TEXAS TURNPIKE AUTHORITY

TOWN OF ADDISON

CONTRACT NO. DNT-49U

UTILITY ADJUSTMENTS AND RELOCATIONS

SECTION VI

DALLAS NORTH TOLLWAY

INDEX OF SHEETS

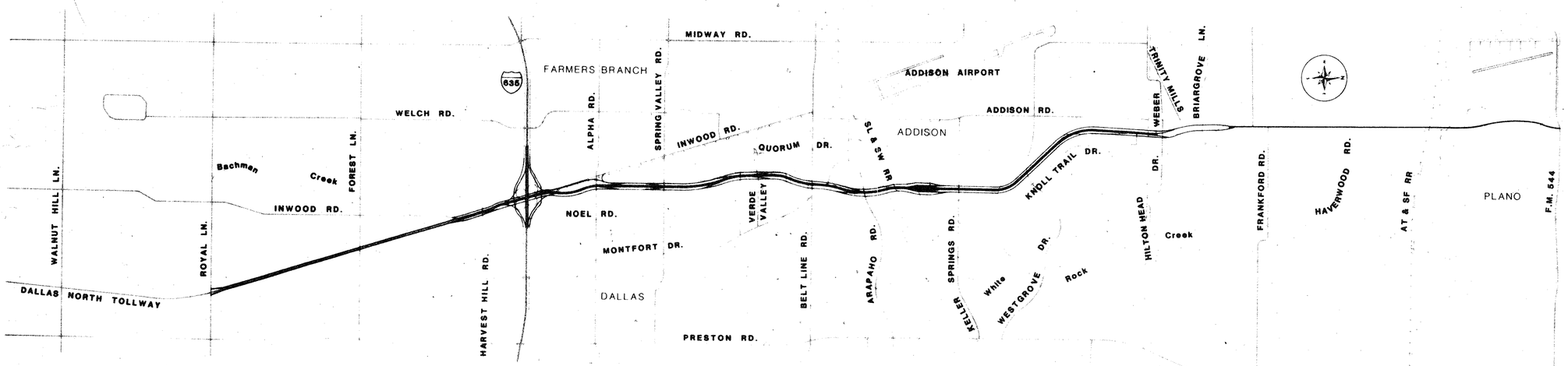
WATER & SANITARY SEWER RELOCATIONS

SHEET NO.	TITLE
1	Cover Sheet
2	Paving Sta 570+00 to Sta 585+00
3	Paving Sta 585+00 to Sta 599+00
4	Paving Sta 599+00 to Sta 613+00
5	Paving Sta 613+00 to Sta 627+00
6	Paving Sta 627+00 to Sta 640+00

APPURTENANCE SHEETS	TITLE
414 D-1 A	Sanitary Sewers
414 D-1	Sanitary Sewer Manholes
414 D-15	Thrust Blocks for Pipe Bends & Tees & Plugs
414 D-29	Advance of Paving - Water - & Sanitary Sewer Appurtenances
414 D-30	Water Service Installations and Methods for Setting Fire Hydrants

GENERAL NOTES

1. All fire hydrant installations shall be with 6" SDR-14-PVC Pipe and conform to 414 D-30, except as noted.
2. Contractor shall install sanitary sewer laterals as per 414 D-29 Laterals shall be the same material as the sewer main.
3. All sanitary sewer manholes to be abandoned shall conform to 414 D-29. The cover is to be disposed of as directed by the Texas Turnpike Authority.
4. Contractor shall install proposed manholes to conform to 414 D-29.
5. Contractor shall install proposed valve covers at existing grade or as directed by Town of Addison inspector.
6. Contractor shall be responsible for water meter relocations. Cost to be subsidiary to water services.



Scale: 1" = 2,000'

1

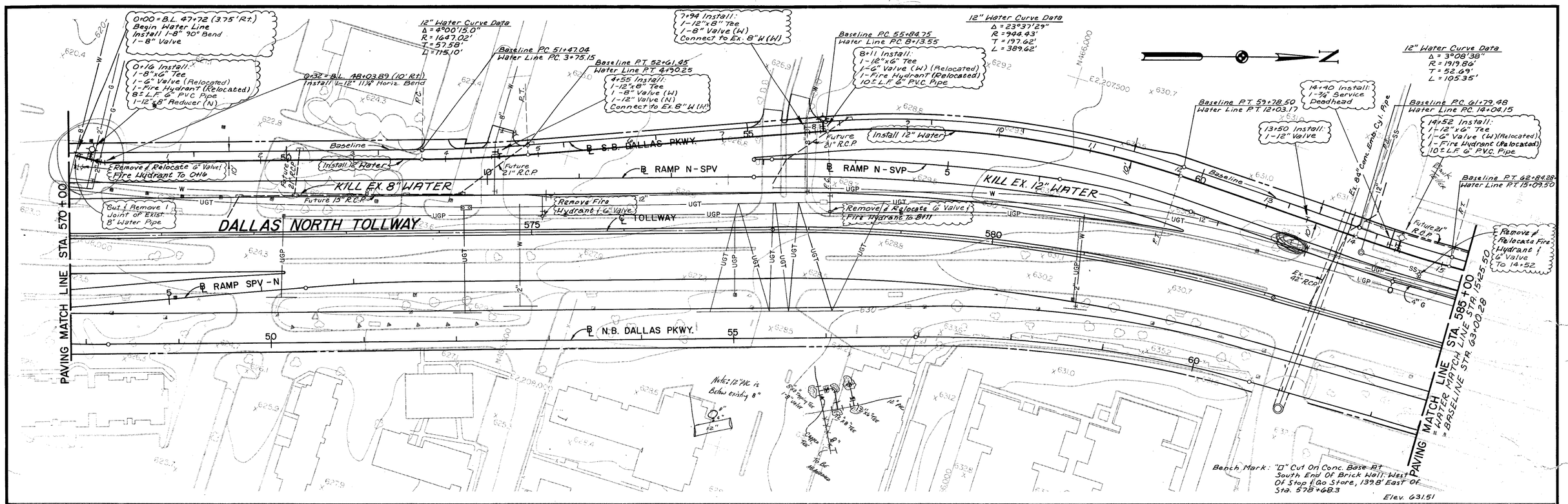
Approved By:
TOWN OF ADDISON
Mayor
Date: 3/28/84

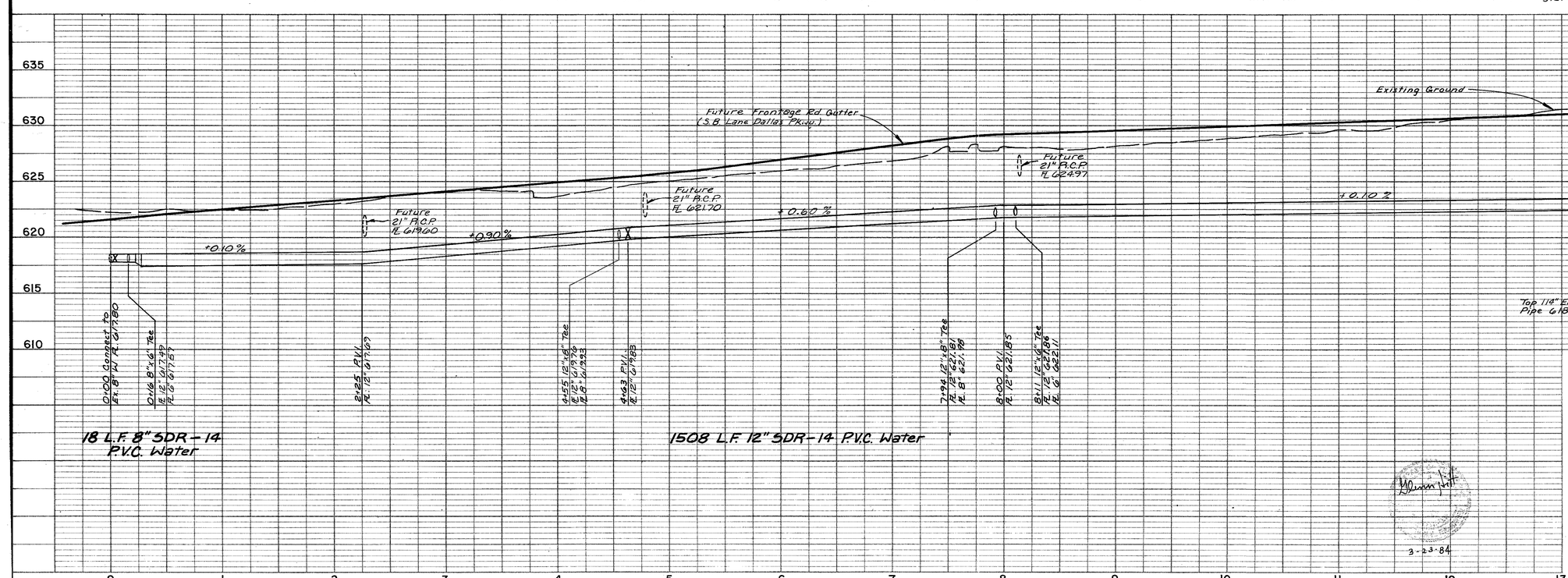
Prepared by:
TURNER, COLLIE & BRADEN, INC.
Glenn Hitt
Date: 3-23-84

Recommended by:
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Daniel L. Beshu
Engineer in Charge
Date: March, 29, 1984

Recommended by:
TEXAS TURNPIKE AUTHORITY
James W. Griffin
Director, Engineering & Maintenance
Date: March 31, 1984

Approved by:
TEXAS TURNPIKE AUTHORITY
Engineer Manager
Date: 4-4-84





NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

WATER & SANITARY SEWER RELOCATIONS
PAVING STA. 570+00 TO STA. 585+00
TOWN OF ADDISON, TEXAS

Turner Collie & Braden Inc.
Consulting Engineers

SECTION VI

DRAWN P.A.T.	DATE 8-83	DESIGNED W.S.	DATE 10-83
CHECKED W.S.	DATE 10-83	SCALE H: 1" = 50' / V: 1" = 5'	

3-23-84

CONTRACT NO. DNT-49U SHEET 2 OF 11

20+75=B.L. 68+49.78
Install 1-12" 45°
Horiz. Bend

20+37 Install
1-12"x6" Tee
1-6" Valve (Relocated)
1-F.H. (Relocated)
23± L.F. 6" PVC Pipe

21+17.4=B.L. 68+86.85 (27.1' Lt.)
Install 1-12" 45° Horiz. Bend

21+48=B.L. 69+10.38 (27.1 Lt.)
Install 1-12"x12" Tee
3-12" Valves
Connect To Ex. 12" W (W)
1-20' Joint Stubout (N)
1-12" Plug (N)

12" San. Sewer Curve Data
Δ = 18°02'59"
R = 974.93'
T = 154.85'
L = 307.18'

1+00
Constr. 4' Dia. Manhole
Over Ex. 12" San. Sewer
Abandon 12" San. Sewer (E)
Abandon Manhole

0+00=B.L. 75+70 (23' Rt.)
Constr. 4' Dia. Manhole
Over Ex. 12" San. Sewer
Abandon Ex. 12" San. Sewer (N)

B.L. 76+75 (26' Lt.)
Adjust Sanitary Sewer
Cleanout
Future Driveway
Top of Pavement
Elev. = 639.0

Install 12" San. Sew.

Baseline P.C. 76+41.87
San. Sewer P.C. 0+71.87 (23' Rt.)

Ex. 15" R.C.P.

Ex. 24" R.C.P.

Future 21" R.C.P.

Baseline

65 (Install 12" Water)

Future 21" R.C.P.

Ex. 24" R.C.P.

QUORUM DR.

Future 21" R.C.P.

Future 36" R.C.P.

℄ S.B. DALLAS PKWY.

Ex. 21" R.C.P.

Future 27" R.C.P.

KILL EX. 12" WATER

Remove & Relocate
Fire Hydrant &
6" Valve Tie 20+37

Future 48" R.C.P.

℄ TOLLWAY

DALLAS NORTH TOLLWAY

℄ RAMP BL-S

Future 54" Encasement Pipe By Others

℄ RAMP S-BL

℄ RAMP S-BL

℄ N.B. DALLAS PKWY.

VERDE VALLEY LN.

WATER MATCH LINE STA. 15+25.50
BASELINE STA. 63+00.28
PAVING MATCH LINE STA. 585+00

PAVING MATCH LINE STA. 599+00
SAN. SEWER MATCH LINE STA. 1+55.5
BASELINE STA. 77+27

Bench Mark: Top Of R.R. Spike In West Face Of Transformer Pole South Of The Parking Lot To Village On The Parkway, 132.4' East Sta. 595+89.0.
Elev. 636.59

Existing Ground @ ℄

Future S.B. Frontage Rd. Gutter (S.B. Lane Dallas Pkwy.)

℄ 24" R.C.P. 630.60

℄ Future 21" R.C.P. 628.60

+2.81%

+1.20%

+0.1%

652 L.F. 12" SDR-14 P.V.C. Water

16+100 P.V.C. 622.85

17+100 P.V.T. 623.50

100' V.C. m = .14

19+43.1 P.V.C. ℄ 12" W 622.73

100' V.C. m = 0.35

20+37 12"x6" Tee ℄ 12" W 622.04 ℄ 6" 622.29

20+43.1 P.V.T. ℄ 12" W 622.21

21+58 P.V.I. 12"x12" Tee Connect To Ex. 12" W ℄ 630.50

21+78 12" Plug

15+25.50 ℄ 12" W 623.96

Future S.B. Frontage Rd. Gutter (33' Rt.) (S.B. Lane Dallas Pkwy.)

Top Future Pavement 639.62

Top Future Pavement 638.68

Existing Ground @ ℄

Ex. 12" San. Sewer

Ex. 12" San. Sewer @ 0.25%

12" @ 0.25%

12" @ 0.37%

Future 54" Encasement Pipe By Others

Ex. 76+75 (26' Rt.) ℄ 12" W 628.06

0+00 Begin 12" San. Sew. Constr. 4' Dia. M.H. Over Ex. 12" San. Sew. ℄ 12" 628.25

1+00 Constr. 4' Dia. M.H. Over Ex. 12" San. Lateral (Rt. 42.94') ℄ 12" Invert 629.00

℄ 12" 629.21 SAN. SEW. MATCH LINE STA. 1+55

155 LF 12" SDR-35 P.V.C. SAN. SEWER

640 / 635 / 630 / 625 / 620

16 17 18 19 20 21 22 0 1 2 3

NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

WATER & SANITARY SEWER RELOCATIONS
PAVING STA. 585+00 TO STA. 599+00
TOWN OF ADDISON, TEXAS

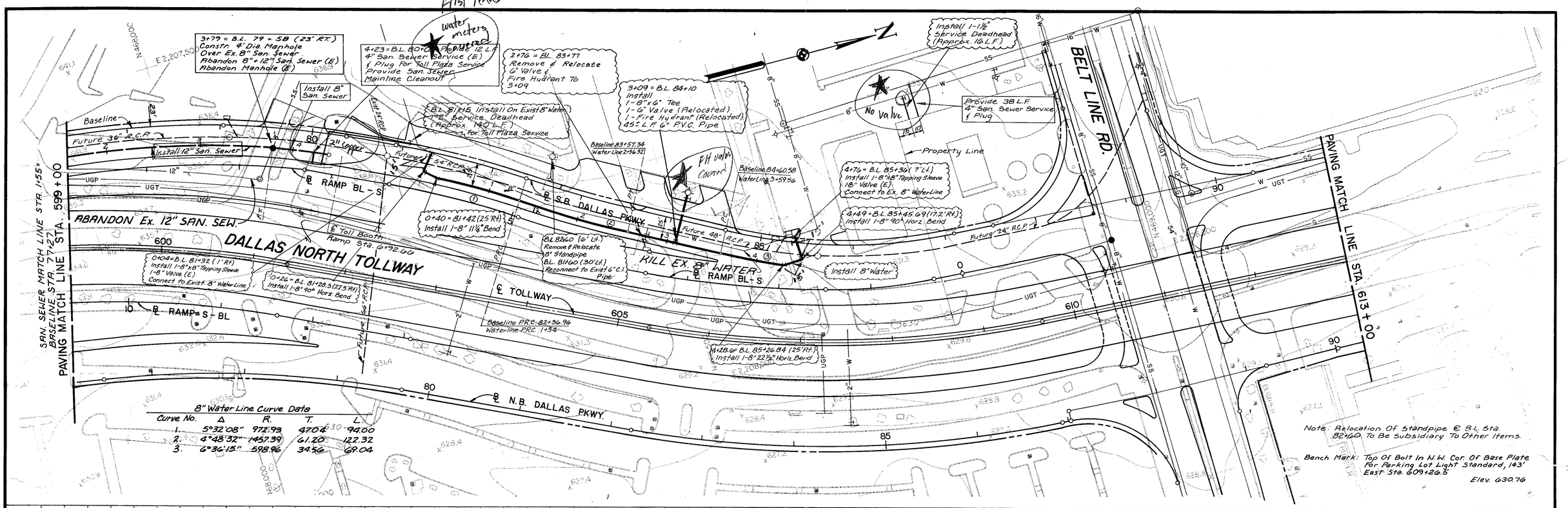
Turner Collie & Braden Inc.
Consulting Engineers

SECTION VI

DRAWN P.A.T. DATE 8-83
CHECKED W.S. DATE 10-83
DESIGNED W.S. DATE 10-83
SCALE H: 1" = 50' / V: 1" = 5'

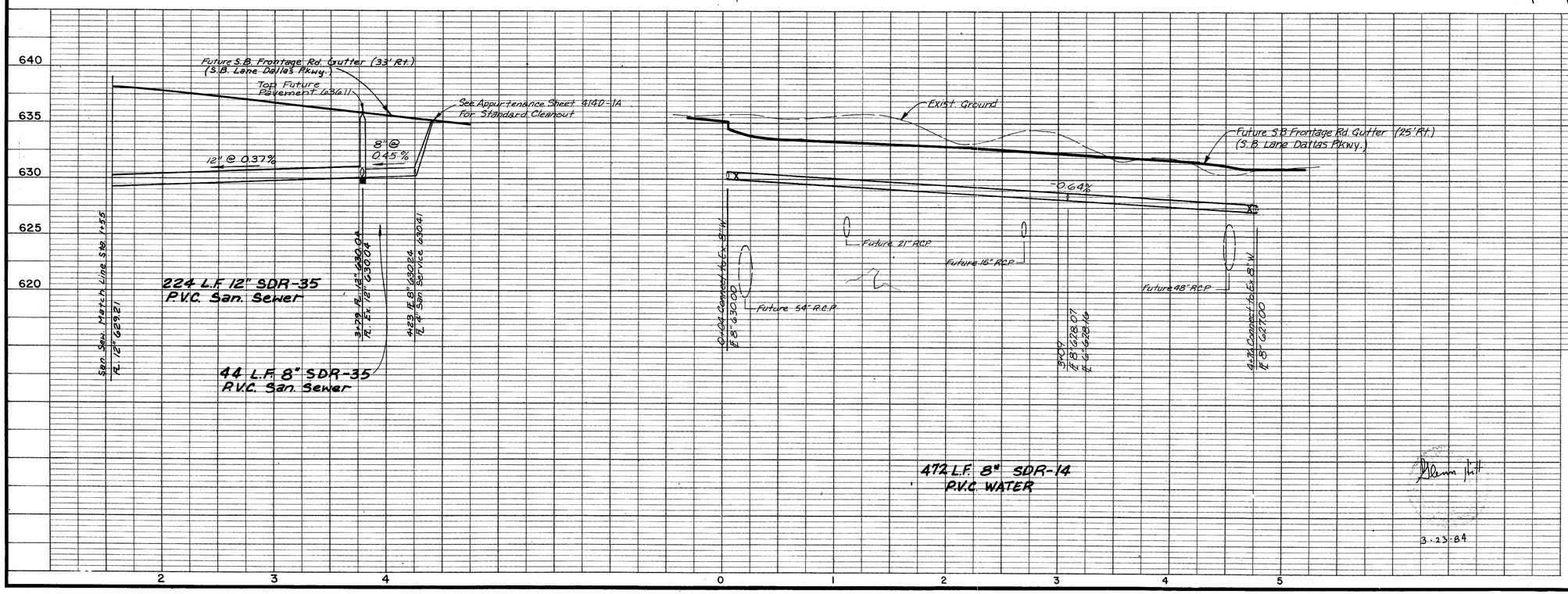
3-23-84

CONTRACT NO. DNT-49U SHEET 3 OF 11



8" Water Line Curve Data

Curve No.	Δ	R.	T.	L
1.	5°32'08"	972.93	47.04	94.00
2.	4°48'32"	1457.39	61.20	122.32
3.	6°36'15"	598.96	34.56	69.04



NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

WATER & SANITARY SEWER RELOCATIONS
PAVING STA. 599+00 TO STA. 613+00
TOWN OF ADDISON, TEXAS

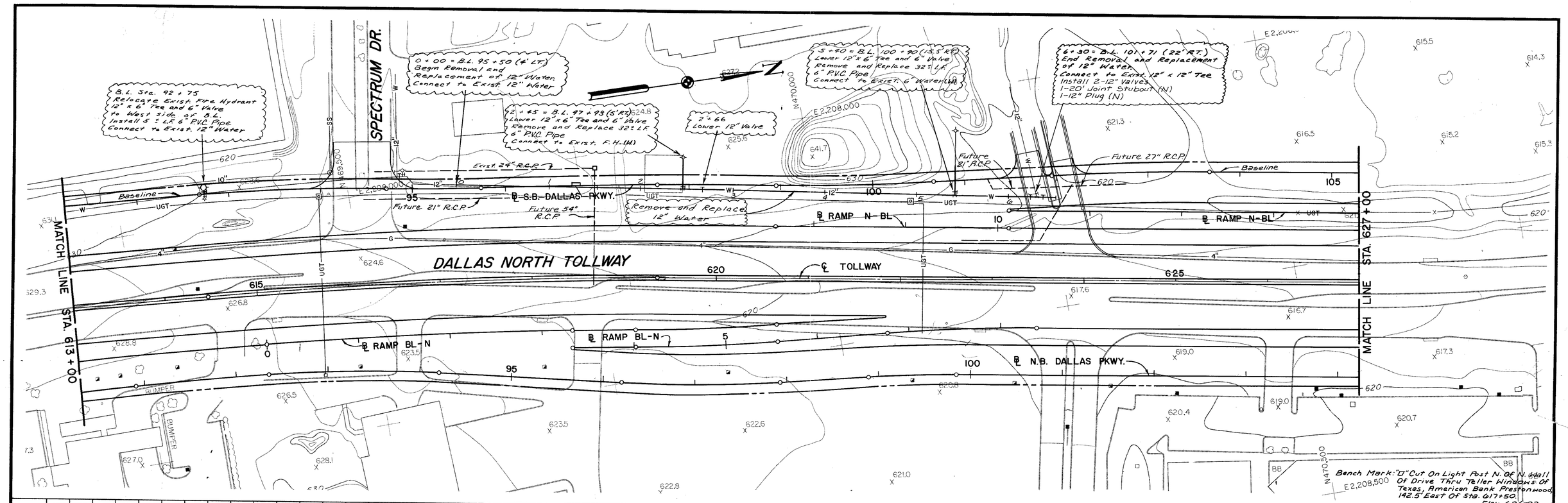
Turner Collie & Braden Inc.
Consulting Engineers

SECTION VI

DRAWN P.A.T.	DATE 8-83	DESIGNED W.S.	DATE 10-83
CHECKED W.S.	DATE 10-83	SCALE H: 1" = 50' / V: 1" = 5'	

3-23-84

CONTRACT NO. DNT-49U SHEET 4 OF 11



NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

WATER & SANITARY SEWER RELOCATIONS
PAVING STA. 613+00 TO STA. 627+00
TOWN OF ADDISON, TEXAS

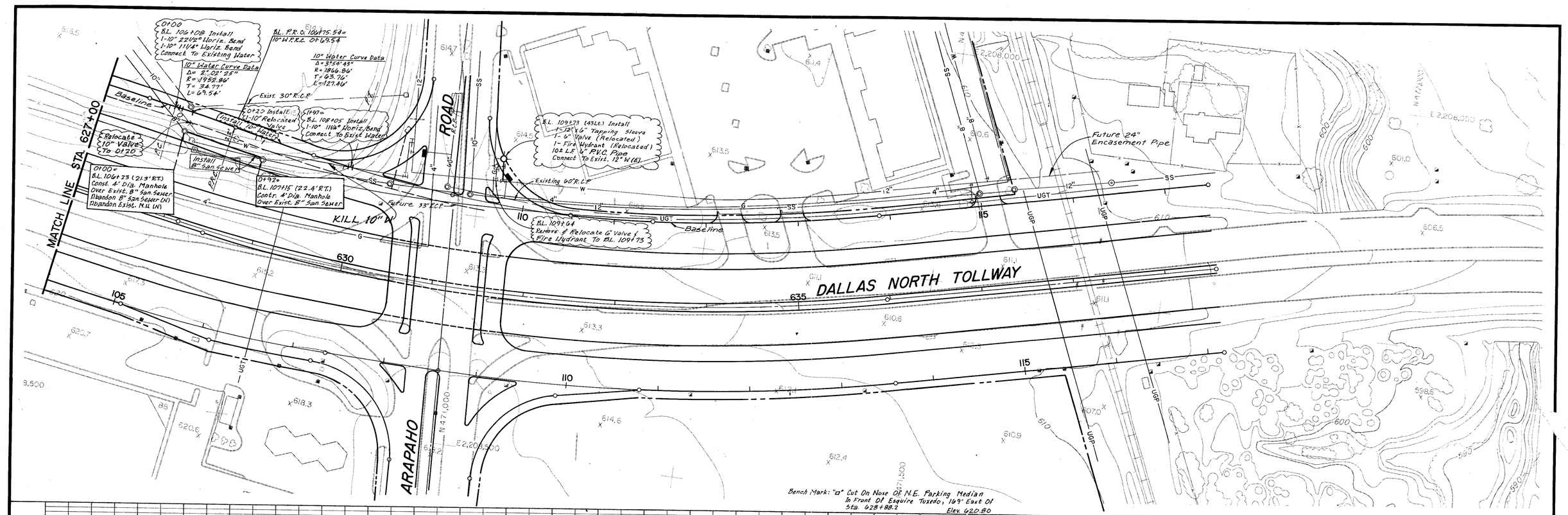
Turner Collie & Braden Inc.
Consulting Engineers

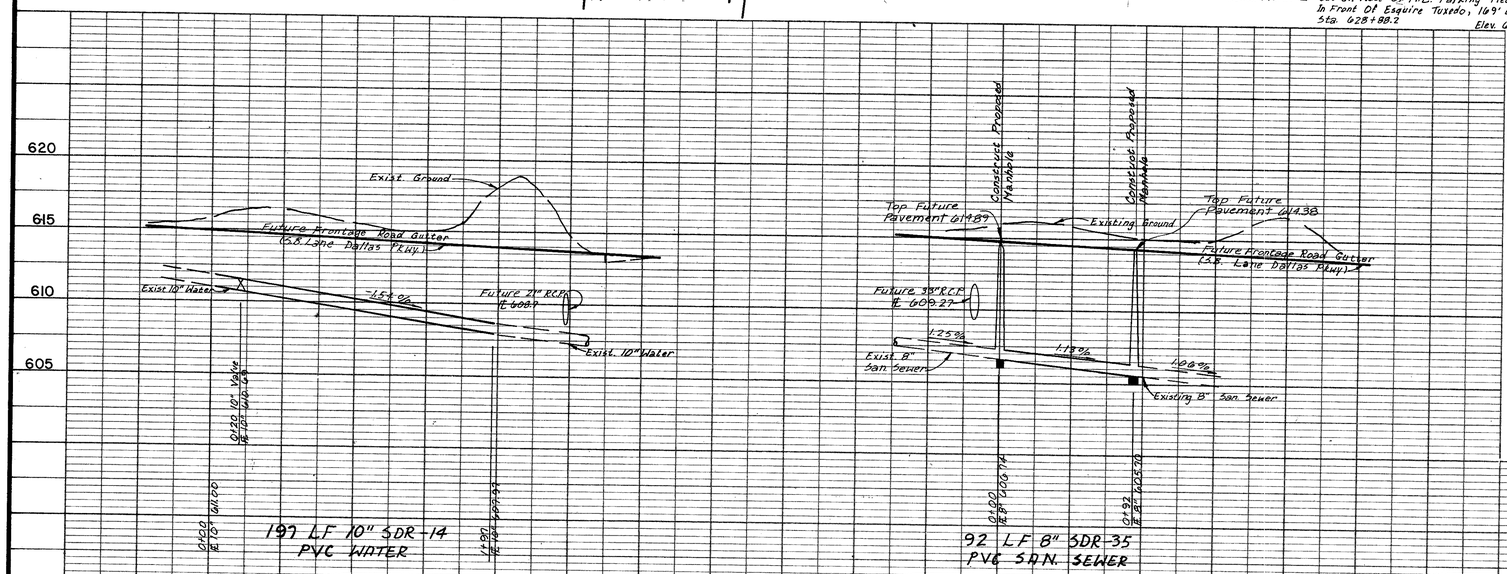
SECTION VI

DRAWN P.A.T.	DATE 8-83	DESIGNED W.S.	DATE 10-83
CHECKED W.S.	DATE 10-83	SCALE H: 1" = 50' / V: 1" = 5'	

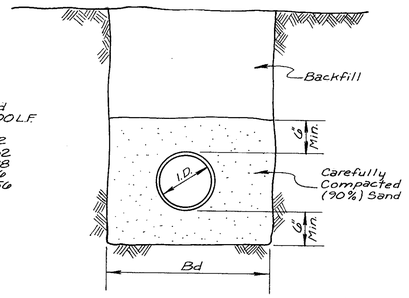
CONTRACT NO. DNT-49U SHEET 5 OF 11

Robert Cure
903-466-5339





Pipe Inside Diameter, I.D.	Type Of Pipe	Trench Width, Bd	Sand C.Y./100 L.F.
8"	P.V.C. Water	2.09	11.92
10"	P.V.C. Water	2.26	13.62
12"	P.V.C. Water	2.43	15.38
8"	P.V.C. Sewer	2.01	11.16
12"	P.V.C. Sewer	2.35	14.56



WATER & SEWER EMBEDMENT DETAIL

3-23-84

NO.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

WATER & SANITARY SEWER RELOCATIONS
PAVING STA. 627+00 TO STA. 640+50
TOWN OF ADDISON, TEXAS

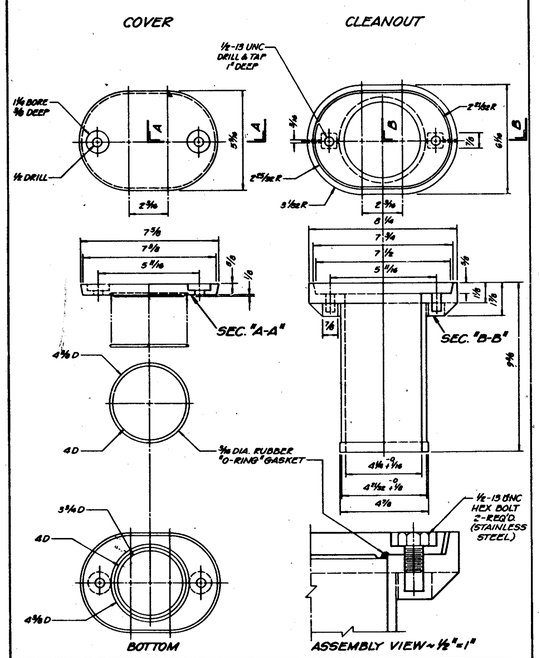
Turner Collie & Braden Inc.
Consulting Engineers

SECTION VI

DRAWN P.A.T. DATE 8-83
CHECKED W.S. DATE 10-83
DESIGNED W.S. DATE 10-83
SCALE H: 1" = 50' / V: 1" = 5'

CONTRACT NO. DNT-49U SHEET 6 OF 11

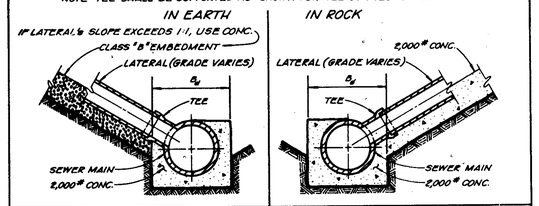
NOTE:
1. ALL DIMENSIONS ARE IN INCHES.
2. THE WORDS "SEWER LATERAL CLEANOUT" SHALL BE CAST INTO TOP OF COVER.
3. MATERIAL TO BE CAST IRON, P.V.C. OR ABS PLASTIC.



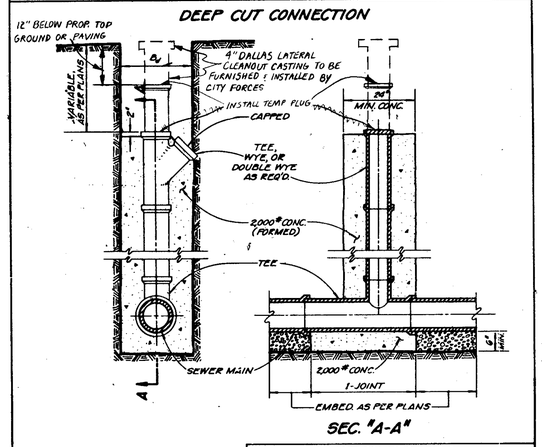
SANI. SEW. LATERAL C.O. & COVER		Design	Drawn	Date	Scale	File	No.
Latest Rev'n.:	Date:	Cummings	DeRemer	3-4-77	1/2" = 1"	414A	13

LATERAL CONNECTION IN DITCH WITH SLOPING SIDES

NOTE: TEE SHALL BE SUPPORTED AS SHOWN FOR TEE CONNECTION SUPPORT.



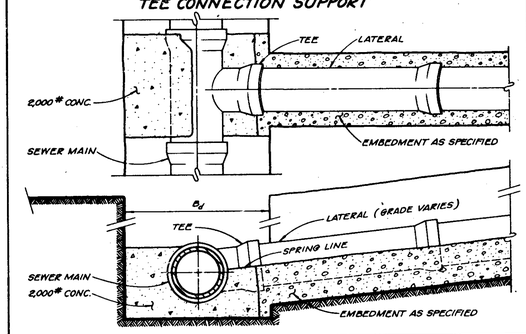
DEEP CUT CONNECTION



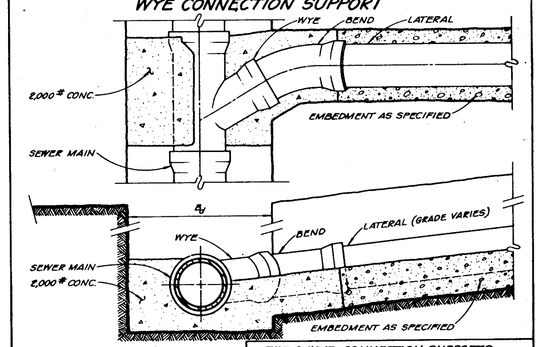
* PER A. ALMEIDA ~ 11-10-81

DEEP CUT CONNECTION & LATERAL CONN. IN DITCH WITH SLOPING SIDES							
LATEST REVISION	DATE	DESIGN	DRAWN	DATE	SCALE	FILE	NO.
		Cummings	DeRemer	3-4-77	None	414A	7

TEE CONNECTION SUPPORT



WYE CONNECTION SUPPORT



TEE & WYE CONNECTION SUPPORTS							
LATEST REVISION	DATE	DESIGN	DRAWN	DATE	SCALE	FILE	NO.
		Cummings	DeRemer	3-4-77	None	414A	9

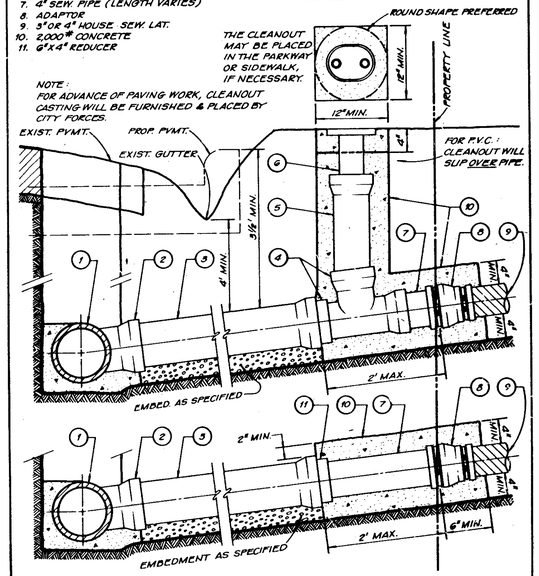
KEY:
1. SEWER MAIN
2. 6" WYE OR TEE
3. 4" SEW. LAT. (LENGTH VARIES)
4. 6"x4" RED. & 4"x4" TEE OR 6"x4" TEE
5. 4" STACK (LENGTH VARIES)
6. 4" SEW. LAT. CLEANOUT CASTING
7. 4" SEW. PIPE (LENGTH VARIES)
8. ADAPTOR
9. 3" OR 4" HOUSE SEW. LAT.
10. 2,000# CONCRETE
11. 6"x4" REDUCER

THE SANITARY SEWER LATERAL SHALL BE CONSTRUCTED IN SUCH A MANNER AS TO CLEAR EXISTING UTILITIES & PROPOSED FACILITIES SUCH AS STORM SEWER MAINS, RETAINING WALLS, ETC.

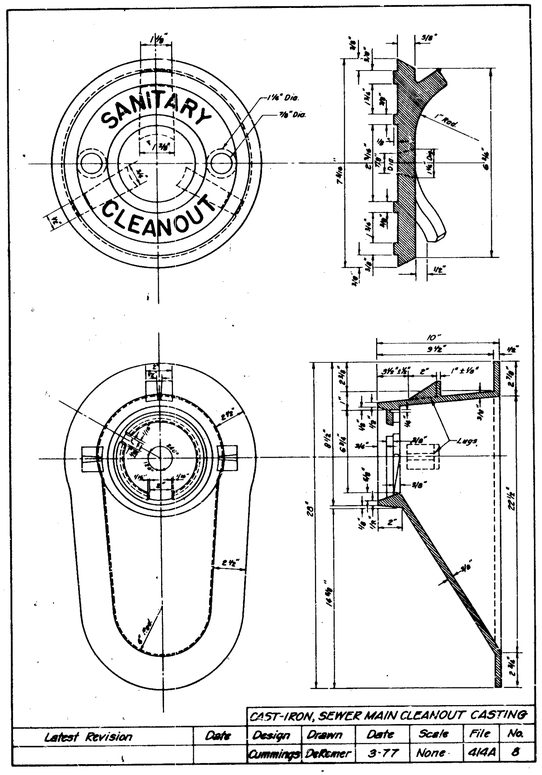
THE CONNECTION TO THE HOUSE LATERAL SHALL BE AS CLOSE TO THE PROPERTY LINE AS POSSIBLE.

THE CLEANOUT MAY BE PLACED IN THE PARKWAY OR SIDEWALK, IF NECESSARY.

NOTE:
FOR ADVANCE OF PAVING WORK, CLEANOUT CASTING WILL BE FURNISHED & PLACED BY CITY FORCES.

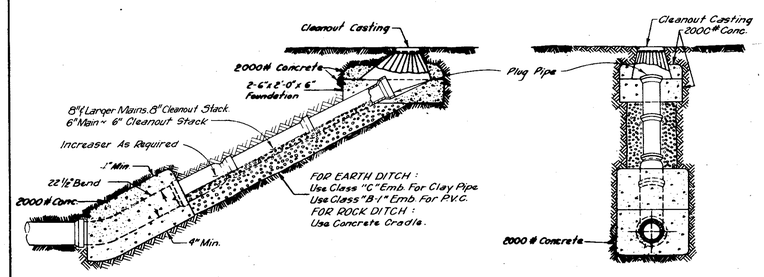


SANITARY SEWER LATERALS WITH & WITHOUT CLEANOUTS							
LATEST REVISION	DATE	DESIGN	DRAWN	DATE	SCALE	FILE	NO.
		Cummings	DeRemer	3-4-77	1" = 1'-0"	414A	10



CAST-IRON, SEWER MAIN CLEANOUT CASTING							
Latest Revision	Date	Design	Drawn	Date	Scale	File	No.
		Cummings	DeRemer	3-77	None	414A	8

STANDARD CLEANOUT DETAIL



LATEST REVISION: Cummings 7/12/77				
STANDARD CLEANOUT				
WATER UTILITIES DEPARTMENT				
DESIGN	DRAWN	DATE	SCALE	FILE NO.
CUMMINGS	JOHNSON	8-76	NONE	414A-31

Latest Revision: Cummings — Date: 7/12/77

APPURTENANCE SHEET

FOR SANITARY SEWERS

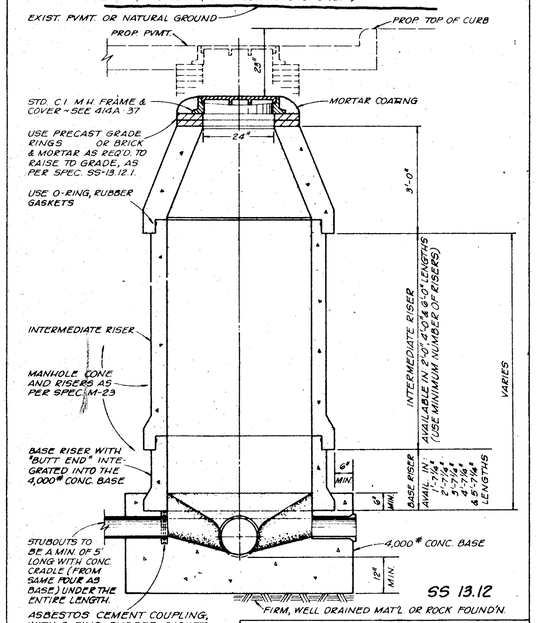
DALLAS WATER UTILITIES

CITY OF DALLAS, TEXAS

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
Michael Cummings		Mar. '77	As Noted	—	414D	1A

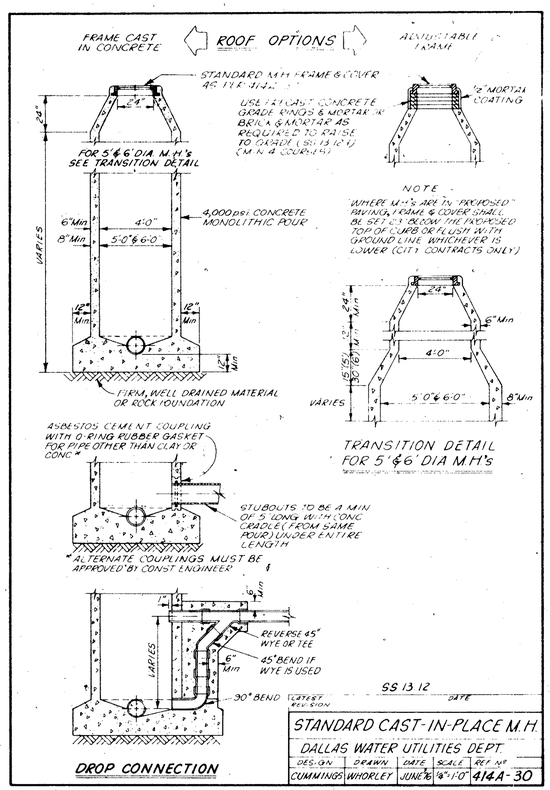
For Sec V

NOTE: WHERE MANHOLES ARE IN PROPOSED PAVING, FRAME & COVER SHALL BE SET 29" BELOW THE PROPOSED TOP OF CURB, AS SHOWN BELOW, OR FLUSH WITH THE EXISTING GROUND, WHICHEVER IS LOWER. (CITY CONTRACTS ONLY)

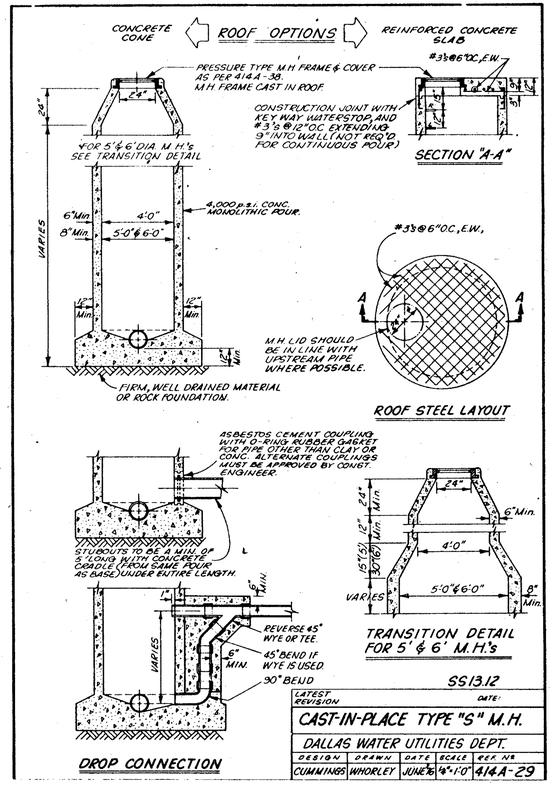


*- ALT. COUPLINGS MUST BE APPROVED BY THE CONST. ENGR.

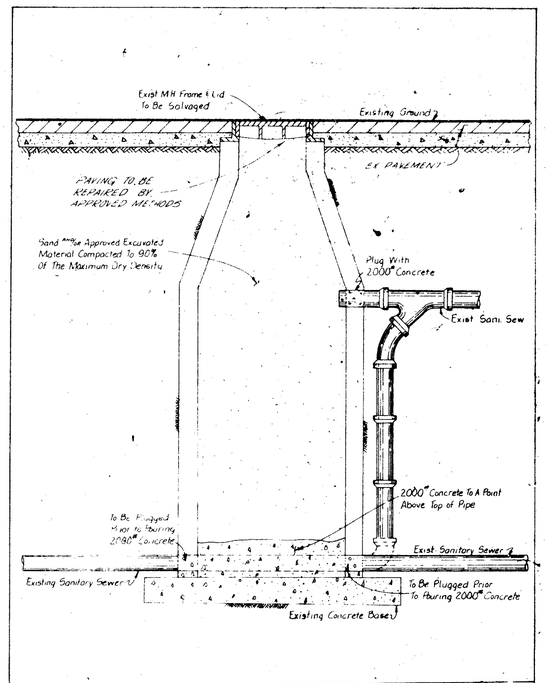
Latest Revision by: Cummings	Date: 6/3/78					
STANDARD PRECAST MANHOLE DALLAS WATER UTILITIES, DALLAS, TEXAS						
	DESIGN	DRAWN	DATE	SCALE	FILE	NO.
For DROP-CONN. See 414A-34	Cummings	DeRemer	Oct, 1976	1/2"=1'-0"	414A	39



LATEST REVISION	DATE				
STANDARD CAST-IN-PLACE M.H. DALLAS WATER UTILITIES DEPT.					
DESIGN	DRAWN	DATE	SCALE	REF. NO.	
CUMMINGS	WHORLEY	JUNE '76	1/4"=1'-0"	414A-30	

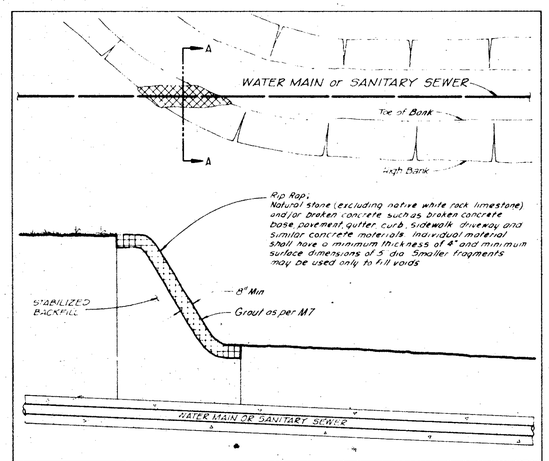


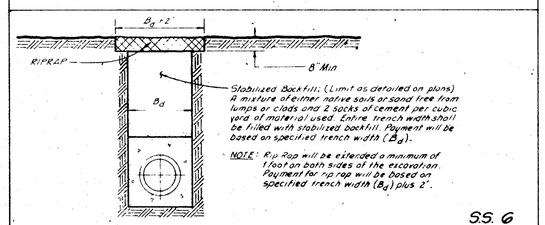
LATEST REVISION	DATE				
CAST-IN-PLACE TYPE "S" M.H. DALLAS WATER UTILITIES DEPT.					
DESIGN	DRAWN	DATE	SCALE	REF. NO.	
CUMMINGS	WHORLEY	JUNE '76	1/4"=1'-0"	414A-29	



ABANDONMENT OF EX. M.H.					
DALLAS WATER UTILITIES DEPT.					
REVISED	DRAWN	DATE	SCALE	REF. NO.	
CUMMINGS		AUG '76		414A-35	

Latest Revision R. Thrash Date 1-17-77



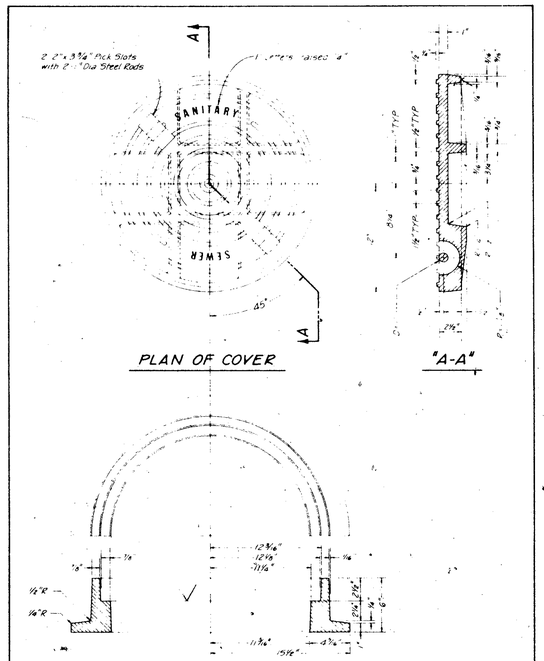


SEC. "A-A"

SS. 6
W. 6

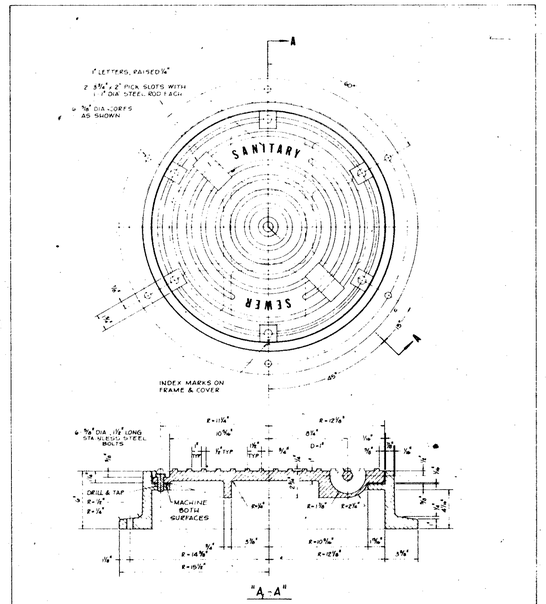
STABILIZED BACKFILL & RIPRAP					
DESIGN	DRAWN	DATE	SCALE	FILE	NO
Cummings	DeRemer	1-20-78	None	414A	40

Latest Rev'n.: Date:



STANDARD CAST-IRON M.H. FRAME & COVER DALLAS WATER UTILITIES ~ DALLAS, TEX.					
DESIGN	DRAWN	DATE	SCALE	FILE	NO
Cummings	DeRemer	Oct, 1976	1/2"=1'-0"	414A	37

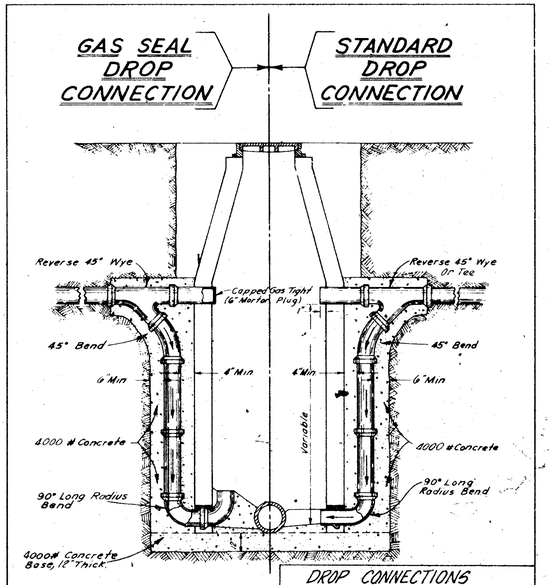
Latest Revision R. Thrash Date 11-1-76



NOTE:
For seal between frame & cover, use either a 1/16" copper gasket or a 1/4" dia. neoprene O-ring gasket (location of O-ring is left to Mfr., but subject to approval by Const. Engr.).

.M-23

Latest Revision: R. Thrash	Date: 12-3-76				
PRESSURE-TYPE CAST-IRON M.H. FRAME & COVER DALLAS WATER UTILITIES, DALLAS, TEX.					
DESIGN	DRAWN	DATE	SCALE	FILE	NO
Cummings	DeRemer	Oct, 1976	None	414A	38



DROP CONNECTIONS					
DALLAS WATER UTILITIES DEPT.					
REVISED	DRAWN	DATE	SCALE	REF. NO.	
CUMMINGS		AUG '76	1/4"=1'-0"	414A-34	

Latest Revision: R. Thrash Date 12-3-76

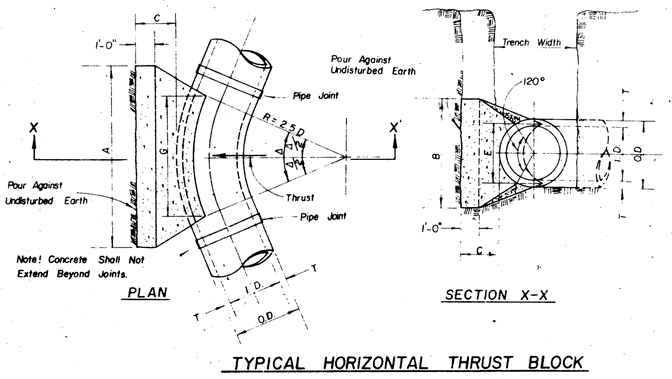
Latest Revision Michael Cummings Date 5/8/78

APPURTENANCE SHEET						
FOR SANITARY SEWER						
MANHOLES						
DALLAS WATER UTILITIES						
CITY OF DALLAS, TEXAS						
DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
Michael Cummings			As Noted	—	414D	1

HORIZONTAL BENDS

					Δ = 11.25°									Δ = 22.50°									Δ = 30°									Δ = 45°									Δ = 67.50°								
							EARTH			ROCK						EARTH			ROCK						EARTH			ROCK						EARTH			ROCK						EARTH			ROCK			
I.D. (in.)	T in.	C 11.25° ft.	C 22.50°+ ft.	E ft.	I.D. (in.)	G ft.	Thrust tons	A ft.	B ft.	Volume c.y.	A ft.	B ft.	Volume c.y.	I.D. (in.)	G ft.	Thrust tons	A ft.	B ft.	Volume c.y.	A ft.	B ft.	Volume c.y.	I.D. (in.)	G ft.	Thrust tons	A ft.	B ft.	Volume c.y.	A ft.	B ft.	Volume c.y.	I.D. (in.)	G ft.	Thrust tons	A ft.	B ft.	Volume c.y.	A ft.	B ft.	Volume c.y.	I.D. (in.)	G ft.	Thrust tons	A ft.	B ft.	Volume c.y.	A ft.	B ft.	Volume c.y.	I.D. (in.)
4,6,8	0.4	1.5	1.5	0.9	4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1	4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1	4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8
10,12	0.5	1.5	1.5	1.2	10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1	10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3	10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12
16,18	0.6	1.5	1.5	1.6	16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,16	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3	16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6	16,18	4.7	28.3	7.5	4.0	1.9	5.0	3.0	0.9	16,18
20	0.7	1.5	1.5	1.8	20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.5	0.4	20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7	20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20
24	0.9	1.5	1.5	2.1	24	1.1	8.9	3.0	3.0	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.0	0.5	24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1	24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24
30	2.9	1.5	1.9	2.6	30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8	30	3.6	27.5	5.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6	30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30
36	4.5	1.5	2.3	3.3	36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3	36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6	36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36
42	5.0	1.8	2.6	3.8	42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1	42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2	42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42
48	5.5	2.0	3.0	4.3	48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8	48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3	48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48
54	6.0	2.3	3.4	4.8	54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1	54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9	54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54
60	6.5	2.5	3.8	5.3	60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3	60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0	60	15.6	235.9	24.0	10.0	35.6	16.0	7.5	17.6	60
66	6.8	2.8	4.1	5.7	66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2	66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2	66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66
72	7.5	3.0	4.5	6.3	72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1	72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7	72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72
78	7.5	3.3	4.9	6.7	78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7	78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9	78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78
84	8.0	3.5	5.3	7.2	84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8	84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6	84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84
90	8.5	3.8	5.6	7.7	90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7	90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6	90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90
96	9.0	4.0	6.0	8.2	96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8	96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5	96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96

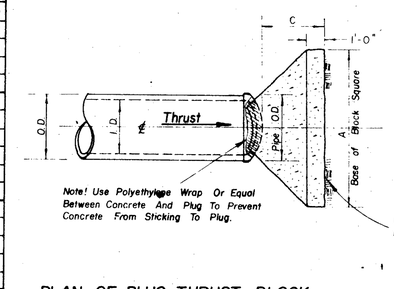
	Δ = 90°							
			EARTH			ROCK		
I.D. (in.)	G ft.	Thrust tons	A ft.	B ft.	Volume c.y.	A ft.	B ft.	Volume c.y.	I.D. (in.)
4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2	4,6,8
10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5	10,12
16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0	16,18
20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5	20
24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1	24
30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3	30
36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3	36
42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7	42
48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4	48
54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1	54
60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0	60
66	21.8	362.8	33.0	11.0	66.2	22.0	8.5	32.5	66
72	23.8	431.8	36.0	12.0	85.6	24.0	9.0	41.0	72
78	257	506.7	39.0	13.0	108.2	26.0	10.0	53.2	78
84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	64.8	84
90	29.	674.6	45.0	15.0	164.9	30.0	11.5	81.2	90
96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1	96



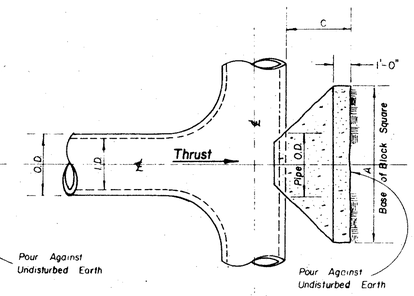
TYPICAL HORIZONTAL THRUST BLOCK

TEES & PLUGS

			EARTH		ROCK	
I.D. (in.)	Thrust tons	C ft.	A ft.	Volume c.y.	A ft.	Volume c.y.
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	452	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	76.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	10.5	11.0	7.5	6.2
48	136.0	5.0	12.0	15.6	8.5	8.7
54	172.0	5.5	13.5	21.4	9.5	11.9
60	212.0	6.0	15.0	28.4	10.5	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	305.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	33.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0



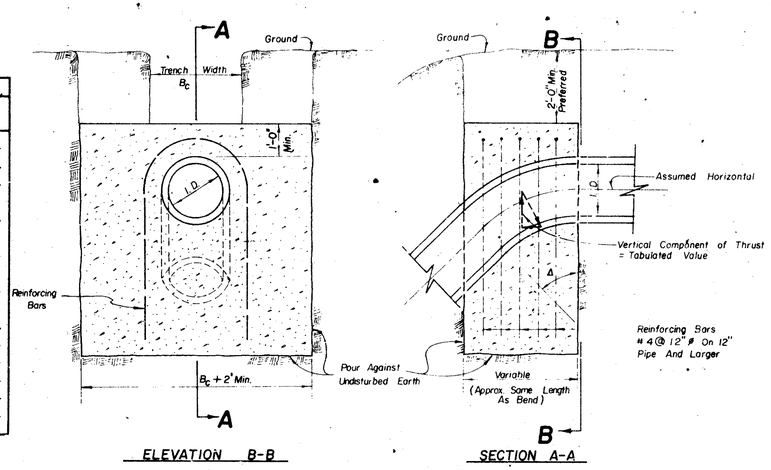
PLAN OF PLUG THRUST BLOCK



PLAN OF TEE THRUST BLOCK

VERTICAL BENDS

Δ →	11.25°		22.50°		30°		45°		67.50°		90°		← Δ
I.D. (in.)	Thrust tons	Volume c.y.	Thrust tons	Volume c.y.	Thrust tons	Volume c.y.	Thrust tons	Volume c.y.	Thrust tons	Volume c.y.	Thrust tons	Volume c.y.	I.D. (in.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96



ELEVATION B-B

SECTION A-A

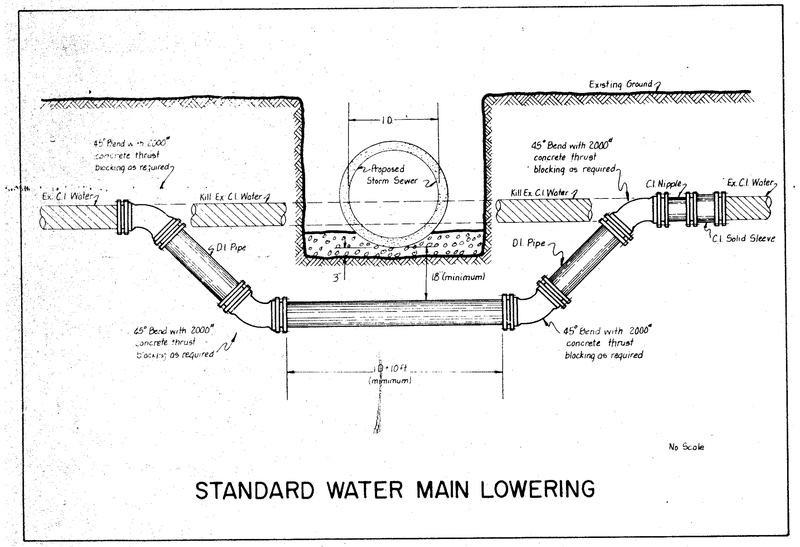
TYPICAL VERTICAL BEND THRUST BLOCK

GENERAL NOTES

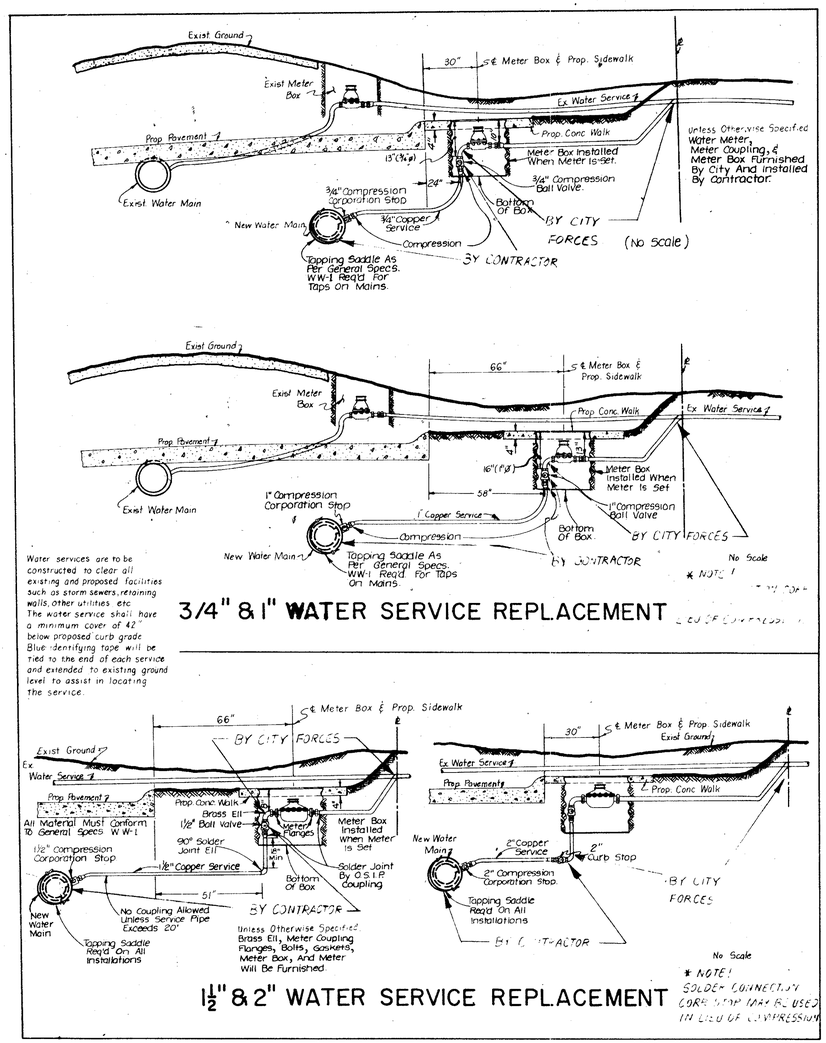
1. All calculations are based on internal pressure of 200 p.s.i. for 24" I.D. pipe and smaller and 150 p.s.i on 30" I.D. and larger.
2. Volumes of vertical bend thrust blocks are net volumes of concrete to be furnished. The corresponding weight of the concrete (4,000 lb./c.y.) is equal to or greater than the vertical component of thrust on the vertical bend.
3. All bearing surfaces of thrust blocks shall be poured against undisturbed earth or rock.
4. Wall thickness (T) assumed here for estimating purposes only.
5. Concrete for blocking shall be 2,000 p.s.i concrete.
6. Dimensions may be varied as required by field conditions where and as directed by the engineer. The volume of concrete blocking shall not be less than shown here.
7. Payment for thrust blocks shall be made at the contract unit price per cubic yard of 2,000 p.s.i. concrete measured in place.

REVISED. BY CHRIS MAURITZEN – DATE APRIL 30, 1976
DRAWN BY R. LARA

APPURTENANCE SHEET						
THRUST BLOCKS FOR PIPE BENDS & TEES & PLUGS						
DALLAS WATER UTILITIES DEPT.						
CITY OF DALLAS, TEXAS						
DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
C.M.	R.L.	4/30/76	NONE	FOLDER	414-D	15

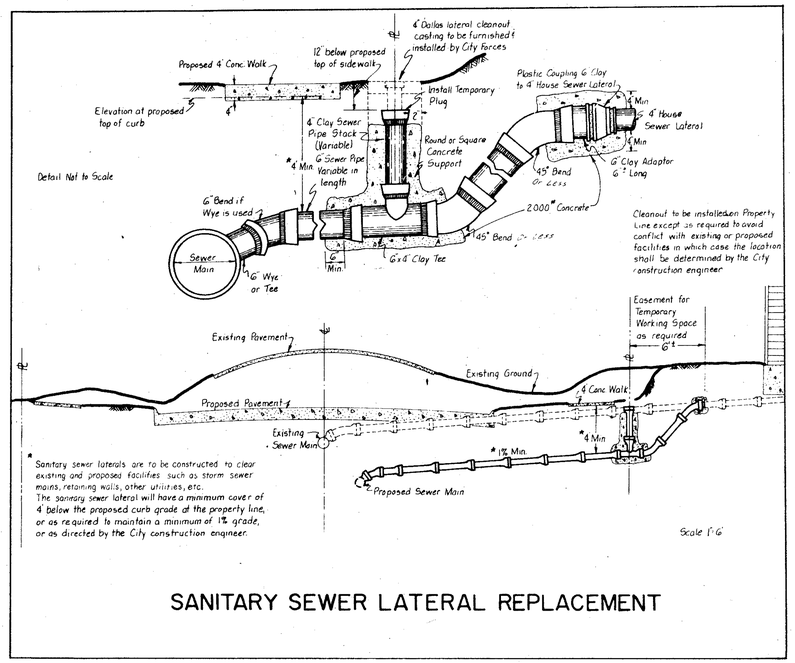


STANDARD WATER MAIN LOWERING



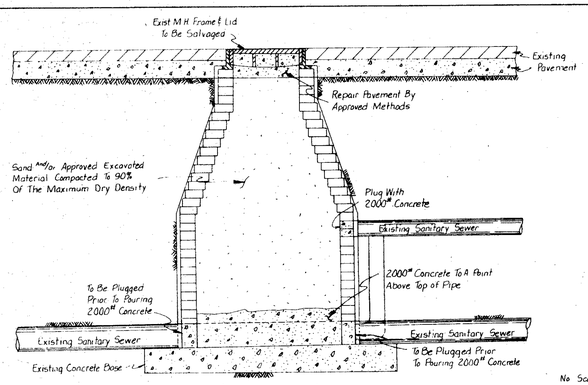
Water services are to be constructed to clear all existing and proposed facilities such as storm sewers, retaining walls, other utilities, etc. The water service shall have a minimum cover of 42" below proposed curb grade. Blue identifying tape will be tied to the end of each service and extended to existing ground level to assist in locating the service.

3/4" & 1" WATER SERVICE REPLACEMENT



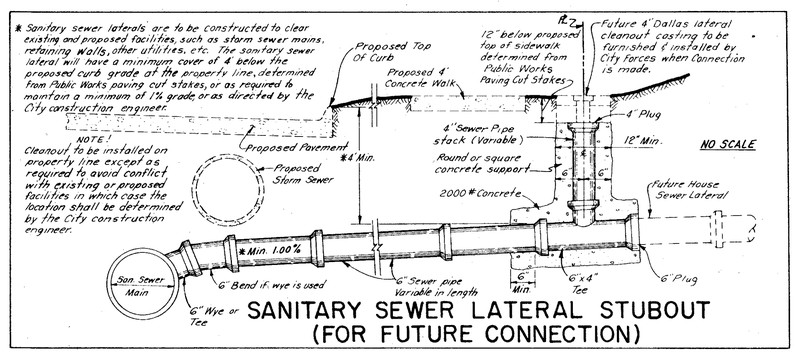
* Sanitary sewer laterals are to be constructed to clear existing and proposed facilities such as storm sewer mains, retaining walls, other utilities, etc. The sanitary sewer lateral will have a minimum cover of 4' below the proposed curb grade at the property line, or as required to maintain a minimum of 1% grade, or as directed by the City construction engineer.

SANITARY SEWER LATERAL REPLACEMENT

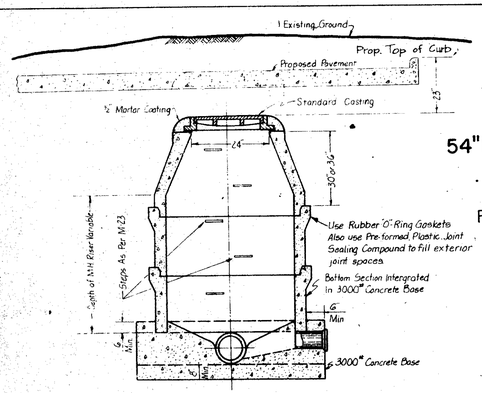


ABANDONMENT OF EXISTING MANHOLE

1½" & 2" WATER SERVICE REPLACEMENT



SANITARY SEWER LATERAL STUBOUT (FOR FUTURE CONNECTION)

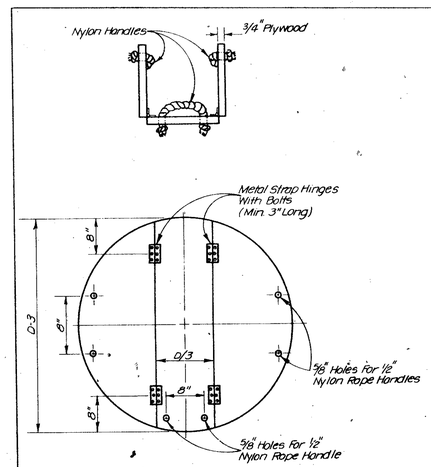


* If the top of proposed pavement is more than 23" above the existing ground, the manhole shall be constructed to conform to the existing ground.

54" DIA. & LARGER - BELLS UP
48" DIA. - BELLS DOWN

FOR DETAILS OF DROP CONN. SEE 414D-1

MANHOLE CONSTRUCTION



INSTALLATION

False Manhole Bottoms Will Be Furnished And Installed In All Manholes Constructed In Advance Of Paving. These False Manhole Bottoms Will Be Installed At A Time Directed By The Engineer But Will Usually Be After All Work Is Completed On The Sani-Sew. System Including The Air Test, But Prior To Final Inspection.

REMOVAL

False Manhole Bottoms Will Be Removed After The Final Appurt. Adjustment Inspection. The Paving Contractor And City Forces Representatives Will Coordinate The Removal Of The False Manhole Bottoms. The False Manhole Bottoms Will Be Removed From The Job Site By City Forces.

(NO SCALE)

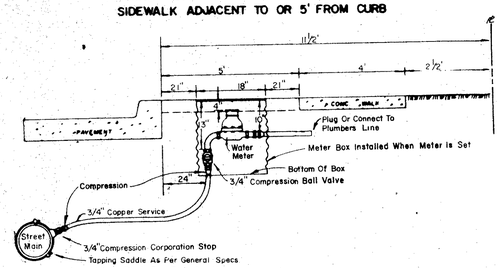
FALSE MANHOLE BOTTOMS

LATEST REVISION: John A. Chelu... DATE: 4-23-81

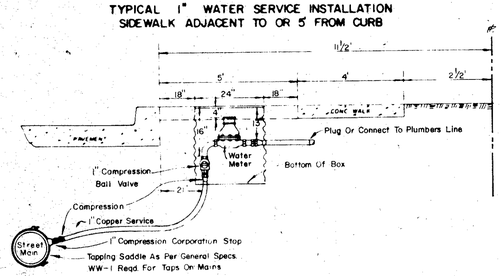
ADVANCE OF PAVING
WATER & SANITARY SEWER APPURTENANCES
DALLAS WATER UTILITIES DEPARTMENT
CITY OF DALLAS, TEXAS

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
Bouse Cowgill	Gearner	JUNE 1974	As Noted	None	414D	29

TYPICAL 3/4" WATER SERVICE INSTALLATION SIDEWALK ADJACENT TO OR 5' FROM CURB



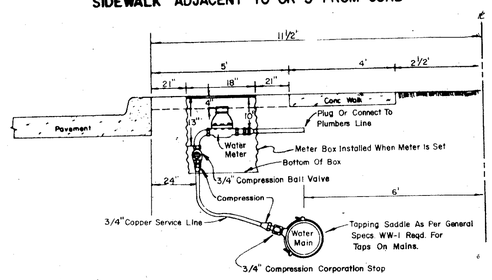
TYPICAL 1" WATER SERVICE INSTALLATION SIDEWALK ADJACENT TO OR 5' FROM CURB



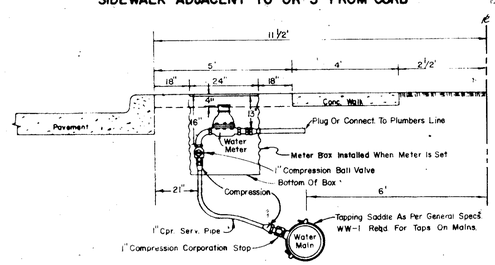
3/4" & 1" Water Service Installations For Water Mains In Street				
Dallas Water Utilities Department				
Revised	Drawn	Date	Scale	Ref. No.
Maurition Goss	Lara	12-10-76	None	684A-56

Latest Rev.: J. Cowgill Date: Dec '78 (J. Campbell April '81)

TYPICAL 3/4" WATER SERVICE INSTALLATION SIDEWALK ADJACENT TO OR 5' FROM CURB



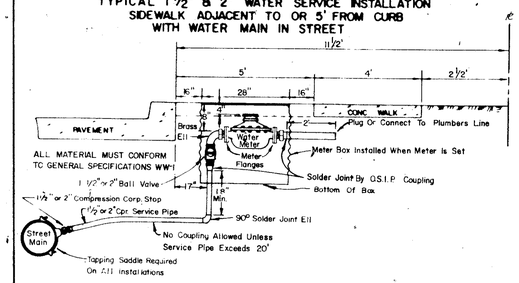
TYPICAL 1" WATER SERVICE INSTALLATION SIDEWALK ADJACENT TO OR 5' FROM CURB



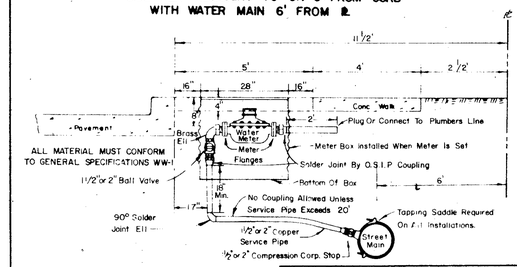
3/4" & 1" Water Service Installation For Water Mains 6' From ℄				
Dallas Water Utilities Department				
Revised	Drawn	Date	Scale	Ref. No.
Maurition Goss	R. Lara & J. Malley	Dec 1976	NONE	684A-57

Latest Rev.: J. Cowgill Date: Dec '78 (J. Campbell April '81)

TYPICAL 1½" & 2" WATER SERVICE INSTALLATION SIDEWALK ADJACENT TO OR 5' FROM CURB WITH WATER MAIN IN STREET



TYPICAL 1½" & 2" WATER SERVICE INSTALLATION SIDEWALK ADJACENT TO OR 5' FROM CURB WITH WATER MAIN 6' FROM ℄



1½" & 2" Water Service Installations For Water Mains In Street Or 6' From ℄				
Dallas Water Utilities Department				
Revised	Drawn	Date	Scale	Ref. No.
Maurition Goss	Lara	Dec '78	NONE	684A-58

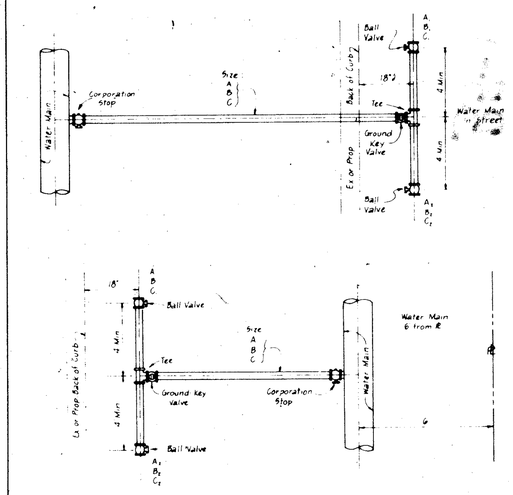
Latest Rev.: J. Cowgill Date: Dec '78 (J. Campbell April '81)

BULL HEAD SERVICES

SIZES:

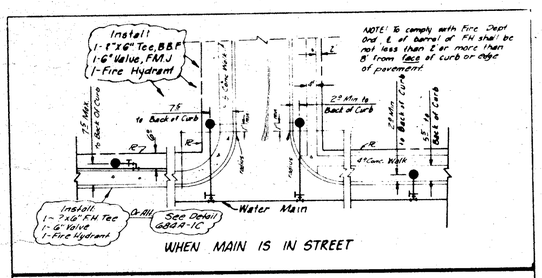
For A = 1" A₁ = ¾" A₂ = ¾"
For B = 1½" B₁ = 1" B₂ = 1½"
For C = 2" C₁ = 1½" C₂ = 1½"

Unless Otherwise Specified

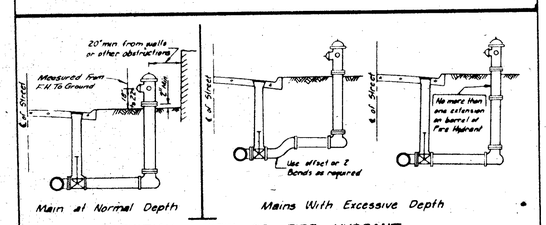


BULL HEAD SERVICES				
DALLAS WATER UTILITIES DEPT.				
Design	Drawn	Date	Scale	Ref. No.
C. Mauritzen	N. Hafner	Dec. '77	None	684A-59

Latest Revision: Date:

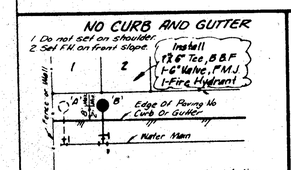


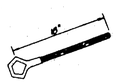
WHEN MAIN IS IN STREET



Main at Normal Depth — Mains With Excessive Depth

ELEVATION VIEW OF FIRE HYDRANT

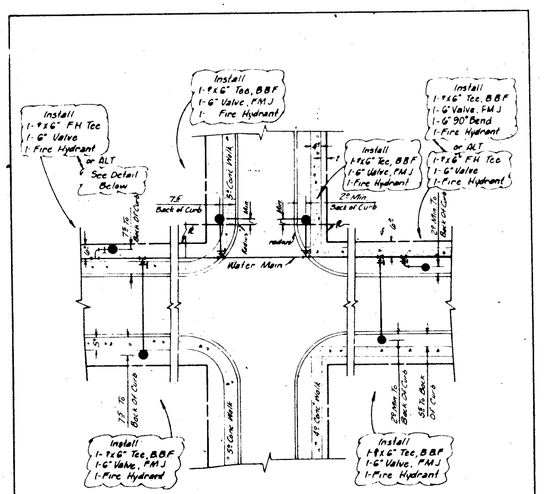




Standard Spanner Wrench

METHODS FOR SETTING FIRE HYDRANTS				
DALLAS WATER UTILITIES DEPT.				
REVISED	DRAWN	DATE	SCALE	REF. NO.
C. Mauritzen	J. Malley	Jan. '77	None	684A-1B

LATEST REVISION: DATE:



METHODS FOR SETTING FIRE HYDRANTS FOR WATER MAINS 6' FROM ℄				
DALLAS WATER UTILITIES DEPT.				
REVISED	DRAWN	DATE	SCALE	REF. NO.
C. Mauritzen	J. Malley	Dec '76	NONE	684A-1C

LATEST REVISION: J. Cowgill DATE: Dec. '78

NOTE! Water Service Taps Will Be Spaced No Closer Than One Foot Apart.

APPURTENANCE SHEET						
Water Service Installations And Methods For Setting Fire Hydrants						
DALLAS WATER UTILITIES DEPT.						
CITY OF DALLAS, TEXAS						
DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO
C. MAURITZEN P.6083	J. MALLEY R. LARA	Dec 1976	NONE		414 D	30

Revision (Water Services & Fire Hydrants) J. Campbell 7-15-81
Revision (Water Services) J. Campbell 4-16-81 Latest Rev.: J. Cowgill Date: Dec '78