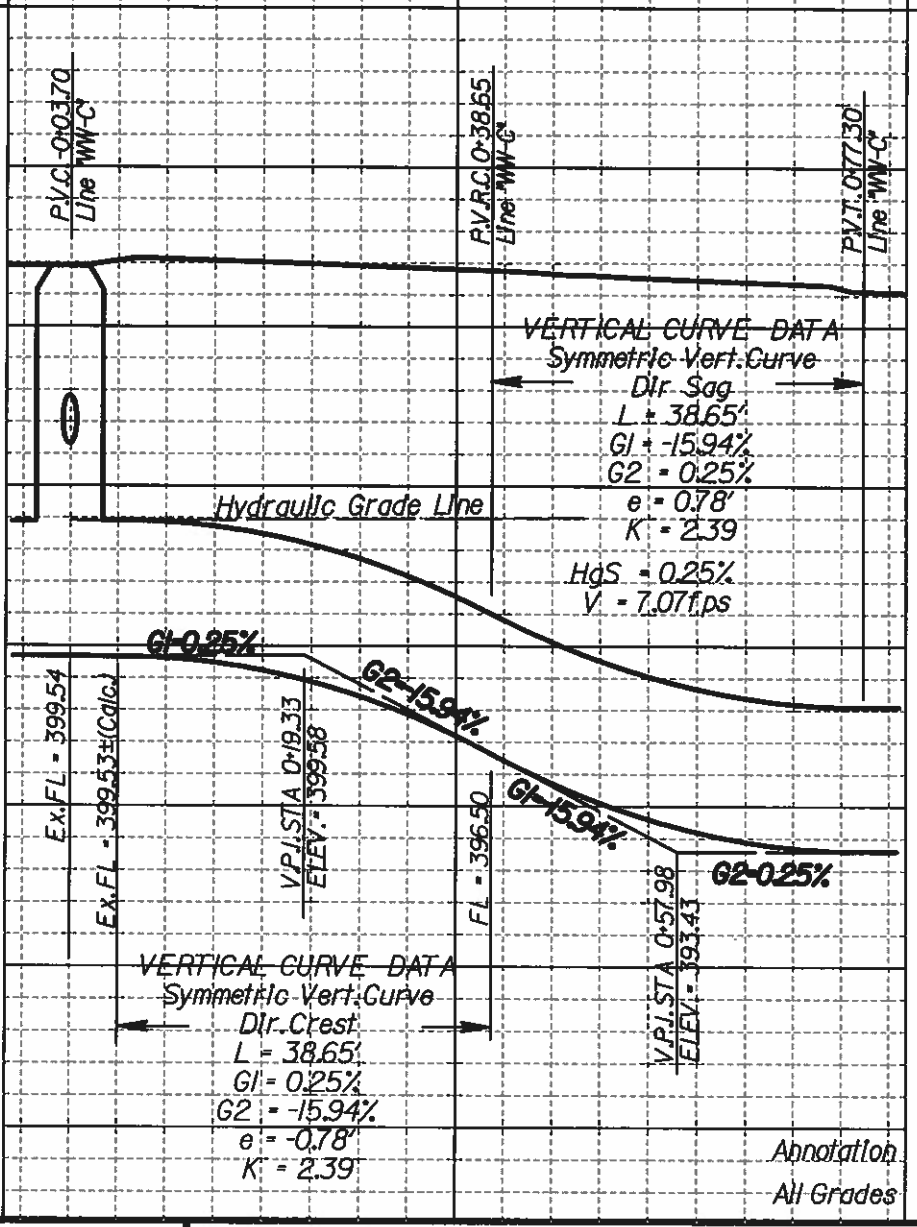
Dallas Water Utilities

PROFILE VIEW: EXISTING WASTEWATER MAINS & APPURTENANCES

Exhibit JJ

Element	Symbol	Level No.	Color No.	Line Style	Weight
Wastewater Main		215	11	0	1
By Other Than Open Cut		221 221 221	67 67 67	0 0 5	0 1 1
Wastewater Main On Other Sheet Or By Others		222	11	1	1
Wastewater Appurtenances		216	11	0	2
Existing & Proposed Groundlines		223 223	64 64	0 5	2 3

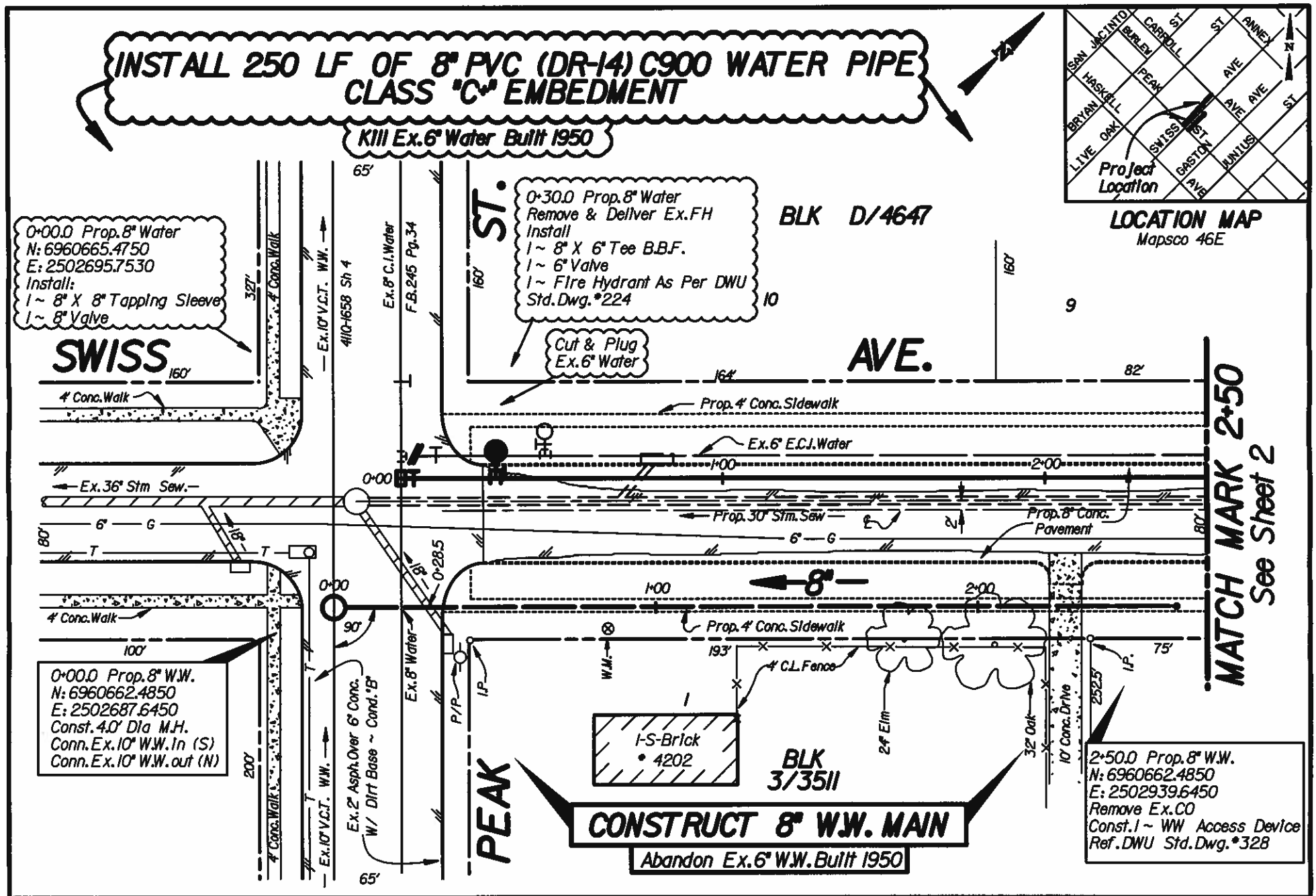
Dallas Water Utilities	PROFILE VIEW: PROPOSED WASTEWATER MAINS & APPURTENANCES	Exhibit J2

Element		Level No.	Color No.	Line Style	Weight
Existing Wastewater Vertical Curve		6006	130	0	0
All Annotation		6006	130	0	0
Proposed Wastewater Vertical Curve		215	11	0	2
Annotation		218	11	0	0
All Grades		219	11	0	2

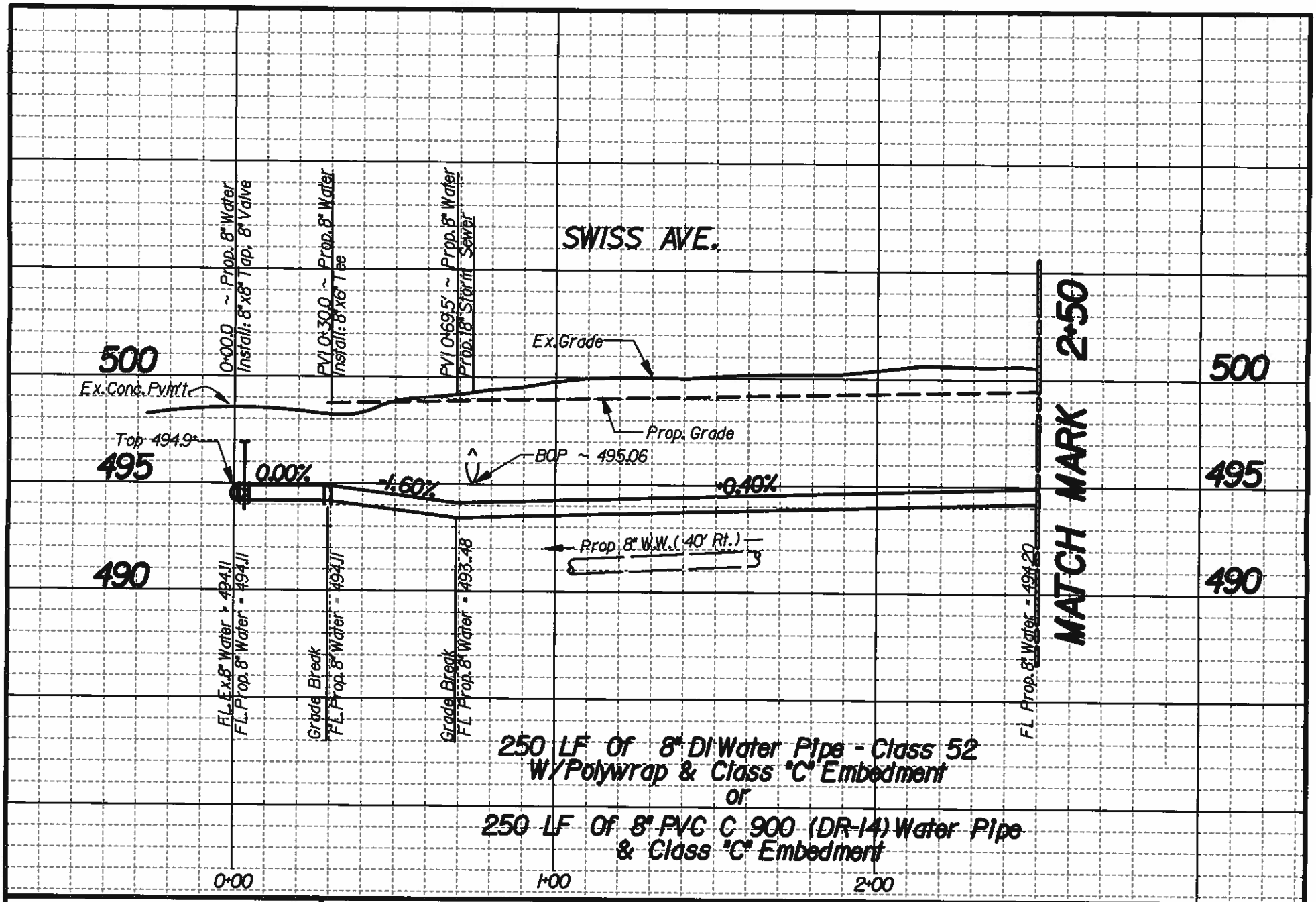
Dallas Water Utilities

PROFILE VIEW: VERTICAL CURVES EXISTING & PROPOSED WASTEWATER

Exhibit J.3



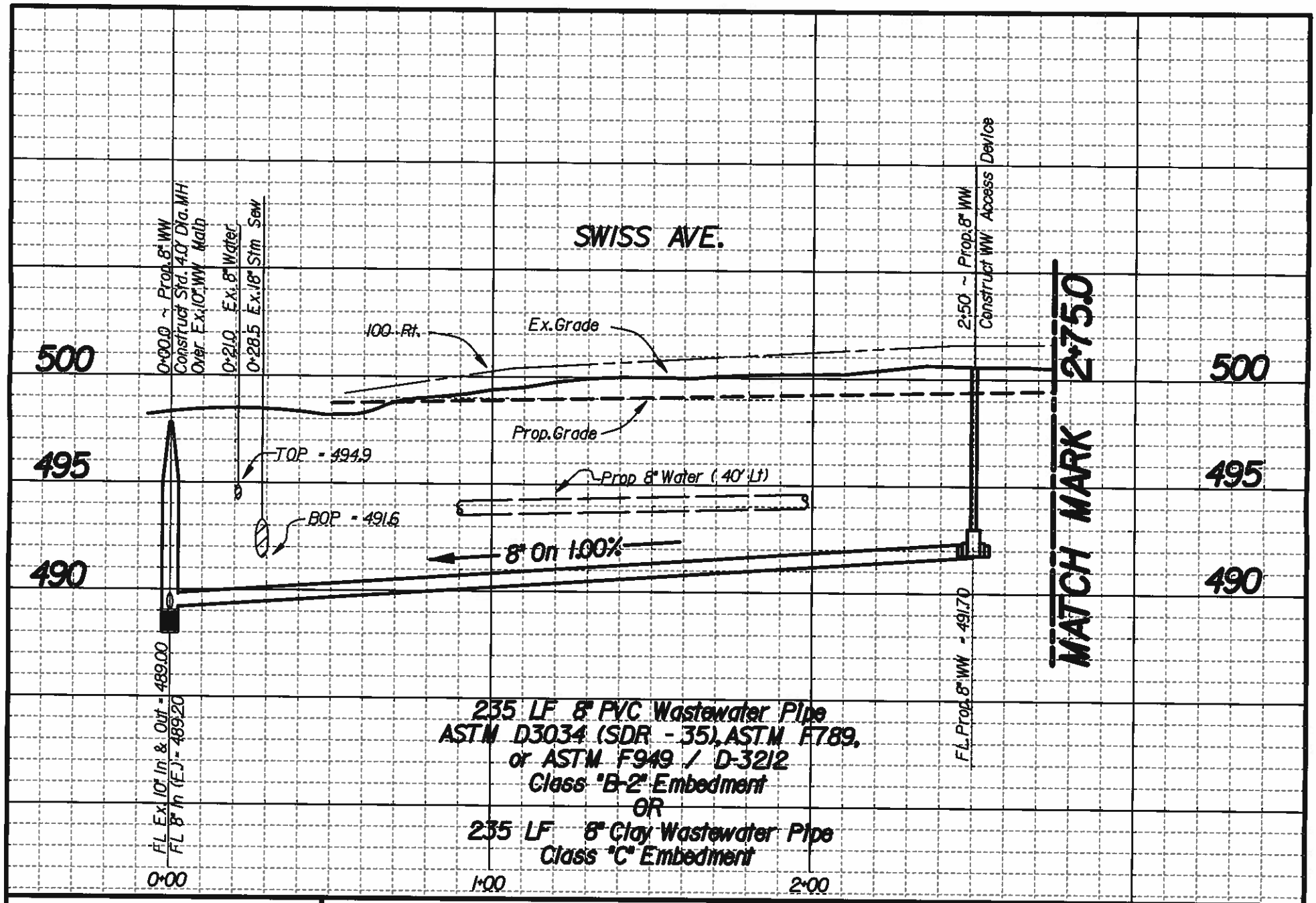
Dallas Water Utilities	EXAMPLE PLAN VIEW: WATER/WASTEWATER MAINS WITHIN STREET RIGHT OF WAY	Exhibit K-1



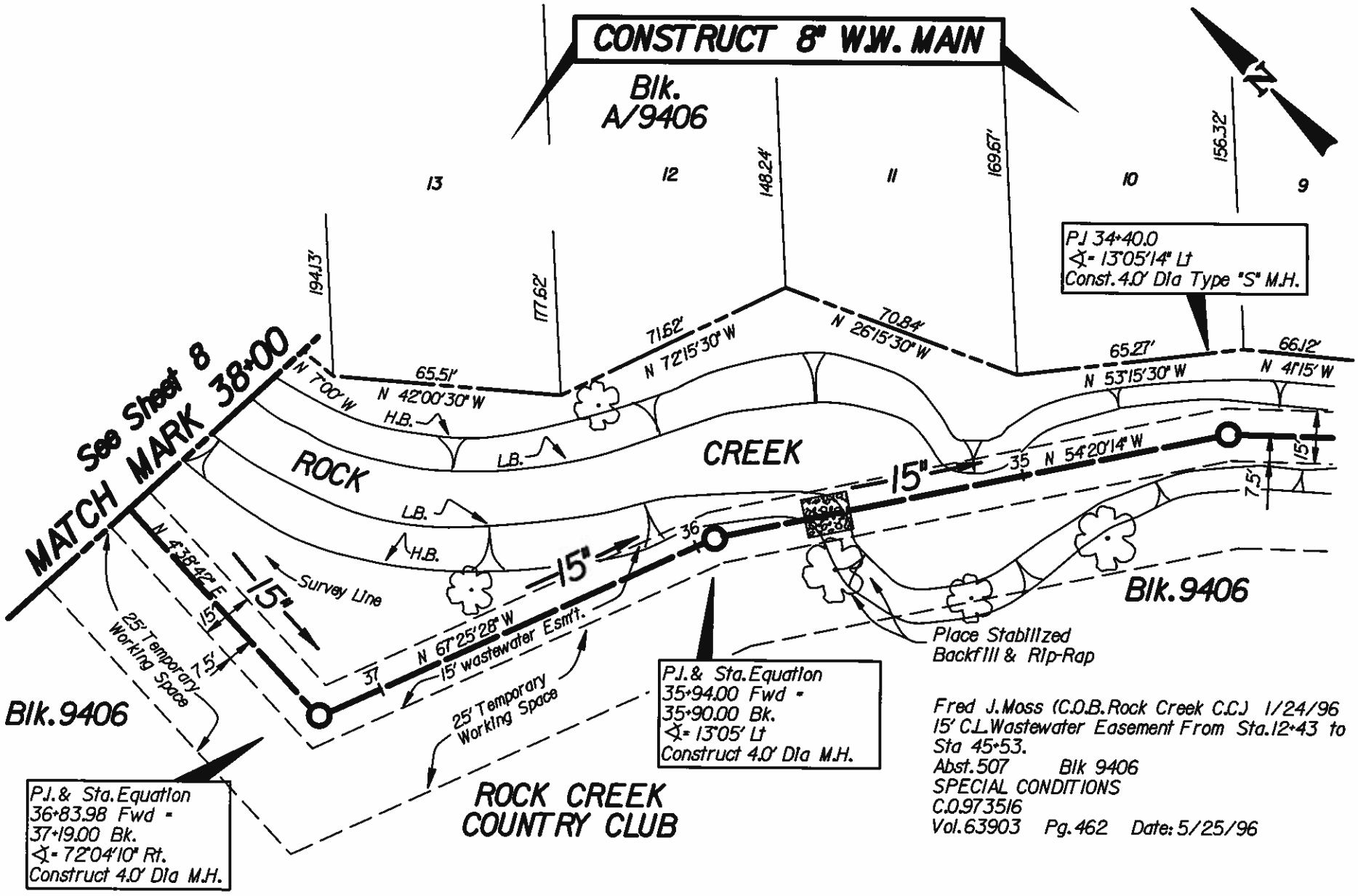
Dallas Water Utilities

EXAMPLE PROFILE VIEW: WATER MAIN WITHIN STREET RIGHT OF WAY

Exhibit K-2



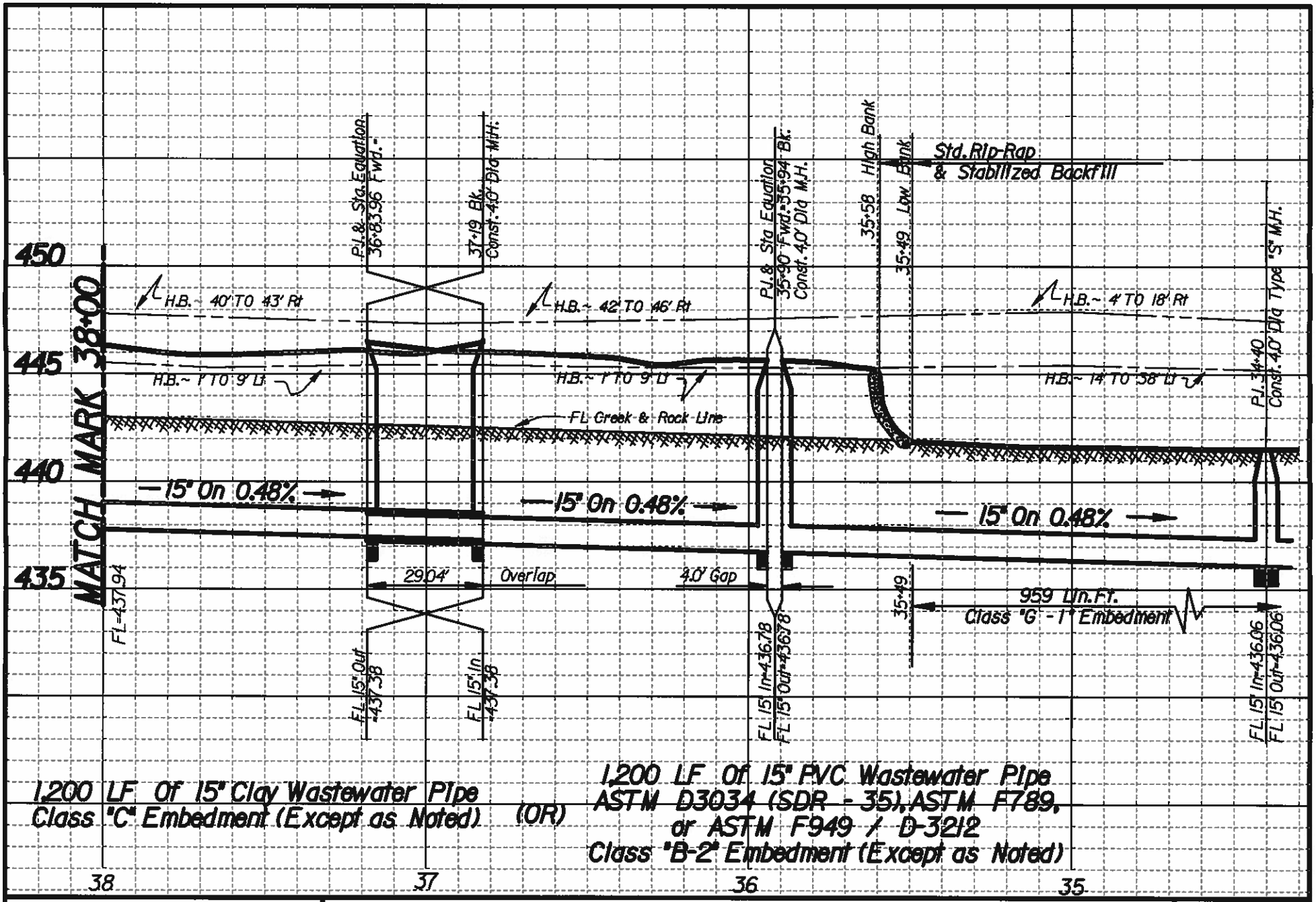
Dallas Water Utilities	EXAMPLE PROFILE VIEW: WASTEWATER MAIN WITHIN STREET RIGHT OF WAY	Exhibit K.3



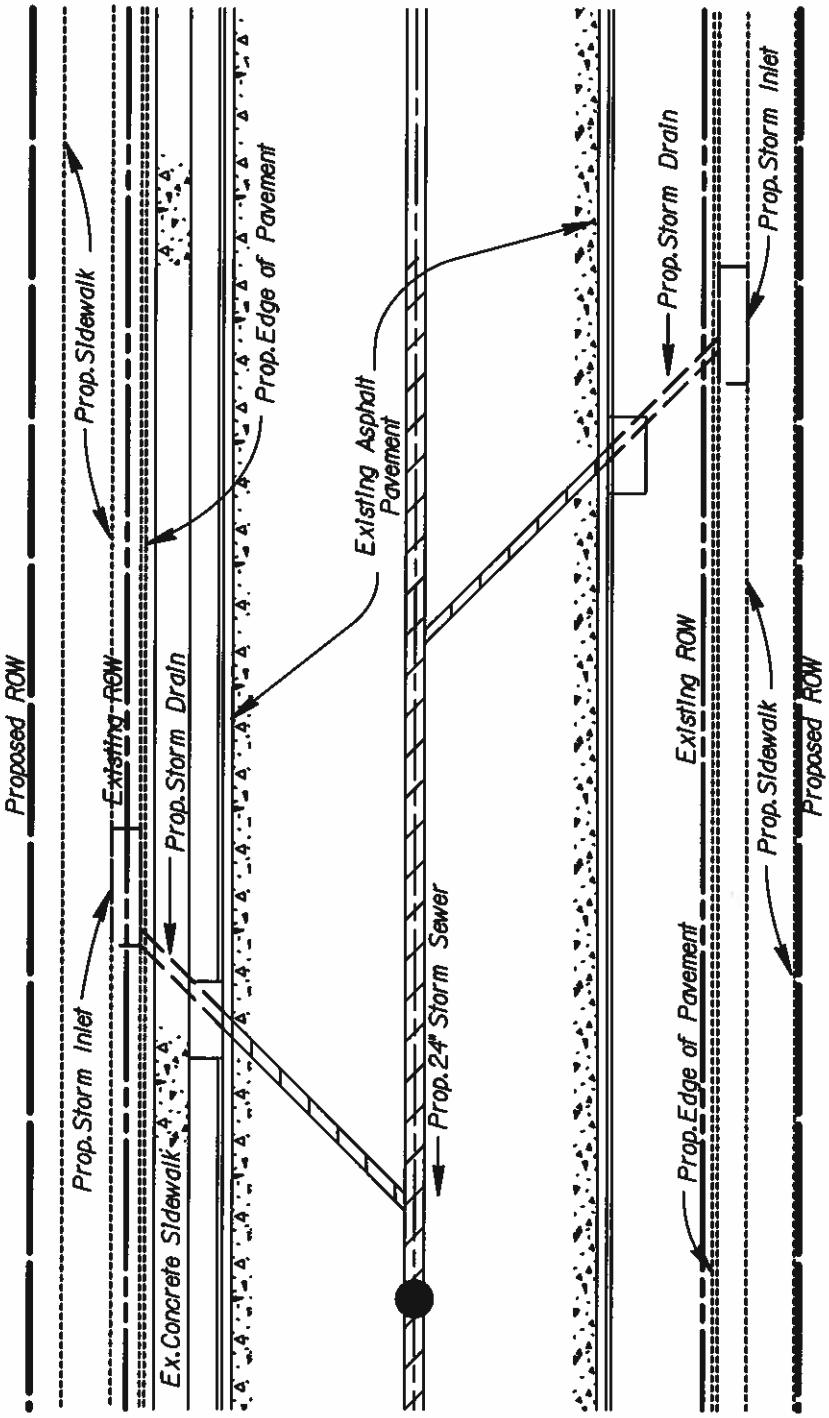
Dallas Water Utilities

EXAMPLE PLAN VIEW: WASTEWATER MAIN WITHIN CREEK/EASEMENT

Exhibit K.4



Dallas Water Utilities	EXAMPLE PROFILE VIEW: WASTEWATER MAIN WITHIN CREEK/EASEMENT	Exhibit K.5



Dallas Water Utilities	EXAMPLE PLAN VIEW: EXISTING & PROPOSED PAVEMENT & STORM DRAINAGE	Exhibit K.6

TYPICAL POSTING OF PERMANENT EASEMENT WITH TEMPORARY WORKING SPACE EASEMENT

Information Obtained from Easement Instrument

Granter of Easement & Date of Instrument ---
Size, Type & Location ----------
---
* Special Conditions (When Aquired) ----------
** Council Order ----------
** County Records: Vol., Pg. Date Recorded -----

Example of Posting Permanent Easement

John Smith & Betty Smith 1/12/96
10' Center Line Wastwater Easement From
Sta.1+75 to Sta.3+75 In Blk.6876 Lots 5 & 6
"SPECIAL CONDITIONS"
C.O.971271
Vol.76503 Pg.4352 Date: 4/30/96

Information Obtained from Easement Instrument

Size, Type & Location ----------

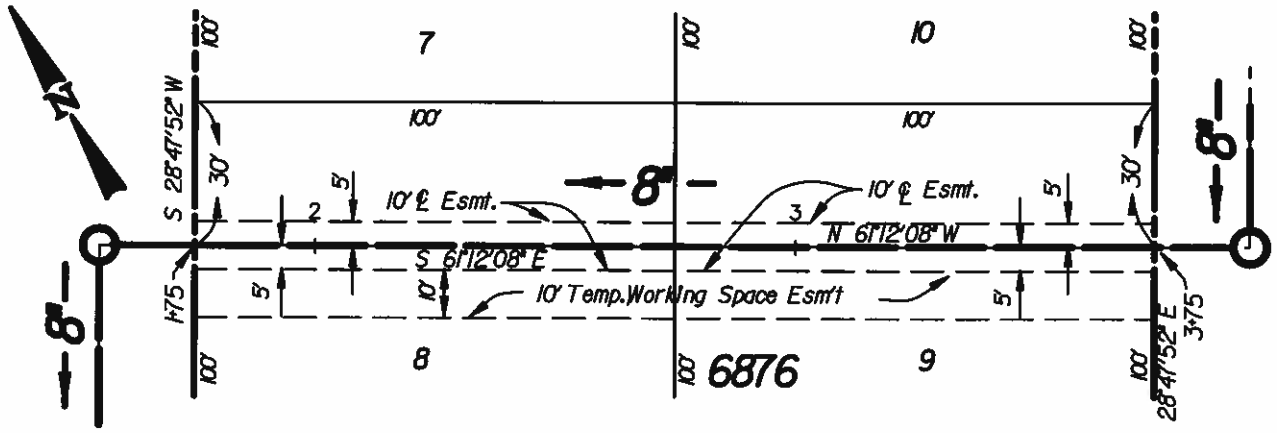
** Council Order ----------
** County Records: Vol., Pg. Date Recorded -----

Example of Posting Temporary Working Space Easement

10' Wide Temporary Working Space Easement
Adjacent to Permenant Easement
C.O.971271
Vol.76503 Pg.4352 Date: 4/30/96

* Special conditions typically refer to agreements that have been negotiated between the property owner and the city for the granting of an easement. Typically, "special conditions" are incorporated in "Exhibit B" easement documents and should also be incorporated in the special provisions of the bid specifications.

** Council Order & County Records data to be posted when easement has been recorded and returned to property management.



John Smith & Betty Smith 1/12/86
10' Center Line Wastwater Easement From
Sta.1+75 to Sta.3+75 In Blk.6876 Lots 5 & 6
"SPECIAL CONDITIONS"
C.O.871271
Vol.76503 Pg.4352 Date: 4/30/86

10' Wide Temporary Working Space Easement
Adjacent to Permenant Easement
C.O.971271
Vol.76723 Pg.2635 Date: 5/07/96

Dallas Water Utilities	EXAMPLE POSTING I: POSTING EASEMENTS ON DRAWINGS	Exhibit K.7

Information Provided by Easement Instrument	Example of Posting on Design Plans

IRREGULAR SHAPED EASEMENT

Granter of Easement & Date of Instrument ---	*Steve Wilson 10/12/95*
Size, Type & Location	*Irregular Shaped Water Easement : 15' X*
(If easement description is lenghtly,	*198.05' X 71.44' X 56.84' X 113' X 25.75' ;*
do not list by bearing or distance)	*In Blk. 6845 Lot 3*
Council Order ----------	*C.O.*
County Records: Vol., Pg. Date Recorded ------	*Vol. Pg. Date:*

UTILITY COMPANY EASEMENT

Granter of Easement & Date of Instrument ---	*T.U. Electric 7/25/97*
Size, Type & Location ----------	*30' Easement for 16" Water Main Crossing*
	The 100' T.U. R.O.W. At Matilda St. &
	Birch Dr. Blk 5608
Special Conditions ----------	*No Dragline or Boom Type Equipment*
(Needs Special Notation On Plans)	*Shall Be Used In This Easement*
Special Conditions ----------	*"SPECIAL CONDITIONS"*
Council Order ----------	*C.O.*
County Records: Vol., Pg. Date Recorded ------	*Vol. Pg. Date:*

EASEMENT BY CONDEMNATION

Subjects / Parties Involved ----------	*Mable Lee Norman*
Size, Type & Location ----------	*15 Wastewater Easement From Sta*
	59+00 to Sta 60+87 , Blk.7498 Lot 1
	EASEMENT AQUIRED BY CONDEMNATION
Cause Number ----------	*Cause No. cc-95-682-b*
Council Order ----------	*C.O.*
County Records: Vol., Pg. Date Recorded ------	*Vol. Pg. Date:*

EASEMENT RELEASE OR ABANDONMENT

Process & Date ----------	*ABANDON EASEMENT 4/30/98*
Size, Type & Location ----------	*10' Water Easement from Sta. 0+65 to*
	Sta 1+96 , Blk 8563 Lot17
County record of Original Easement ----------	*Vol 4572 Pg. 385*
Council Order ----------	*C.O.*
County Records: Vol., Pg. Date Recorded ------	*Vol. Pg. Date:*

Dallas Water Utilities	EXAMPLE POSTING 2: VARIOUS TYPES OF EASEMENTS	Exhibit K.8

The following are typical illustrations showing the posting of approvals, agreements, and wastewater backflow release notes.

TEXAS DEPARTMENT OF TRANSPORTATION APPROVAL

TxDOT APPROVAL 10/12/95
Approval for a 12" wastewater main along north side of N.W. Highway (Loop 12) from 345 ft. east of Durham St. extending easterly a distance of 685 ft.
PERMIT NO.199510750

PARK DEPARTMENT APPROVAL

PARK DEPARTMENT APPROVAL 8/22/97
Approval for construction of a 15" wasetwater main from Sta 0+00 to Sta 19+54 through a portion of White Rock Creek Parkway. For special conditions see memo dated November 15, 1996 , subject: White Rock Creek Parkway.

R. R. LICENSE AGREEMENT

R.R. LICENSE AGREEMENT 12/25/96
Agreement obtained from A.T.&S.F. Railroad for the construction of a 20" water main crossing at Beaumont St. from water Sta 0+75 to 2+37 @ R.R. mile marker 357+25
C.O.

NORTH TEXAS TOLLWAY AUTHORITY (NTTA) AGREEMENT

TEXAS TURNPIKE AUTHORITY AGREEMENT 4/30/96
Approval obtained for construction of 24" wastewater main crossing turnpike R.O.W. from west R.O.W. of Loop 12 for 245 ft. to Texas & Pacific R.R. R.O.W. As per special specifications in letter of agreement.

WASTEWATER BACKFLOW RELEASE

WASTEWATER BACKFLOW RELEASE 6/17/96
Jack Raymond Jones to City of Dallas, Block 2/6573 , Lot 5
Street address 4574 Winford St.
C.O. 964647
Vol. 73985 Pg. 362 Date: 8/24/96

Dallas Water Utilities	EXAMPLE POSTING 3: APPROVALS. AGREEMENTS & RELEASES	Exhibit K.9

APPENDICES

APPENDIX A.1 SURVEY CHECKLIST

GENERAL

- ☐ Survey Under Direct Supervision of Texas Registered Land Surveyor (RPLS)
- ☐ Utilize Texas State Plane Coordinate System, North Central Zone, North American Datum of 1983

SURVEY CONTROL/ R.O.W. / PROPERTY

- ☐ Locate and Establish Survey Control from City of Dallas Benchmark (BM)
- ☐ Establish Control Points (CP) within 200 ft. at the Beginning and End of the Project and at Intervals not to Exceed 500 ft. throughout the Project as Necessary
- ☐ Establish Survey Control Points with Markers of a Permanent Nature including Iron Rod, Spike, Highway Monuments or Other Lasting Identification
- ☐ Locate and Tie All Existing Right-of-Ways, Property Lines, Easements Including Size, Bearing, Volume and Page Number as Necessary
- ☐ Show Centerlines and Angles of Intersection of Side Street with Main Street Centerline, with Street Name(s), as Necessary
- ☐ Lot, Block, Abstract Number and Dimension
- ☐ Corporation Lines with Involved Cities Listed

TOPOGRAPHIC FEATURES

- ☐ Pavement Limits and Type (Streets, Sidewalks, Alley or Driveways)
- ☐ Existing or Abandoned Railway Tracks with Company Names
- ☐ Power and Utility Poles (with Anchors)
- ☐ Trees, Shrubs, and Landscaping
- ☐ Mail Boxes, Road Signs, Signal Posts
- ☐ Structures and Buildings with Addresses
- ☐ Fences and Retaining Walls
- ☐ Bridges, Culverts, and Drainage Channels
- ☐ Levees, Flood Plains and Creeks (with High and Low Banks)

UTILITIES

- ☐ Locate and Confirm All Existing Utilities and Appurtenances as Possible:

  - ☐ Water Mains (Size, Material, Appurtenances- Manhole, Meter, Fire Hydrant, Valve with Operating Nut Elevation, etc.)
  - ☐ Wastewater Mains (Size, Material, Flow Direction, Appurtenances- Wastewater Access Device, Cleanout, Manhole with Rim and Pipe Invert Elevations etc.)
  - ☐ Stormdrains (Size, Flow Direction, Appurtenances- Inlet, Manhole, Junction Box etc.)
  - ☐ Gas Mains (Size, Material, Appurtenances- Meter, Manhole etc.)
  - ☐ Underground Telephone (Size, Material, Appurtenances- Manhole etc.)
  - ☐ Underground Electric (Size, Material, Appurtenances- Manhole etc)
  - ☐ Underground Cable (Size, Material, Appurtenances- Manhole etc.)
  - ☐ Underground Fiber Optic (Size, Appurtenances- Manhole etc.)

APPENDIX A.2: BASEMAP CHECKLIST

GENERAL

- ☐ North Arrow

R.O.W. / PROPERTY

- ☐ Iron Pins, Rods, Spikes and Highway Monuments
- ☐ Existing and Proposed Right-of-Way Limits and Width of Street, Alley, Highway and Railroad
- ☐ Existing Easements with Size, Bearings, Volume and Page Number
- ☐ Street Names and Railroad Owners
- ☐ Lot, Block, Abstract Number and Dimension
- ☐ Corporation Lines with Involved Cities Listed

TOPOGRAPHIC FEATURES

- ☐ Limit and Type of Existing and Proposed Pavement of Streets, Sidewalks, Alleys, and Driveways
- ☐ Existing or Abandoned Railway Tracks with Company Names
- ☐ Power and Utility Poles (and Anchors)
- ☐ Trees, Shrubs, and Landscaping
- ☐ Mail Boxes, Road Signs and Signal Posts
- ☐ Existing and Proposed Buildings and Structures with Address
- ☐ Fences and Retaining Walls
- ☐ Ex. and Prop. Bridges, Culverts, and Drainage Channels
- ☐ Levees, Flood Plains, Creeks (with High and Low Banks)

UTILITIES

- ☐ Existing Water Mains (Size, Material, Appurtenances- Manhole, Meter, Fire Hydrant, Valve, Existing 685W/411Q/FB and C.B Numbers)
- ☐ Existing Wastewater Mains (Size, Material, Flow Direction, Appurtenances- Wastewater Access Device, Cleanout, Manhole with Pipe Invert Elevations, Existing 685W/411Q/FB/CB Numbers)
- ☐ Existing and Proposed Storm drains (Size, Material, Appurtenances and Flow Direction)
- ☐ Existing and Proposed Gas Mains (Size, Material and Appurtenances)
- ☐ Existing and Proposed Underground Telephone (Size, Material and Appurtenances)
- ☐ Existing and Proposed Underground Electric (Size, Material and Appurtenances)
- ☐ Existing and Proposed Underground Cable (Size, Material and Appurtenances)
- ☐ Existing and Proposed Underground Fiber Optic (Size, Material and Appurtenances)

APPENDIX A.3: DESIGN PLAN CHECKLIST

GENERAL

- ☐ North Arrow and Horizontal/Vertical Bar Scale(s)
- ☐ Location Map with North Arrow, Mapsco and PID Numbers
- ☐ Caution Notes, Reference Old As-Built Maps-Water, Wastewater and Bud Holcomb
- ☐ General Notes, Unless Covered by Project General Notes
- ☐ Two Benchmarks Per Design Sheet (At Least One Must Be DWU Benchmark)
- ☐ Engineer's Seal, Signature, and TBPE Firm Registration Number, If Applicable
- ☐ Title Block Consisting of Project Location/Limits, File and Sheet Number
- ☐ DWU and Joint Contract Number as Applicable
- ☐ Highway / Railroad/Other Agencies Approval or Reference Number(s)

R.O.W. / PROPERTY, TOPOGRAPHIC FEATURES, UTILITIES

- ☐ All Items As Listed Under Base Map Checklist

PROPOSED WATER MAINS

Plan View:

- ☐ "Install" Notes for All Proposed Water Appurtenances (Valves, Fire Hydrants, Tees, Reducers, Horizontal and Vertical Bends, etc)
- ☐ Station, PI's, and Curve Data as Necessary
- ☐ Northing and Easting at Beginning, Ending and PI Stations
- ☐ "Cut and Plug" Note
- ☐ Title Note ("INSTALL … LF.." including "Kill Ex…., Year Built)

Profile View:

- ☐ Existing and Proposed Ground Line
- ☐ Pertinent Design Notes for Prop. Appurtenances
- ☐ Proposed Slope, Grade Breaks Points and Vertical Curves
- ☐ Cross Utilities and Parallel Utilities (If Within 10 ft)
- ☐ By Other Than Open Cut (Limits, Encasements, Special Conditions, etc)
- ☐ Special Backfill (Limits, Material)
- ☐ Note Showing Prop. Pipe Description- Linear Feet, Size, Material, Class and Embedment

PROPOSED WASTEWATER MAINS

Plan View:

- ☐ "Construct" Notes for All Proposed Wastewater Appurtenances (Manholes, Wastewater Access Device, Cleanout etc.)
- ☐ Station, PI's, and Curve Data as Necessary
- ☐ Northing and Easting at Beginning, Ending, PI and Manhole Stations
- ☐ "Connect To Manhole", "Remove Manhole" or "Abandon Manhole" Notes
- ☐ Existing and Proposed Pipe Size with Flow Direction
- ☐ Title Note ("CONSTRUCT … LF…" including Abandoned EX .." and Year Built)

Profile View:

- ☐ Existing and Proposed Ground Line
- ☐ Pertinent Design Notes for Proposed Appurtenances
- ☐ Existing and Proposed Slope and Pipe Size
- ☐ Cross and Parallel (Within 10') Utilities
- ☐ By Other Than Open Cut (Limits, Encasements, Special Conditions, etc)
- ☐ Special Backfill (Limits, Material)
- ☐ Note Showing Proposed Pipe Description- Linear Feet, Size, Material, Class and Embedment

APPENDIX A.4: AS-BUILT DRAWING CHECKLIST

GENERAL

☐ Marked with Red Pen on Full-Size Sealed Design Plans

PROPOSED WATER BUILT PER PLAN

☐ "Built Per Plans" Note Next to Proposed Water Title Note ☐ **YES** ☐ **NO**

☐ Valve Manufacturer's Name As Applicable
☐ Tie Details indicating Distances Between Valves, Fittings, and Fire Hydrants

PROPOSED WASTEWATER BUILT PER PLAN

☐ "Built Per Plans" Note Next to Proposed Title Note ☐ **YES** ☐ **NO**

☐ Verify Type of Rehabilitation if Not Specified on Design
☐ Note Manhole Coating or Con-Shield

PROPOSED WATER BUILT WITH FIELD CHANGES

Plan View: ☐ **YES** ☐ **NO**

☐ Strikeout Items Not Installed and Specify As "Deleted"
☐ Strikeout Items Modified and Specify the Change with Details As Necessary
☐ Valve Manufacturer's Name As Applicable
☐ Ties Shown Indicating Distances Between Fittings, Valves and Fire Hydrants
☐ Alignment Changes with Ties Referencing to Original Alignment or Existing Back of Curb
☐ Addition/Change/Verify Size and Material of Pipe and Appurtenances As Necessary
☐ Change/Verify Installation or Rehabilitation Methods (Ex. Open Cut to Trenchless)
☐ Addition/Deletion/Change/Verify Station, Size and Type of Large Service (Greater than 2")

Profile View:

☐ Changes in Slope with Flowline Elevations at Grade Break Stations
☐ Changes in Embedment
☐ Addition/Change/Verify Encasement Pipe with Type and Size
☐ Addition/Change/Verify Special Backfill with Limits and Material Used (Ex. Flowable)

PROPOSED WASTEWATER WITH FIELD CHANGES

Plan View: ☐ **YES** ☐ **NO**

☐ Strikeout Items not Installed and Specify As "Deleted"
☐ Strikeout Items Modified and Specify the Change with Details As Necessary
☐ Alignment Changes with Ties Referencing to Original Alignment or Existing Back of Curb
☐ Addition/Change/Verify Size and Material of Pipe and Appurtenances
☐ Change/Verify Installation/Rehabilitation Methods (Ex. Open Cut to Trenchless)
☐ Addition/Deletion/Change in Station of Manhole, Wastewater Access Device, Cleanouts
☐ Note Manhole Coating or Con-Shield

Profile View:

☐ Changes in Slope with Flowline Elevations at Manhole
☐ Changes in Embedment
☐ Addition/Change/Verify Encasement Pipe with Type and Size
☐ Addition/Change/Verify Special Backfill with Limits and Material Used (Ex. Flowable Fill)

APPENDIX A.5: RECORD DRAWING CHECKLIST

GENERAL

- ☐ To be Drafted on Final Design Plans on Mylar
- ☐ Disclaimer Consisting of Name of Contractor, Inspector and Person Preparing Record Drawing
- ☐ Laying Plan Reference at Pipe Alignment on Plan View if Available

PROPOSED WATER BUILT PER PLAN

- ☐ Check Mark "Built Per Plans" Note in Disclaimer
- ☐ Valve Manufacturer's Name Next To Valve Callout
- ☐ Tie Details As Per As-Built Dimensions and Notes

PROPOSED WASTEWATER BUILT PER PLAN

- ☐ Check Mark "Built Per Plans" Note in Disclaimer
- ☐ Type of Rehabilitation as verified by As-Built

PROPOSED WATER BUILT WITH FIELD CHANGES

Plan View:

- ☐ Check Mark "Built Per Field Modifications" in Disclaimer
- ☐ Delete Items Not Installed
- ☐ Update Items Modified with Details and Callouts
- ☐ Valve Manufacturer's Name Next To Valve Callout
- ☐ Tie Details As Per As-Built Dimensions and Notes
- ☐ Alignment Change with Dimensions, Stations, P.I. and Station Equation As Necessary:
  - ☐ Alignment Offset 2 ft. or Greater
  - ☐ Length Extended/ Shortened 5 ft or Greater
- ☐ Update Size and Material of Pipe and Appurtenances
- ☐ Update Installation or Rehabilitation Methods as Verified
- ☐ Update Station, Size and Type of Large Service (2" or Greater)

Profile View:

- ☐ Update Changes in Slope with Flowlines at Grade Break Stations
- ☐ Changes in Embedment
- ☐ Addition or Change in Encasement Pipe with Type and Size
- ☐ Addition or Change in Special Backfill with Limits and Material Used
- ☐ Update Type of Installation or Rehabilitation Method As Verified

PROPOSED WASTEWATER BUILT WITH FIELD CHANGES

Plan View:

- ☐ Check Mark "Built Per Field Modifications" in Disclaimer
- ☐ Delete Items Not Installed As Verified
- ☐ Update Items Modified with Details and Callouts
- ☐ Alignment Change with Dimensions, Stations, P.I. and Station Equation As Verified
  - ☐ Alignment Offset 2 ft. or Greater
  - ☐ Length Extended/ Shortened 5 ft or Greater
- ☐ Update Size and Material of Pipe and Appurtenances
- ☐ Update Installation or Rehabilitation Methods including Type Used
- ☐ Update Addition/Deletion/Change in Station of Manhole, Wastewater Access Device, Cleanouts

Profile View:

- ☐ Update Changes in Slope with Flowline Elevations at Manhole
- ☐ Changes in Embedment
- ☐ Change in Size and Material of Pipe and Appurtenances
- ☐ Addition or Changes in Encasement Pipe with Type and Size
- ☐ Addition or Change in Special Backfill with Limits and Material Used
- ☐ Update Type of Installation/Rehabilitation Method as Verified

APPENDIX B.1: PREDEFINED LEVELS FOR GENERAL DESIGN (G)

(ALLOCATED LEVELS: 1- 99)

Level Name	Level Number	Level Description	Color	Style	Weight
Default	0		0	0	0
G_BORDER	1	Sheet Border & Title Block	19	0	0
G_GRID_MAJOR	2	Major Grid with Elevation	0	0	0
G_GRID_MINOR	3	Minor Grid	200	1	0
G_BAR SCALE	4	Bar Scale	0	0	0
G_SIGNATURE BLOCK	5	P.E. Seal & Disclaimers (Draft & Record Drawing)	0	0	1
G_LOGO	6	City of Dallas, DWU & Consultant Logo	0	0	2
G_MAP	7	Locator Map & North Arrow	1	0	0
G_CAUTION NOTE	8	Caution Notes	69	0	0
G_GENERAL NOTE	9	General Notes & Legends	0	0	0
G_MISC TEXT	10	Texts for Cover Sheet, Title Block, Benchmarks, Revisions, Etc	0	0	0
G_ARROWHEAD	11	Leader Arrowhead	0	0	0
G_MATCH MARK	12	Match Mark with Text	24	6	3
G_REF_WINDOW	13	Reference Window for Design	13	2	2
G_REF_RASTER1	14	Reference Window for Raster	0	0	0
G_REF_RASTER2	15	Reference Window for Raster	0	0	0
G_SHEET_EDGE	16	Design Sheet Limit for Plotting	26	0	0

APPENDIX B.100: PREDEFINED LEVELS FOR CIVIL- WATER (C_WATER)

(ALLOCATED LEVELS: 100- 199)

Level Name	Level Number	Level Description	Color	Style	Weight
C_WATER_PLAN_MAIN_2	100	Plan Water Main 2 inch & Smaller	7	0	3
C_WATER_PLAN_MAIN_4	101	Plan Water Main 4 inch	7	2	4
C_WATER_PLAN_MAIN_6	102	Plan View Water Main 6 inch	7	3	4
C_WATER_PLAN_MAIN_8 TO 27	103	Plan Water Main 8 to 27 inch	7	0	4
C_WATER_PLAN_MAIN_30+	104	Plan Water Main 30+ inch	7	0	2
C_WATER_PLAN_CL	105	Plan Water Main Centerline	7	4	0
C_WATER_PLAN_FUTURE	106	Plan Water Future Main	7	5	0
C_WATER_PLAN_SERVICE	107	Plan Water Service	7	5	2
C_WATER_PLAN_APRT	108	Plan Water Appurtenances	7	0	3
C_WATER_PLAN_STATION	109	Plan Water Stationing	67	0	1
C_WATER_PLAN_LABEL	110	Plan Water Main Line Label	7	0	3
C_WATER_PLAN_CALLOUT	111	Plan Water Callout Text & Cloud	7	0	0
C_WATER_PLAN_TITLE_INSTALL	112	Plan Water Install Title Box & Text	7	0	3
C_WATER_PLAN_TITLE_KILL	113	Plan Water Kill Title Box & Text	7	0	2
C_WATER_PLAN_DIM	114	Plan Water Dimensions	0	0	0
C_WATER_PLAN_ENC	115	Plan Water Encasement	51	0	1
C_WATER_PLAN_CURVE	116	Plan Water Curve Data	7	0	1
C_WATER_PLAN_OTSH_MAIN	117	Plan Water Main Other Sheet	7	1	1
C_WATER_PROF_ALGN	118	Profile Water Alignment	7	0	2
C_WATER_PROF_APRT	119	Profile Water Appurtenances	7	0	2
C_WATER_PROF_STATION	120	Profile Water Stationing	67	0	1
C_WATER_PROF_CALLOUT	121	Profile Water Vertical Callouts	7	0	0
C_WATER_PROF_GRADE	122	Profile Water Grade Text	7	0	2
C_WATER_PROF_EMB	123	Profile Water Pipe & Embedment Note	7	0	3
C_WATER_PROF_ENC	124	Profile Water Encasement	51	0	1
C_WATER_PROF_OTSH_MAIN	125	Profile Water Main Profile Other Sheet	7	1	1
C_WATER_PROF_GROUND	126	Profile Water Groundline	64	0	2

APPENDIX B.200: PREDEFINED LEVELS FOR CIVIL- WASTEWATER (C_WASTEWATER)

(ALLOCATED LEVELS: 200- 299)

Level Name	Level Number	Level Description	Color	Style	Weight
C_WW_PLAN_MAIN_6 TO 27	200	Plan W.W. 6 to 27 inch Main	11	2	4
C_WW_PLAN_MAIN_30+	201	Plan W.W. 30+ inch Main	11	0	2
C_WW_PLAN_CL	202	Plan W.W. Main Centerline	11	4	0
C_WW_PLAN_FUTURE	203	Plan W.W. Future Main	11	5	0
C_WW_PLAN_LATERAL	204	Plan W.W. Lateral	11	5	2
C_WW_PLAN_APRT	205	Plan W.W. Appurtenances	11	0	3
C_WW_PLAN_STATION	206	Plan W.W. Stationing	67	0	1
C_WW_PLAN_LABEL	207	Plan W.W. Main Line Label	11	0	3
C_WW_PLAN_TITLE_CONST	208	Plan W.W. Construct Title Box & Text	11	0	3
C_WW_PLAN_TITLE_ABDN	209	Plan W.W. Abandon Title Box & Text	11	0	2
C_WW_PLAN_CALLOUT	210	Plan W.W. Callout Text & Box	11	0	0
C_WW_PLAN_DIM	211	Plan W.W. Dimension	11	0	1
C_WW_PLAN_ENC	212	Plan W.W. Encasement	51	0	0
C_WW_PLAN_CURVE	213	Plan W.W. Curve Data	11	0	1
C_WW_PLAN_OTSH_MAIN	214	Plan W.W. Main Other Sheet	11	1	1
C_WW_PROF_ALGN	215	Profile W.W. Alignment	11	0	2
C_WW_PROF_APRT	216	Profile W.W. Appurtenances	11	0	2
C_WW_PROF_STATION	217	Profile W.W. Stationing	67	0	1
C_WW_PROF_CALLOUT	218	Profile W.W. Vertical Callouts	11	0	0
C_WW_PROF_GRADE	219	Profile W.W. Grade Text	11	0	2
C_WW_PROF_EMB	220	Profile W.W. Pipe & Embedment Note	11	0	2
C_WW_PROF_ENC	221	Profile W.W. Encasement	51	0	1
C_WW_PROF_OTSH_MAIN	222	Profile W.W. Main Other Sheet	11	1	1
C_WW_PROF_GROUND	223	Profile W.W. Groundline	64	0	2

APPENDIX B.300: PREDEFINED LEVELS FOR CIVIL- TRAFFIC (C_TRAFFIC)

(ALLOCATED LEVELS: 300- 349)

Level Name	Level Number	Level Description	Color	Style	Weight
C_TRAFFIC	300	Traffic Plan	0	0	0

APPENDIX B.350: PREDEFINED LEVELS FOR CIVIL- PVMT (C_PAVING)

(ALLOCATED LEVELS: 350- 399)

Name	Number	Description	Color	Style	Weight
C_PVMT	350	Paving (Relo)	4	1	1
C_PVMT_SDSH	351	Profile Side Shots (Relo)	64	6	0

APPENDIX B.400: PREDEFINED LEVELS FOR CIVIL- WATER (C_STORM)

(ALLOCATED LEVELS: 400-449)

Name	Number	Description	Color	Style	Weight
C_STORM	400	Storm Drainage (Relo)	68	5	1

APPENDIX B.450: PREDEFINED LEVELS FOR CIVIL- MISC (C_MISC)

(ALLOCATED LEVELS: 450-499)

Name	Number	Description	Color	Style	Weight
C_UG STRUCTURE	450	Prop. Underground Structure	0	5	1
C_MISC_CONTOUR	451	Prop. Final Grade	0	0	1
C_MISC_GROUND	452	Proposed Groundline	64	5	3
C_MISC_BLDG	453	Prop. Building	7	5	3
C_MISC_NGAS	454	Prop. Natural Gas Line & Appurtenances	20	5	1
C_MISC_TELE	455	Prop. Telephone Line & Appurtenances	62	5	1
C_MISC_ELEC	456	Prop. Electric Line & Appurtenances	27	5	1
C_MISC_CATV	457	Prop. Cable TV Line & Appurtenances	30	5	1
C_MISC_FBOP	458	Prop. Fiber Optic Line & Appurtenances	46	5	1

APPENDIX B.1000: PREDEFINED LEVELS FOR SURVEY- GENERAL (C_GENERAL)

(ALLOCATED LEVELS: 1000-1999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_GENERAL_ELEV	1000	Point Elevation	76	0	1
V_GENERAL_DESC	1001	Point Description	0	0	1
V_GENERAL_PTNUM	1002	Point Number	40	0	1
V_GENERAL_TKMK	1003	Point Tick Mark	38	0	1
V_GENERAL_BM	1004	Benchmarks	0	0	0
V_GENERAL_CP	1005	Control Points	0	0	0
V_GENERAL_SURVEY LINE	1006	Survey Line	3	0	0

APPENDIX B.2000: PREDEFINED LEVELS FOR SURVEY- PROPERTY (C_PROPERTY)

(ALLOCATED LEVELS: 2000-2999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_PROPERTY_ROW_LINE_EX	2000	ROW Line (Existing)	2	6	2
V_PROPERTY_ROW_LINE_PROP	2001	ROW Line (Proposed)	2	3	3
V_PROPERTY_ROW_CL	2002	ROW Centerline	4	7	0
V_PROPERTY_ROW_NAME	2003	ROW Name (Road, Creek, & Railroad)	0	0	4
V_PROPERTY_ROW_ALLEY	2004	Alley ROW	0	0	1
V_PROPERTY_BLOCK_LINE	2005	Block Line	0	0	2
V_PROPERTY_LOT_LINE	2006	Lot Line	0	0	0
V_PROPERTY_ESMT_EX	2007	Easement (Existing)	0	5	0
V_PROPERTY_ESMT_PROP	2008	Easement (Proposed)	0	5	1
V_PROPERTY_SUB_RPLT	2009	Subdivision Replat Perimeter Line	2	0	4
V_PROPERTY_ADDRESS	2010	Addresses	0	0	0
V_PROPERTY_BLOCK_NUM	2011	Block Numbers	0	0	2
V_PROPERTY_LOT_NUM	2012	Lot Numbers	0	0	1
V_PROPERTY_LOT_DIM	2013	Lot Dimensions	0	0	0
V_PROPERTY_CORP_LINE	2014	City Boundary Line	84	0	3
V_PROPERTY_IPF	2015	Iron Pin Found	0	0	0
V_PROPERTY_IPS	2016	Iron Pin Set	0	0	0

APPENDIX B.3000: PREDEFINED LEVELS FOR SURVEY- PAVEMENT (V_PVMT)

(ALLOCATED LEVELS: 3000-3999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_PVMT_EDGE	3000	Pavement Edge	4	0	0
V_PVMT_CL	3001	Pavement Centerline	4	0	0
V_PVMT_CURB	3002	Curb	4	0	0
V_PVMT_GUTTER	3003	Gutter	4	0	0
V_PVMT_BFR	3004	Barrier Free Ramp	4	0	0
V_PVMT_SWLK	3005	Sidewalk	0	0	0
V_PVMT_ASPHALT	3006	Asphalt Pavement	0	0	0
V_PVMT_BRICK	3007	Brick Pavement	216	0	0
V_PVMT_CONCRETE	3008	Concrete Pavement	0	0	0
V_PVMT_GRAVEL	3009	Gravel Pavement	0	0	0
V_PVMT_SAND	3010	Sand Cell	0	0	0
V_PVMT_MISC	3011	Pavement Misc	0	0	0

APPENDIX B.4000: PREDEFINED LEVELS FOR TOPOGRAPHY (V_TOPO)

(ALLOCATED LEVELS: 4000-4999)

Name	Number	Description	Color	Style	Weight
V_TOPO_RAIL_BALLAST	4000	Railroad Ballast	64	0	0
V_TOPO_RAIL_CL	4001	Railroad Centerline	0	{Rail Road}	0
V_TOPO_RAIL_XING	4002	Railroad Crossing Control	3	0	0
V_TOPO_RAIL_MISC	4003	Railroad Misc	0	0	0
V_TOPO_BLDG_COLUMN	4004	Building Column	5	0	0
V_TOPO_BLDG	4005	Building	5	0	0
V_TOPO_BLDG_MISC	4006	Building Misc	5	0	0
V_TOPO_BRDG_BASE	4007	Bridge Abutment Base	36	0	0
V_TOPO_BRDG_TOP	4008	Bridge Abutment Top	36	0	0
V_TOPO_BRDG_COLUMN	4009	Bridge Column	36	0	0
V_TOPO_BRDG_MISC	4010	Bridge Misc	36	0	0
V_TOPO_BILLBOARD	4011	Billboard Pole	104	0	0
V_TOPO_BOLLARD	4012	Bollard	35	0	0
V_TOPO_BKWL	4013	Brick Wall	70	0	0
V_TOPO_DITCH_FL	4014	Ditch Flowline	103	0	0
V_TOPO_FENCE_CHAIN	4015	Chainlink Fence	5	0	0
V_TOPO_FENCE_POST	4016	Fence Post	5	0	0
V_TOPO_FENCE_WI	4017	Wrought Iron Fence	83	0	0
V_TOPO_FENCE_WOOD	4018	Wood Fence	102	0	0
V_TOPO_FENCE_OTHER	4019	Fence Other	5	0	0
V_TOPO_MLBX	4020	Mail Box	37	0	0
V_TOPO_MTWL	4021	Monitoring Well	109	0	0
V_TOPO_PKMT	4022	Parking Meter	36	0	0
V_TOPO_PLTR	4023	Planter	82	0	0
V_TOPO_RPRP	4024	Rip Rap	0	0	0
V_TOPO_RTWL	4025	Retaining Wall	4	0	0
V_TOPO_BRSH_LINE	4026	Brush Line	82	{Tree Line}	0
V_TOPO_SIGN	4027	Sign	19	0	0
V_TOPO_SPOT	4028	Spot Elevation	0	0	0
V_TOPO_STLT	4029	Street Light	0	0	0
V_TOPO_SLOPE_TOE	4030	Slope Toe	0	0	0
V_TOPO_SLOPE_TOP	4031	Slope Top	0	0	0
V_TOPO_TREE_LINE	4032	Tree Line	82	{Tree Line}	0
V_TOPO_STREAM_LINE	4033	Stream Line	55	4	1
V_TOPO_WTRS_EDGE	4034	Waters Edge	55	0	0
V_TOPO_MISC	4035	Topo Misc	0	0	0
V_TOPO_TRFC_GDRL	4036	Traffic Guard Rail	3	0	0
V_TOPO_TRFC_PLBX	4037	Traffic Pull Box	78	0	0
V_TOPO_TRFC_SGBX	4038	Traffic Signal Box	78	0	0
V_TOPO_TRFC_SGPL	4039	Traffic Signal Pole	78	0	0
V_TOPO_TRFC_MISC	4040	Traffic Misc	78	0	0
V_TOPO_UG STRUCTURE	4041	Underground Structure	0	5	0
V_TOPO_TREE	4042	Tree	82	0	0

APPENDIX B.5000: PREDEFINED LEVELS FOR SURVEY- WATER (V_WATER)

(ALLOCATED LEVELS: 5000-5999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_WATER_MAIN_2	5000	Water 2 inch Main or Smaller	1	0	0
V_WATER_MAIN_4	5001	Water 4 inch Main	1	2	1
V_WATER_MAIN_6	5002	Water 6 inch Main	1	3	1
V_WATER_MAIN_8_TO_27	5003	Water 8 to 27 inch Main	1	0	1
V_WATER_MAIN_30+	5004	Water 30+ inch Main	1	0	0
V_WATER_CL	5005	Water Main Centerline	1	4	0
V_WATER_SERVICE	5006	Water Service	1	5	0
V_WATER_APRT_PLAN	5007	Water Appurtenances Plan	1	0	1
V_WATER_APRT_PROF	5008	Water Appurtenances Profile	1	0	0
V_WATER_MAIN_PROF	5009	Water Main Profile	1	0	0
V_WATER_AIR VALVE	5010	Water Air Release Valve	1	0	0
V_WATER_CATHODIC	5011	Water Cathodic Protection	1	0	0
V_WATER_FH	5012	Water Fire Hydrant	1	0	0
V_WATER_FRLN	5013	Water Fire Line Connection	1	3	1
V_WATER_IRCV	5014	Water Irrigation Control Valve	1	0	0
V_WATER_VALVE	5015	Water Valve	1	0	0
V_WATER_MH	5016	Water Manhole	1	0	0
V_WATER_METER	5017	Water Meter	1	0	0
V_WATER_VAULT	5018	Water Vault	1	0	0
V_WATER_FLUSH	5019	Water Flush Point	1	0	0
V_WATER_MISC	5020	Water Misc	1	0	0

APPENDIX B.6000: PREDEFINED LEVELS FOR SURVEY- WASTEWATER (V_WW)

(ALLOCATED LEVELS: 6000-6999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_WW_MAIN_6 to 27	6000	W.W. 6 to 27 inch Main	130	0	1
V_WW_MAIN_30+	6001	W.W. 30+ inch Main	130	0	1
V_WW_MAIN_CL	6002	W.W. Main Centerline	130	4	0
V_WW_LATERAL	6003	W.W. Lateral	130	0	0
V_WW_APRT_PLAN	6004	W.W. Appurtenances Plan	130	0	1
V_WW_APRT_PROF	6005	W.W. Appurtenances Profile	130	0	0
V_WW_MAIN_PROF	6006	W.W. Main Profile	130	0	0
V_WW_MH	6007	W.W. Manhole	130	0	0
V_WW_WWAD	6008	W.W. Access Device	130	0	0
V_WW_FLOWLINE	6009	W.W. Invert Flowline	130	0	0
V_WW_LTCO	6010	W.W. Lateral Cleanout	130	0	0
V_WW_MLCO	6011	W.W. Main Line Cleanout	130	0	0
V_WW_GTRAP	6012	W.W. Grease Trap	130	0	0
V_WW_LFST	6013	W.W. Lift Station	130	0	0
V_WW_MISC	6014	W.W. Misc	130	0	0

APPENDIX B.7000: PREDEFINED LEVELS FOR SURVEY- STORM (V_STORM) & SURVEY- UTILITY (V_UTIL) (ALLOCATED LEVELS: 7000-7999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_STORM_STMH	7000	Storm Manhole	68	0	0
V_STORM_INLET	7001	Storm Inlet	68	0	0
V_STORM_MAIN	7002	Storm Main	68	0	0
V_STORM_MAIN_CL	7003	Storm Main Centerline	68	4	0
V_STORM_FLOW LINE	7004	Storm Main Flowline	68	0	0
V_STORM_FLUME	7005	Flume	68	0	0
V_STORM_HDWL	7006	Headwall	68	0	0
V_STORM_WING_BOT	7007	Wing Wall Bottom	68	0	0
V_STORM_WING_TOP	7008	Wing Wall Top	68	0	0
V_STORM_MISC	7009	Storm Sewer Misc	68	0	0
V_UTIL_CATV_APRT	7100	Cable TV Appurtenances	30	0	0
V_UTIL_CATV_CONDUIT	7101	Cable TV Conduit	30	0	0
V_UTIL_ELEC_APRT	7200	Electric Appurtenances	27	0	0
V_UTIL_ELEC_OE	7201	Electric Overhead	27	0	0
V_UTIL_ELEC_CONDUIT	7202	Electric Conduit	27	0	0
V_UTIL_FBOP_APRT	7300	Fiber Optic Cable Appurtenances	46	0	0
V_UTIL_FBOP_CONDUIT	7301	Fiber Optic Cable Conduit	46	0	0
V_UTIL_NGAS_APRT	7400	Natural Gas Appurtenances	20	0	0
V_UTIL_NGAS_MAIN	7401	Natural Gas Main	20	0	0
V_UTIL_TELE_APRT	7500	Telephone Appurtenances	62	0	0
V_UTIL_TELE_CONDUIT	7501	Telephone Conduit	62	0	0

APPENDIX B.8000: PREDEFINED LEVELS FOR SURVEY- CAD

(ALLOCATED LEVELS: 8000-8999)

Level Name	Level Number	Level Description	Color	Style	Weight
V_BREAKLINE	8000	Breakline	0	0	0
V_DTM	8001	DTM	0	0	0
V_CAD_CONTOUR_MAJOR	8002	Contours Major	3	0	0
V_CAD_CONTOUR_MAJOR_ANNO	8003	Contours Major Annotation	3	0	0
V_CAD_CONTOUR_MINOR	8004	Contours Minor	0	0	0
V_CAD_CONTOUR_MINOR_ANNO	8005	Contours Minor Annotation	0	0	0