

**NVE<sup>®</sup>**

**Environmental  
Protection**

**WATER MAIN  
STANDARD DRAWINGS**

PREPARED BY

CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
DIVISION OF INFRASTRUCTURE  
BUREAU OF DESIGN

DECEMBER 9, 2020

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

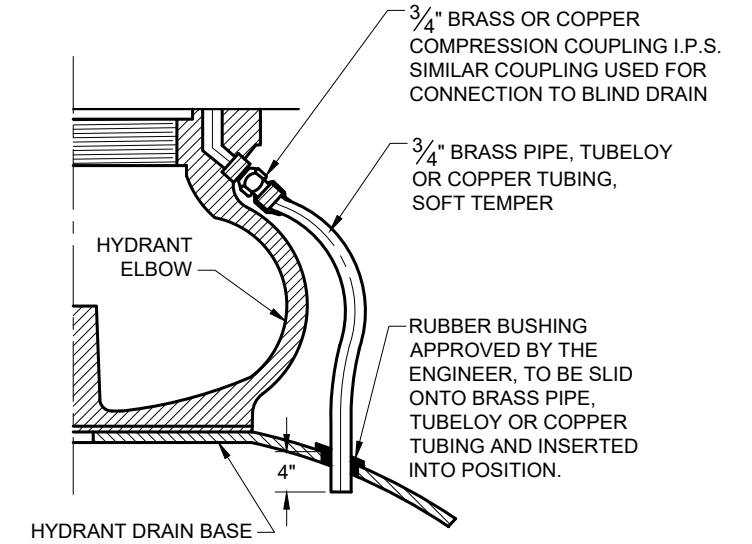
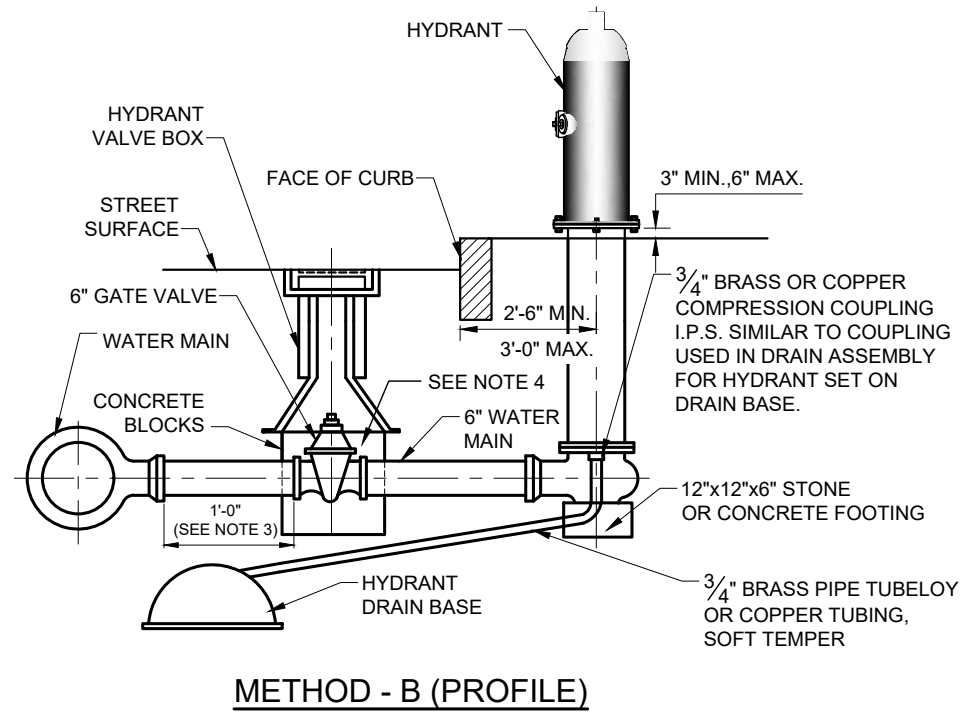
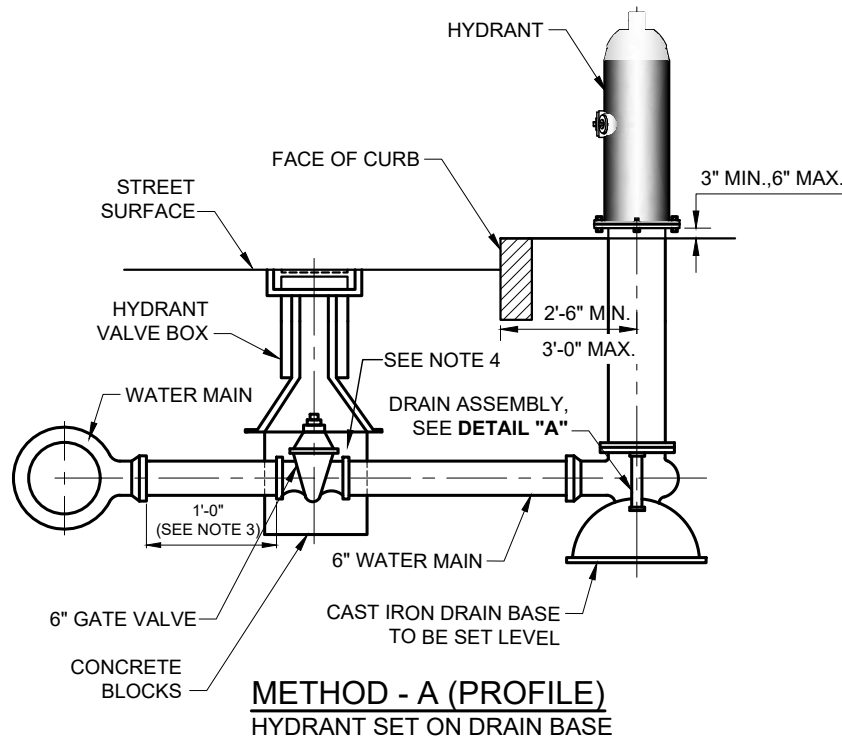
LIST OF WATER MAIN STANDARD DRAWINGS

NO.	STD. DWG. NO.	DESCRIPTION
1	WM0020	HYDRANT SETTING METHODS & DRAIN BASE
2	WM0030	HYDRANT FENDERS
3	WM0031	OVERSIZE HYDRANT FENDERS
4	WM0040	HYDRANT VALVE BOX
5	10240-A-Z	VALVE BOX SKIRT
6	11576-A-Z	FOUNDATIONS FOR VALVE BOXES
7	13547-B-Z	WIDE FLANGE MANHOLE HEAD & COVER
8	18583-Z	LARGE MANHOLE FRAME & COVER
9	19840-A-X	STANDARD REGULATOR CHAMBERS
10	19841-Z-B	STANDARD METHODS FOR RECONSTRUCTING CATCH BASIN CONNECTIONS
11	20731-Z-C	STANDARD METHOD OF CONNECTIONS BETWEEN STEEL AND C.I. PIPE
12	26438-Z-A	STANDARD SYMBOLS TO BE USED ON ALL PLANS & MAPS
13	33317-Y	STANDARD CHAMBER FOR 20" CONNECTION VALVES ON STEEL MAINS
14	34006-Y	MASONRY FOR ACCESS MANHOLES ON 30" Ø TO 72" Ø STEEL MAINS
15	35310-C-Y	JOINTS FOR STEEL WATER MAINS
16	38226-Y-A	STANDARD FABRICATED CONNECTIONS FOR STEEL MAINS
17	40868-Z	SUPPORTS FOR WATER MAIN OVER PIPE CROSSING

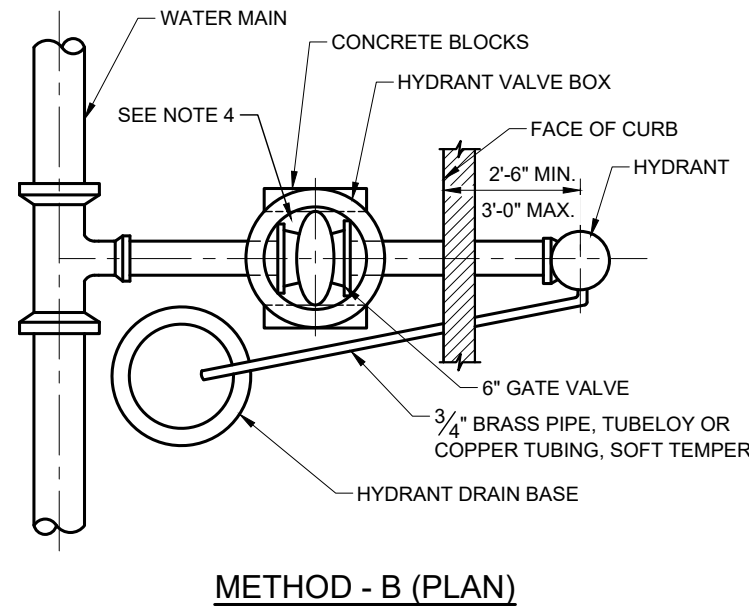
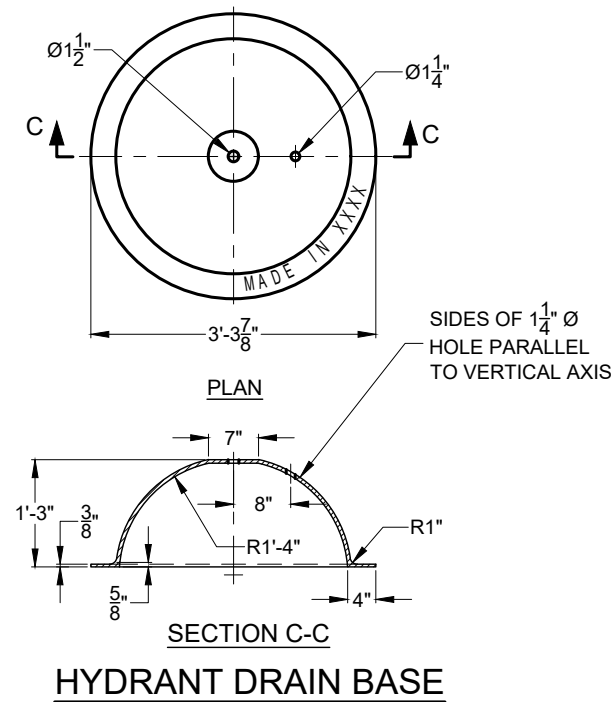
NO.	STD. DWG. NO.	DESCRIPTION
18	42063-Y	SHALLOW CROSSING FOR WATER MAINS, 24" DIAMETER AND SMALLER
19	44015-A-X	STANDARD CHAMBER FOR 36" BUTTERFLY LINE VALVE ON STEEL MAIN
20	44162-W	STANDARD CHAMBER FOR 30" & 36" BUTTERFLY CONNECTION VALVE ON STEEL MAIN
21	44292-B-Z	GRAVEL OR BROKEN STONE BEDDING AND FILTER FABRIC INSTALLATION FOR DUCTILE CAST IRON PIPES
22	44387-Z-B	RODDING ALL SPECIAL CASTINGS, LEAD & MECHANICAL JOINTS ON LOW PRESSURE WATER MAINS, PUSH-ON JOINT PIPE
23	44573-W	STANDARD CHAMBER FOR 48" BUTTERFLY CONNECTION VALVE ON STEEL MAIN
24	44588-A-X	STANDARD CHAMBER FOR 48" BUTTERFLY LINE VALVE ON STEEL MAIN
25	45700-W	STANDARD SUPPORTS FOR WATER MAINS INSTALLED AT SUBWAYS AND IN EXTREMELY YIELDING SOIL
26	46006-X	STANDARD BLOWOFFS, DETAILS OF VALVE AND BLOWOFF MANHOLES
27	46069-Y	STANDARD CHAMBER FOR 12" OUTLET VALVE
28	46104-W	INSULATED FLANGE JOINTS FOR REDUCTION OF ELECTROLYSIS IN TRUNK MAINS
29	46105-W	STANDARD CHAMBER FOR INTERMEDIATE INSULATED FLANGE JOINTS FOR 36" TO 72" STEEL AND CONCRETE PIPE
30	46464-Z	METHOD FOR PROTECTING D.I. WATER MAINS WITH SHALLOW (LESS THAN 24") COVER
31	48829-Z	EXPANSION JOINT FOR 30", 36" AND 48" DIA. BUTTERFLY VALVES
32	WM0401	PAVEMENT EXCAVATION LIMITS FOR PERMANENT RESTORATION IN STREETS NOT PROTECTED BY N.Y.C. ADM. CODE § 19.144, WATER MAINS 20" AND LESS IN DIAMETER
33	WM0402	PAVEMENT EXCAVATION LIMITS FOR PERMANENT RESTORATION IN STREETS PROTECTED BY N.Y.C. ADM. CODE § 19.144, WATER MAINS 20" AND LESS IN DIAMETER
34	WM0403	PAVEMENT EXCAVATION LIMITS FOR PERMANENT RESTORATION, WATER MAINS 24" AND LARGER IN DIAMETER

LIST OF WATER MAIN STANDARD DRAWINGS

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**HYDRANT SETTING METHODS & DRAIN BASE**  
(NOT TO SCALE)



**DETAIL "A"**  
DRAIN ASSEMBLY  
FOR HYDRANT SET ON DRAIN BASE



**METHOD - B (PLAN)**

**NOTES:**

1. HYDRANT DRAIN BASE MUST BE MADE IN ACCORDANCE WITH DEPARTMENT'S LATEST STANDARD SPECIFICATION FOR IRON CASTINGS.
2. LOCATION OF THE DOMED CAST IRON HYDRANT DRAIN IN METHOD-B TO BE AS DETERMINED BY THE ENGINEER.
3. THE DISTANCE OF THE HYDRANT VALVE FROM THE WATER MAIN WILL BE 1 FOOT UNLESS OTHERWISE SHOWN ON CONTRACT PLANS AND/OR AS DIRECTED BY THE ENGINEER.
4. SELECT GRANULAR FILL MUST BE PROVIDED TO BACKFILL VOID SPACE FROM THE BOTTOM OF THE CONCRETE BLOCKS UP TO THE BOTTOM OF THE VALVE BOX SKIRT, IN LINE WITH THE TOP OF THE VALVE BOX FLANGE.

DRAIN BASE WEIGHT - LBS		
MIN.	STD.	MAX.
229	270	284

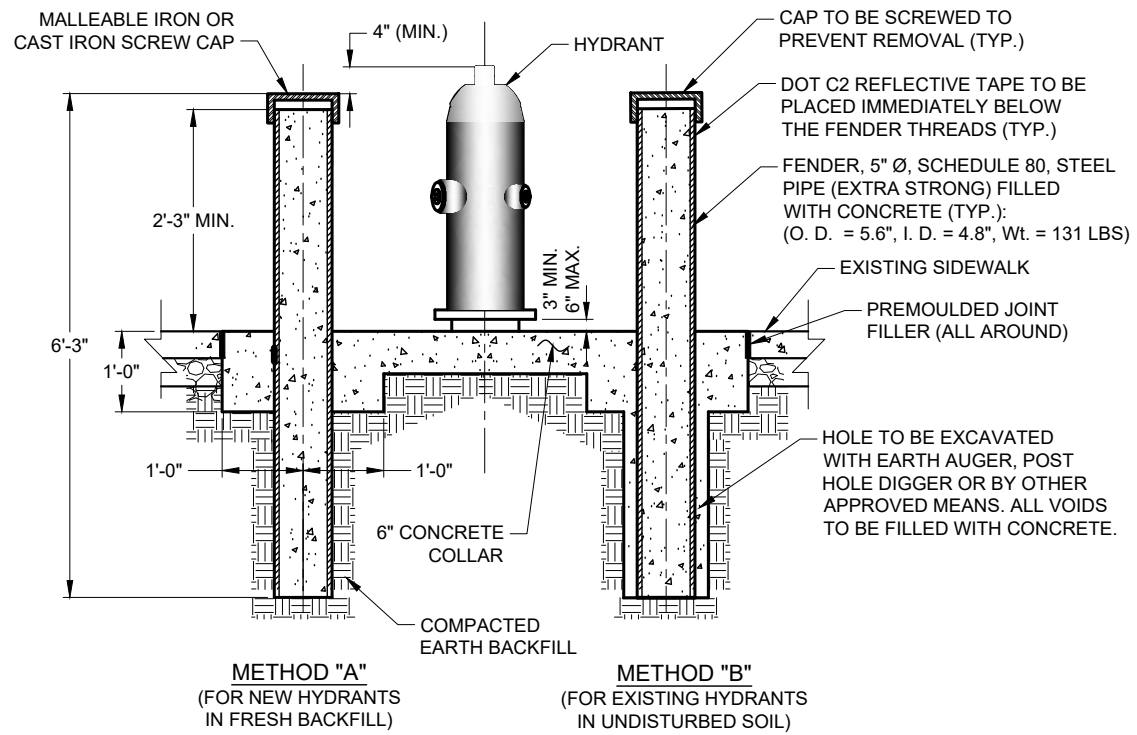
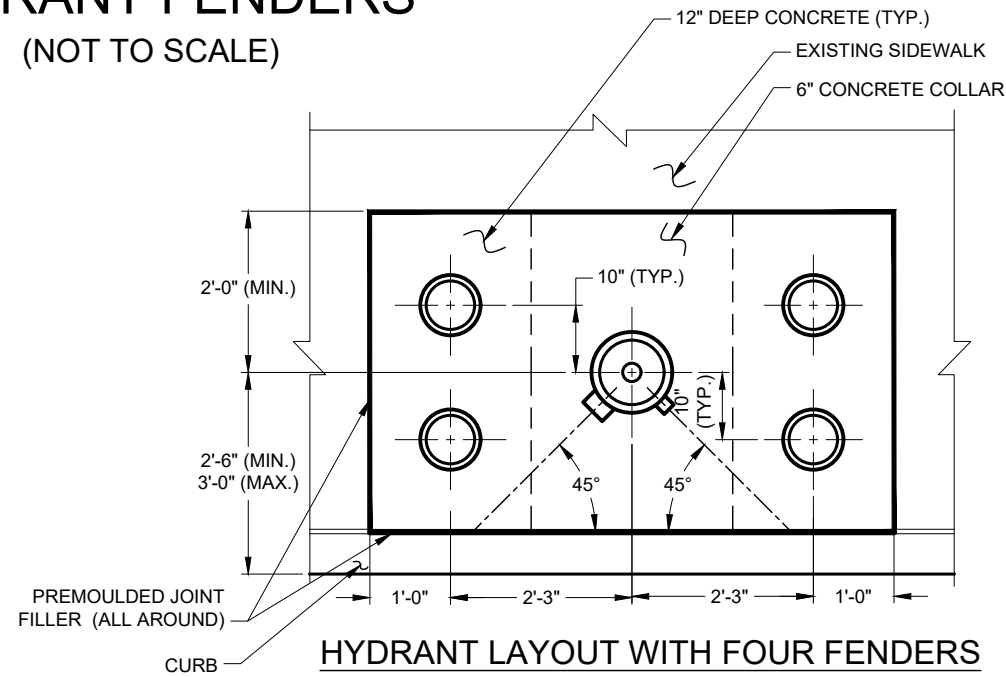
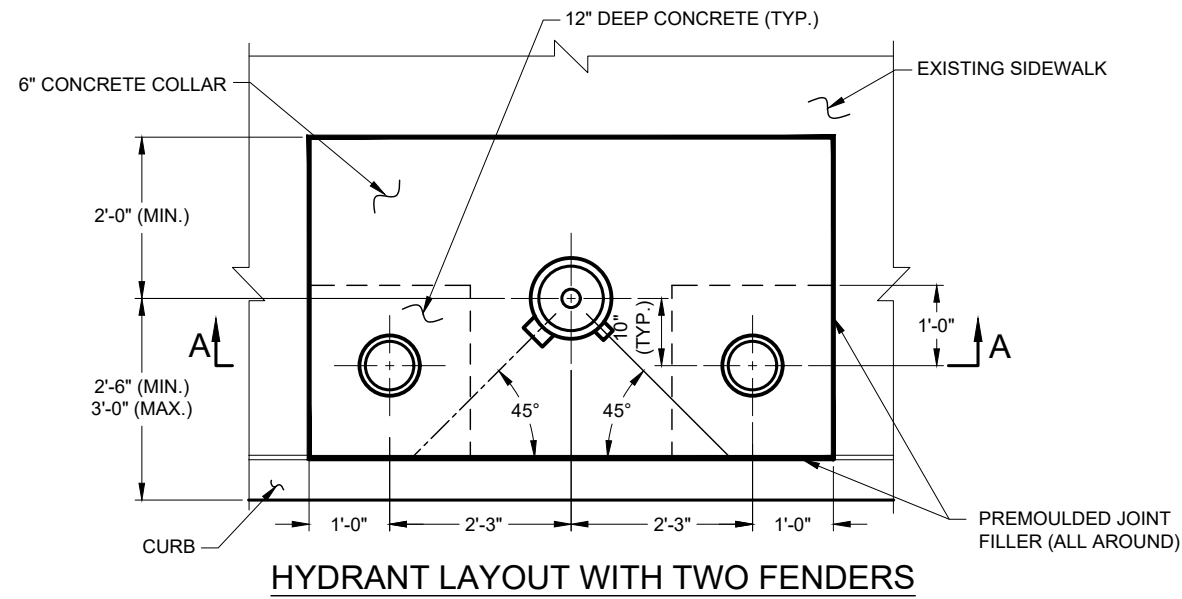
*Moham Zanganeh* P.E.  
ASSOCIATE COMMISSIONER, DESIGN  
DEPARTMENT OF DESIGN AND CONSTRUCTION

11-30-20  
DATE

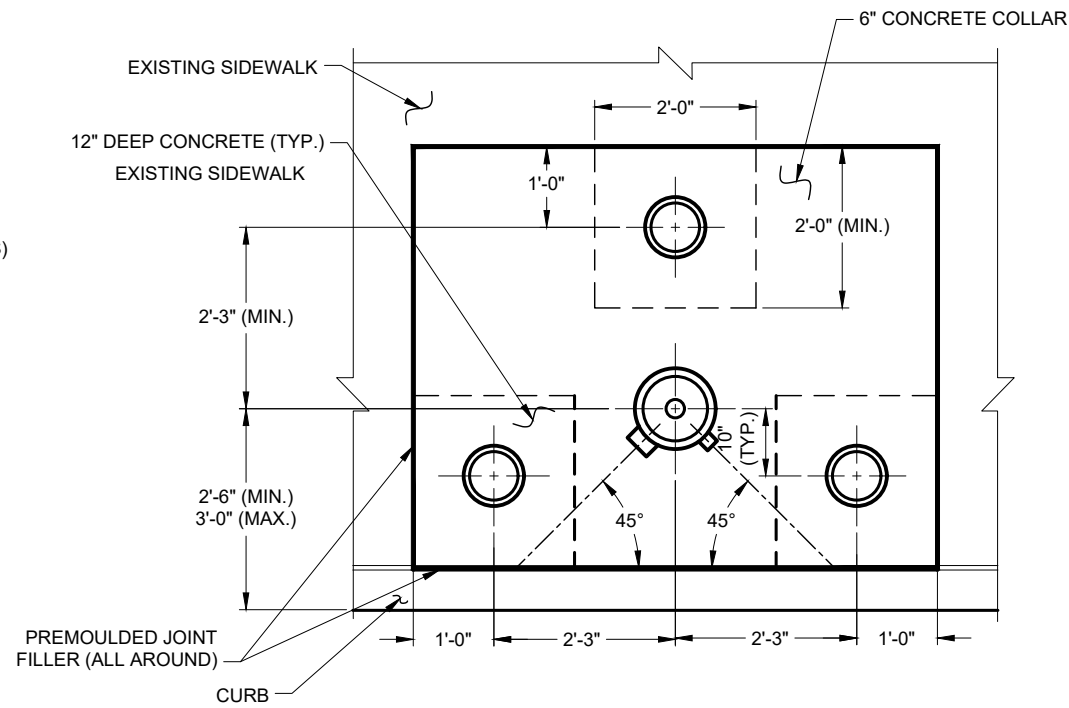
*Thomas Wynne* P.E.  
EXECUTIVE DIRECTOR OF ENGINEERING  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

11/30/2020  
DATE

# HYDRANT FENDERS (NOT TO SCALE)



**SECTION A-A**



**NOTES:**

1. CONCRETE COLLARS MUST BE SQUARED AND MADE FLUSH WITH EXISTING SIDEWALK, PAVEMENT, AND CURB.
2. ALL PARTS OF HYDRANT FENDERS MUST BE CLEANED OF SCALE, RUST, AND DIRT AND BE COATED ON THE OUTSIDE WITH A COAT OF RED PRIMER AND ONE COAT OF BLACK ASPHALT PAINT BELOW THE GROUND AND ONE COAT OF INDUSTRIAL GRADE ALUMINUM PAINT ABOVE THE GROUND.
3. THE NUMBER OF HYDRANT FENDERS INSTALLED, AT ANY LOCATION, WILL BE AT THE DISCRETION OF THE ENGINEER.  
  
TYPICALLY, HYDRANT LAYOUT WITH TWO FENDERS IS USED AT MID BLOCK LOCATIONS AND HYDRANT LAYOUTS WITH THREE OR FOUR FENDERS ARE USED IN ISLANDS/MEDIANS OR COMMERCIAL DRIVEWAY AREAS.
4. ALL FIELD PAINT MUST BE APPLIED WITH A MINIMUM OF TWO (2) COATS BY BRUSH AS PER THE MANUFACTURER'S INSTRUCTIONS.
5. EXISTING HYDRANTS TO BE CLEANED OF SCALE, RUST AND DIRT PRIOR TO RECEIVING FINISH COATING.
6. ALL HYDRANTS MUST HAVE ONE FINISH COAT OF HEAVY DUTY / INDUSTRIAL EXTERIOR GRADE ENAMEL PAINT  
  
TOP = BRIGHT ALUMINUM  
UPPER SECTION = BLACK < 24" PIPE DIA.  
RED ≥ 24" PIPE DIA.
7. SIZE OF WATER MAIN TO BE STENCILED ON STREET SIDE OF HYDRANT IN HEAVY DUTY / EXTERIOR ENAMEL PAINT.  
COLOR = HIGH GLOSS WHITE  
MIN. HEIGHT = 4"  
MAX. HEIGHT = 6"
8. UNITED STATES DEPARTMENT OF TRANSPORTATION CERTIFIED 2" WIDE (DOT C2) REFLECTIVE TAPE MUST BE PLACED IMMEDIATELY BELOW THE THREADS OF THE HYDRANT FENDERS AND MUST ENCIRCLE THE HYDRANT FENDER'S CIRCUMFERENCE. THE TYPE OF DOT C2 TAPE MUST BE 6" RED/6" WHITE.

*Moham Fanzuelchi*  
P.E.  
ASSOCIATE COMMISSIONER, DESIGN  
DEPARTMENT OF DESIGN AND CONSTRUCTION

11-30-20  
DATE

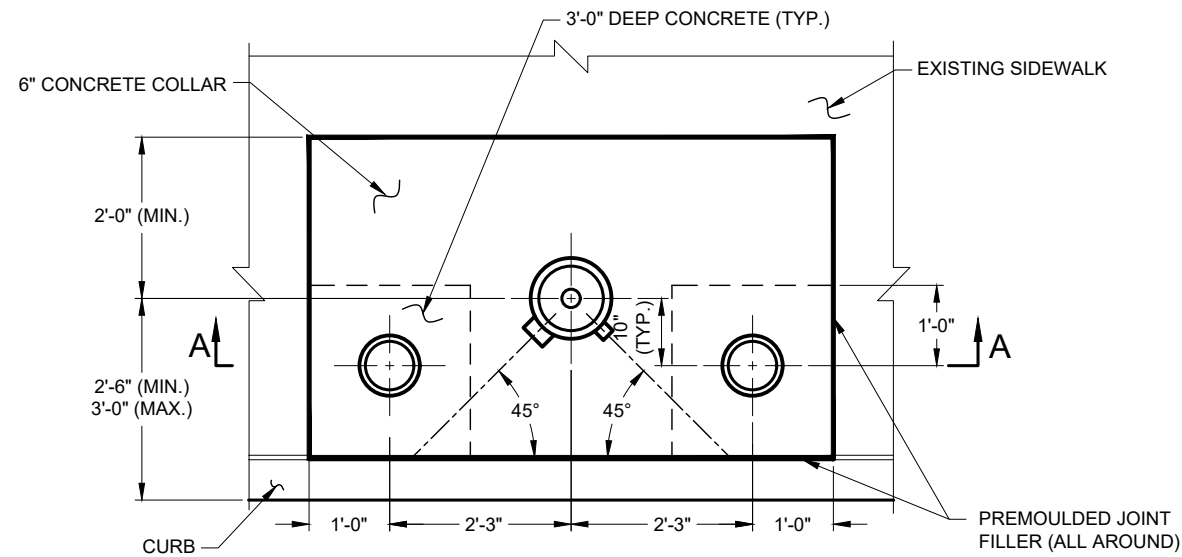
*Thomas Wynne*  
P.E.  
EXECUTIVE DIRECTOR OF ENGINEERING  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

11/30/2020  
DATE

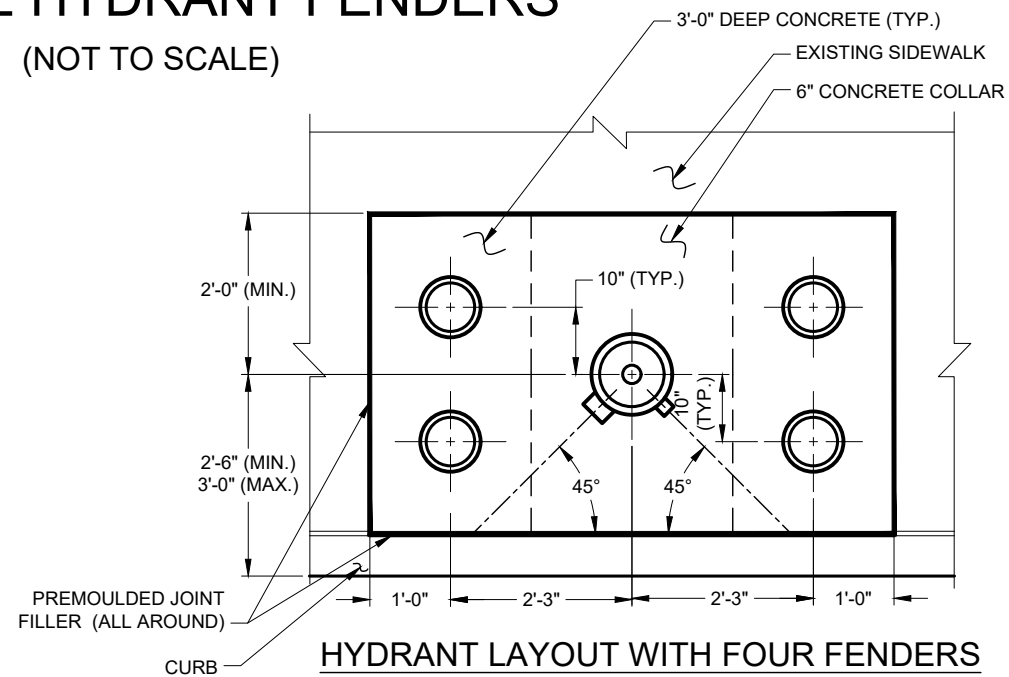


CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OVERSIZE HYDRANT FENDERS

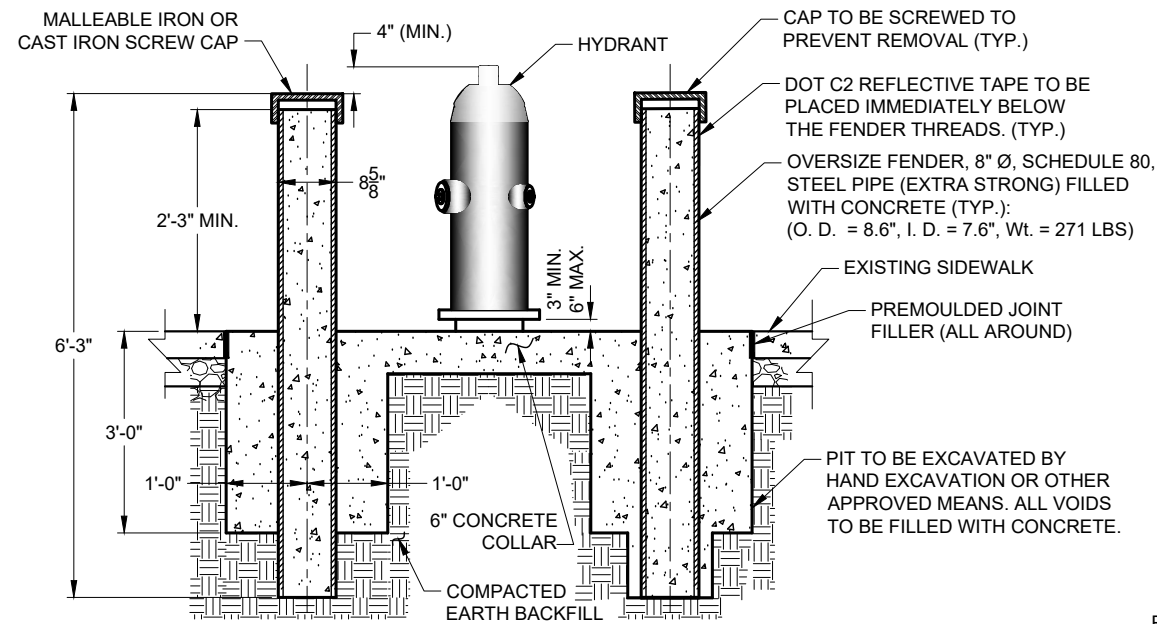
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HYDRANT LAYOUT WITH TWO FENDERS



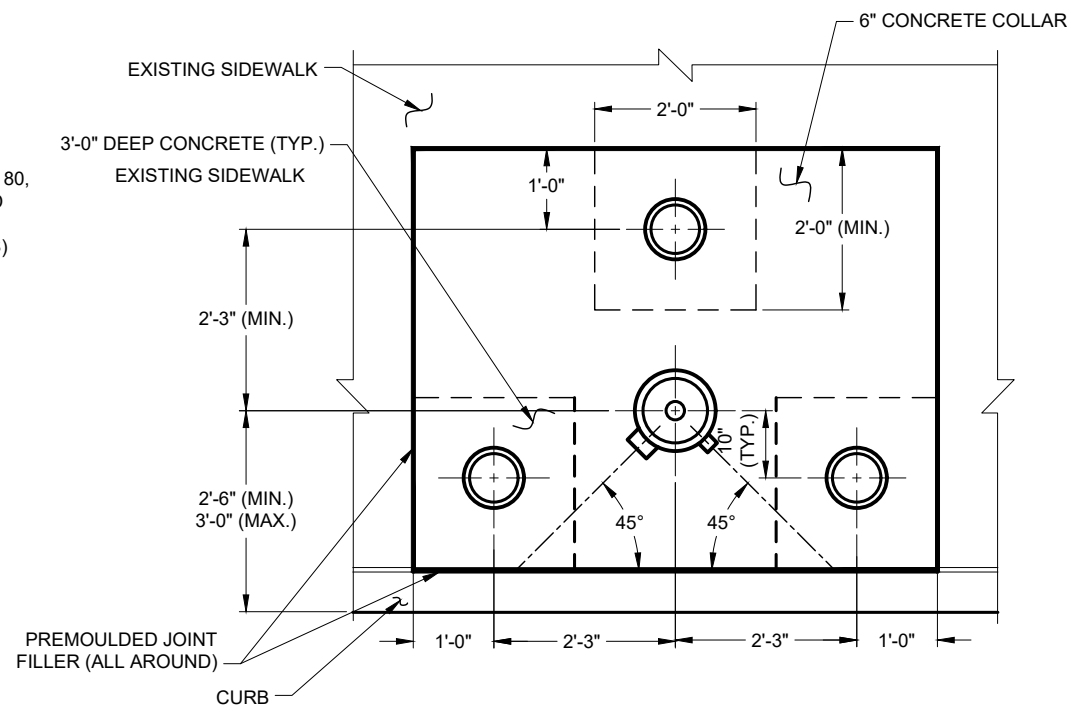
HYDRANT LAYOUT WITH FOUR FENDERS



METHOD "A"  
(FOR NEW HYDRANTS  
IN FRESH BACKFILL)

METHOD "B"  
(FOR EXISTING HYDRANTS  
IN UNDISTURBED SOIL)

SECTION A-A



HYDRANT LAYOUT WITH THREE FENDERS

NOTES:

1. CONCRETE COLLARS MUST BE SQUARED AND MADE FLUSH WITH EXISTING SIDEWALK, PAVEMENT, AND CURB. THE CONTRACTOR MUST HAND EXCAVATE THE FENDER PIT TO THE REQUIRED DEPTH AND WIDTH WITH CARE NOT TO DAMAGE THE HYDRANT PARTS. THE CONTRACTOR MUST ENSURE A MINIMUM OF 6" CLEARANCE BETWEEN THE HYDRANT DRAIN BASE AND FENDER CONCRETE ENCASUREMENT.
2. ALL PARTS OF OVERSIZE HYDRANT FENDERS MUST BE CLEANED OF SCALE, RUST, AND DIRT AND BE COATED ON THE OUTSIDE WITH A COAT OF RED PRIMER AND ONE COAT OF BLACK ASPHALT PAINT BELOW THE GROUND AND ONE COAT OF INDUSTRIAL GRADE ALUMINUM PAINT ABOVE THE GROUND.
3. THE NUMBER OF OVERSIZE HYDRANT FENDERS INSTALLED, AT ANY LOCATION, WILL BE AT THE DISCRETION OF THE ENGINEER.  
  
TYPICALLY, HYDRANT LAYOUT WITH TWO FENDERS IS USED AT MID BLOCK LOCATIONS AND HYDRANT LAYOUTS WITH THREE OR FOUR FENDERS ARE USED IN ISLANDS/MEDIANS OR COMMERCIAL DRIVEWAY AREAS.
4. ALL FIELD PAINT MUST BE APPLIED WITH A MINIMUM OF TWO (2) COATS BY BRUSH AS PER THE MANUFACTURER'S INSTRUCTIONS.
5. EXISTING HYDRANTS TO BE CLEANED OF SCALE, RUST AND DIRT PRIOR TO RECEIVING FINISH COATING.
6. ALL HYDRANTS MUST HAVE ONE FINISH COAT OF HEAVY DUTY / INDUSTRIAL EXTERIOR GRADE ENAMEL PAINT  
  
TOP = BRIGHT ALUMINUM  
UPPER SECTION = BLACK < 24" PIPE DIA.  
RED ≥ 24" PIPE DIA.
7. SIZE OF WATER MAIN TO BE STENCILED ON STREET SIDE OF HYDRANT IN HEAVY DUTY / EXTERIOR ENAMEL PAINT.  
COLOR = HIGH GLOSS WHITE  
MIN. HEIGHT = 4"  
MAX. HEIGHT = 6"
8. THE USE OF OVERSIZE HYDRANT FENDERS MUST BE AS SHOWN ON THE CONTRACT DRAWINGS OR AS DIRECTED BY THE ENGINEER.
9. UNITED STATES DEPARTMENT OF TRANSPORTATION CERTIFIED 2" WIDE (DOT C2) REFLECTIVE TAPE MUST BE PLACED IMMEDIATELY BELOW THE THREADS OF THE HYDRANT FENDERS AND MUST ENCIRCLE THE HYDRANT FENDER'S CIRCUMFERENCE. THE TYPE OF DOT C2 TAPE MUST BE 6" RED/6" WHITE.

*Robert Fungalechi*  
P.E.

ASSOCIATE COMMISSIONER, DESIGN  
DEPARTMENT OF DESIGN AND CONSTRUCTION

11-30-20

DATE

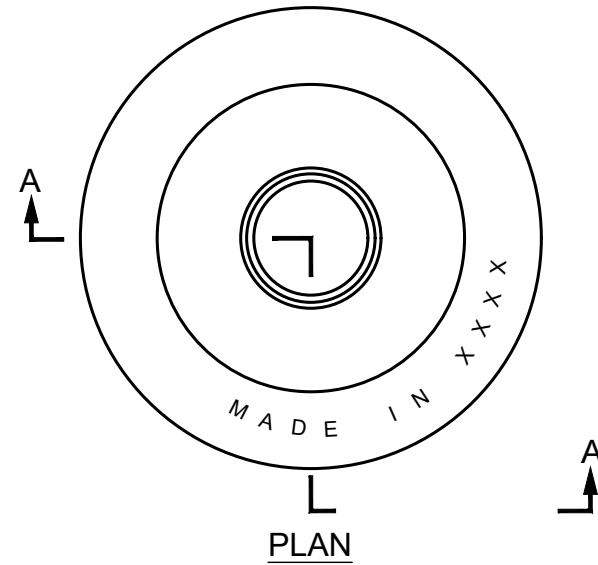
*Thomas Wynne*  
P.E.

EXECUTIVE DIRECTOR OF ENGINEERING  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

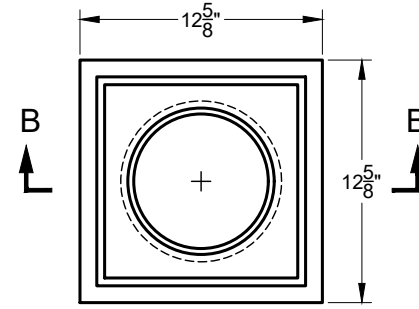
11/30/2020

DATE

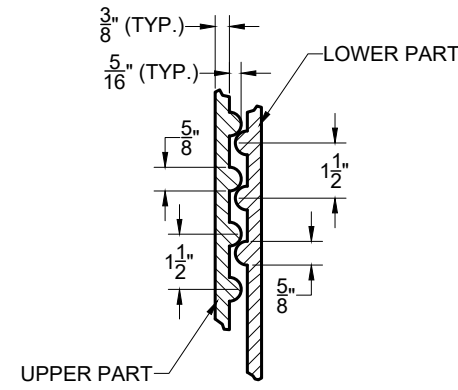
HYDRANT VALVE BOX  
(NOT TO SCALE)



PLAN



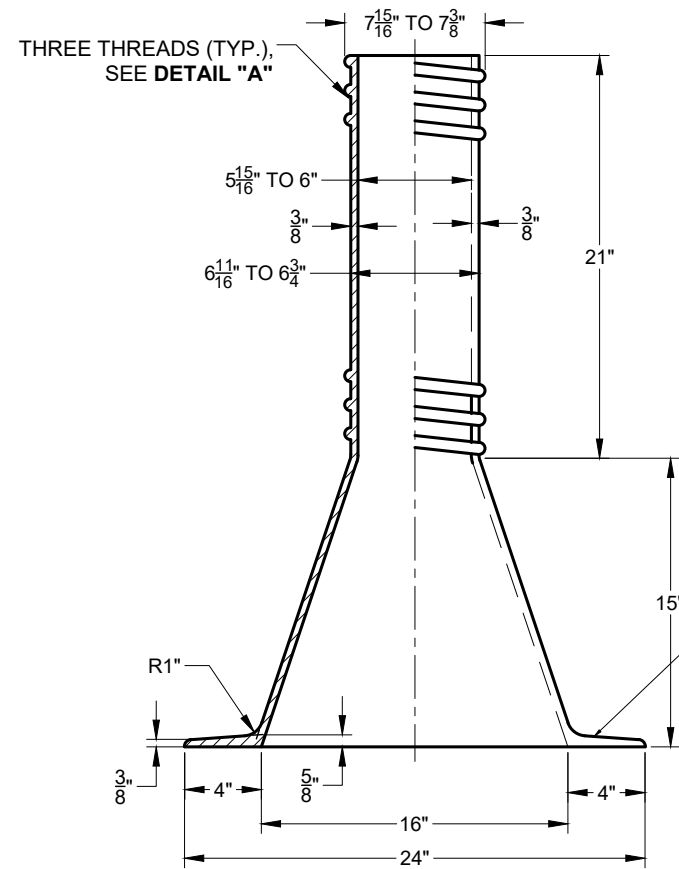
PLAN



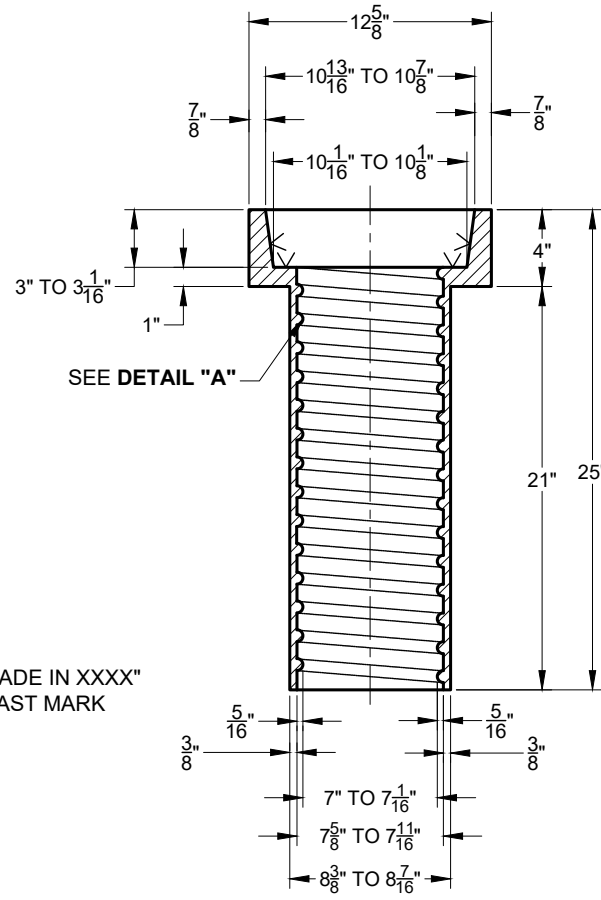
DETAIL "A"

NOTES:

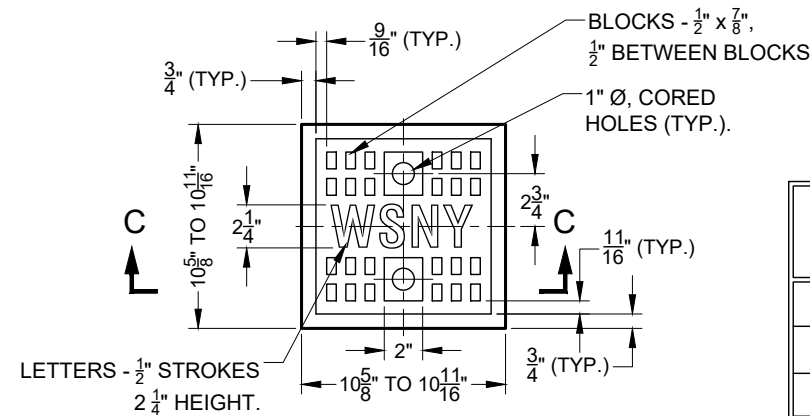
1. ALL CASTINGS MUST CONFORM TO THE STANDARD SPECIFICATIONS FOR IRON CASTINGS, DEPARTMENT OF ENVIRONMENTAL PROTECTION, CITY OF NEW YORK.
2. WHEN TOLERANCE IN DIMENSIONS IS NOT SHOWN, THE TOLERANCE IN THICKNESS OF METAL MUST NOT BE GREATER THAN 1/16 INCH. ALL OTHER DIMENSIONS MUST BE AS SHOWN ON THE DRAWING AND WITHIN THE TOLERANCES CONSISTENT WITH THE BEST FOUNDRY PRACTICE.
3. HYDRANT VALVE BOXES MUST BE DELIVERED IN ASSEMBLED SETS CONSISTING ONE EACH OF LOWER PART, UPPER PART, AND COVER PER SET PRIOR TO ASSEMBLY. THE COMPONENTS MUST BE COATED AS SPECIFIED IN SPECIFICATIONS MENTIONED ABOVE IN NOTE 1.



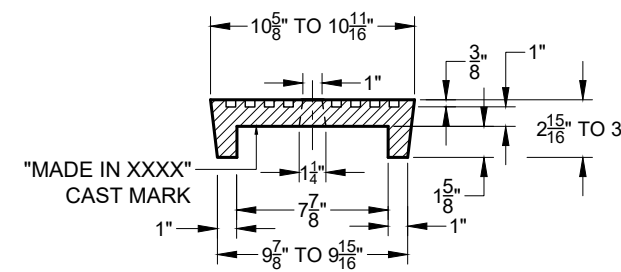
SECTION A-A  
LOWER PART



SECTION B-B  
UPPER PART



PLAN



SECTION C - C  
COVER

DESCRIPTION	WEIGHT - LBS		
	MIN.	STD.	MAX.
UPPER PART	108	120	126
LOWER PART	117	130	137
COVER	43	48	50

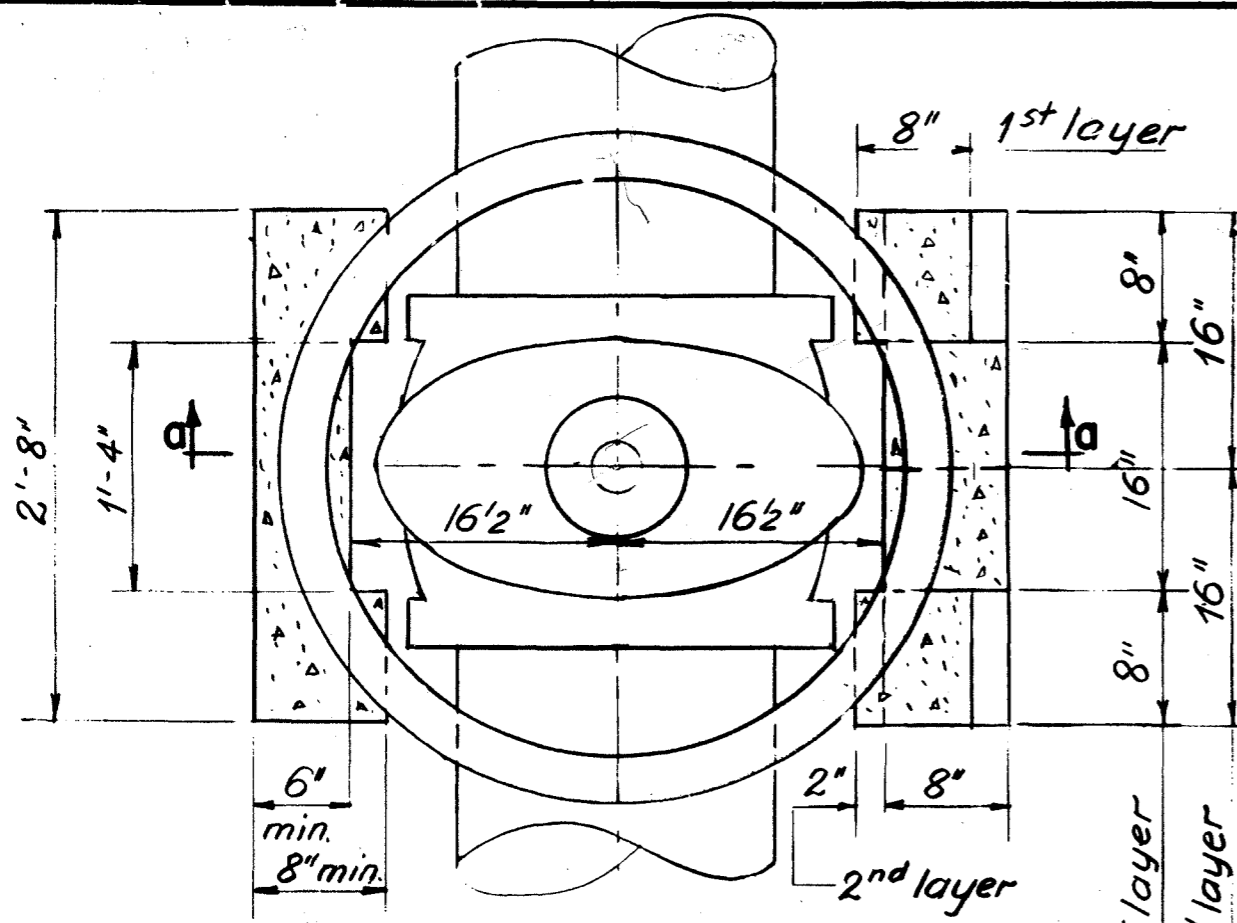
*Moham Fanzalechi* P.E.  
ASSOCIATE COMMISSIONER, DESIGN  
DEPARTMENT OF DESIGN AND CONSTRUCTION

11-30-20  
DATE

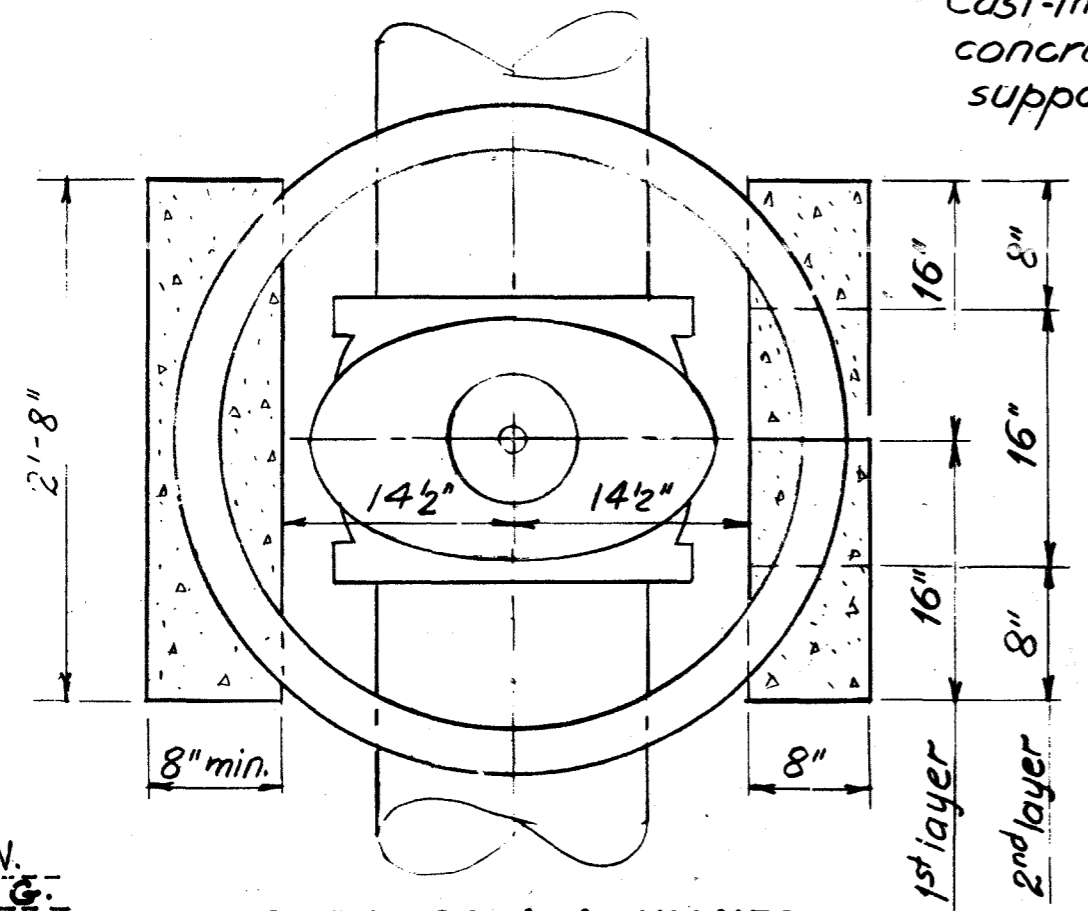
*Thomas Wynne* P.E.  
EXECUTIVE DIRECTOR OF ENGINEERING  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

11/30/2020  
DATE

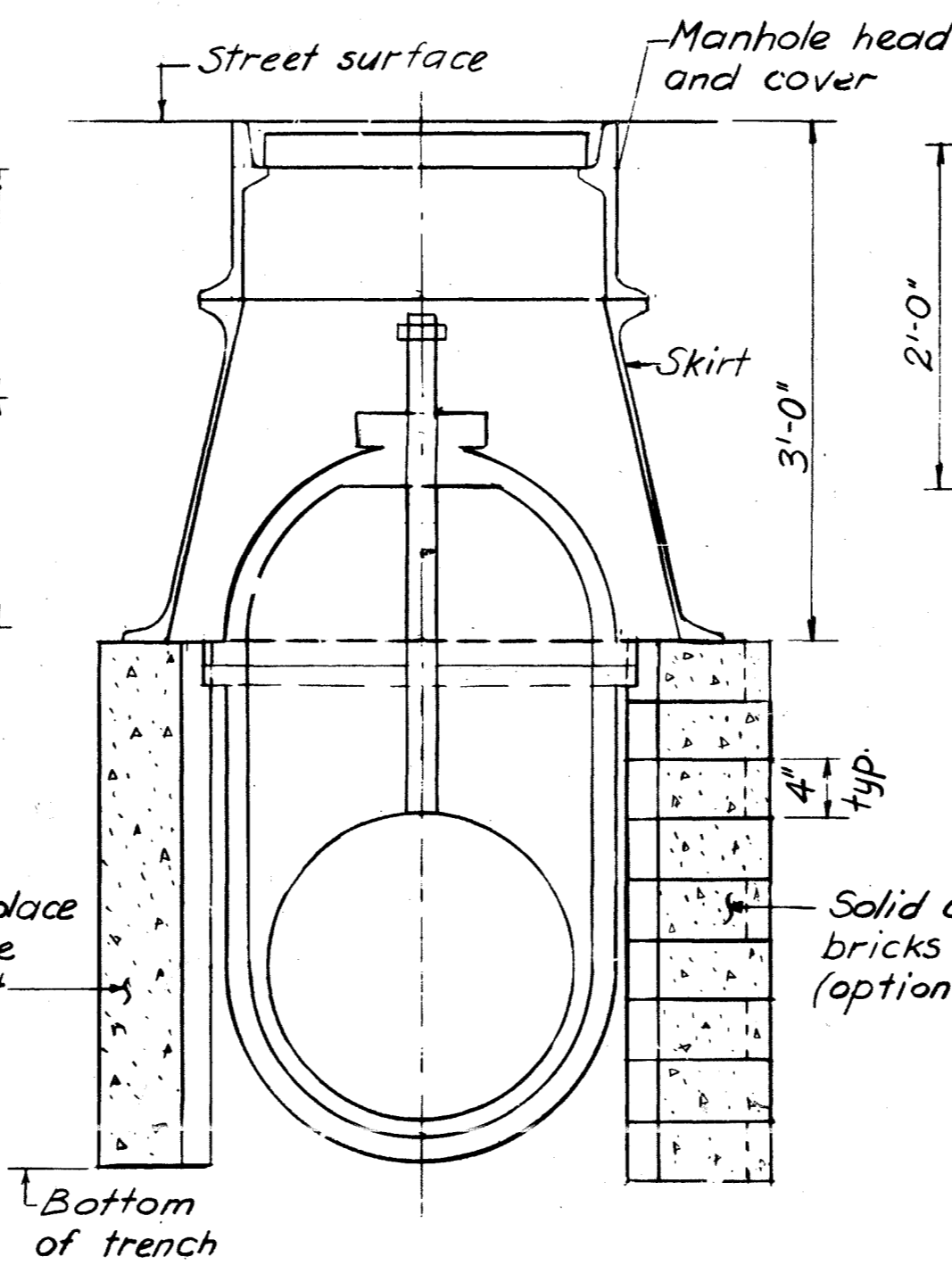




20-inch VALVE

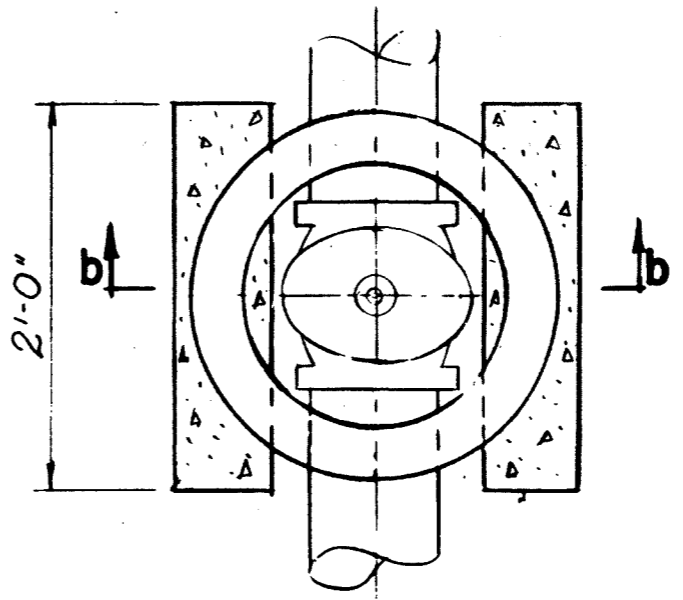


UP TO 20-inch VALVES

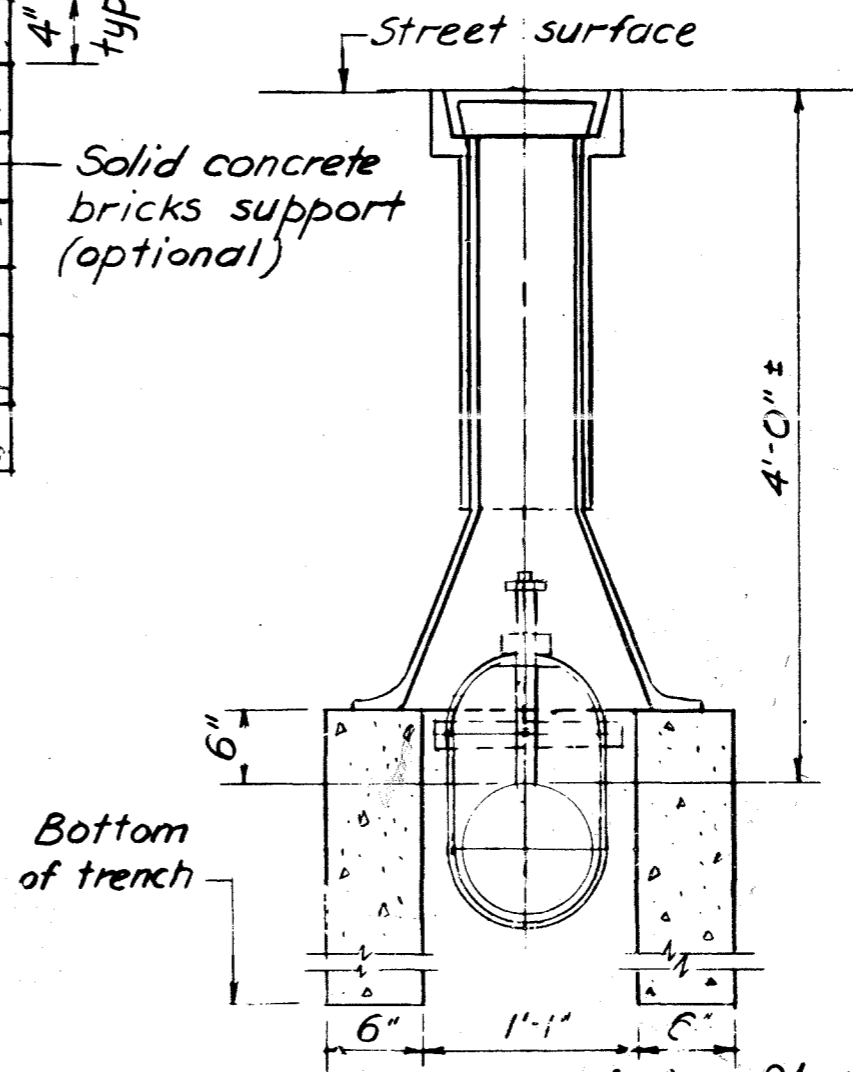


SECTION a-a

MAIN LINE VALVE BOXES



HYDRANT VALVE BOX



SECTION b-b

- NOTES:**
1. In wet trenches crushed stone or sand shall be placed under foundation, as required.
  2. For standard hydrant connection details, see Std. Dwg. No 18581-B-Z
  3. For details of standard manhole head and cover and skirt, See Std. Dwg. No. 10240-A-Z

This drawing  
supersedes  
Dwg. No. 11576-Z

Drawn I.V.  
Checked S.G.

Stephen G. Simeri  
Division Engineer

Walter C. Fitzpatrick  
Chief of Design

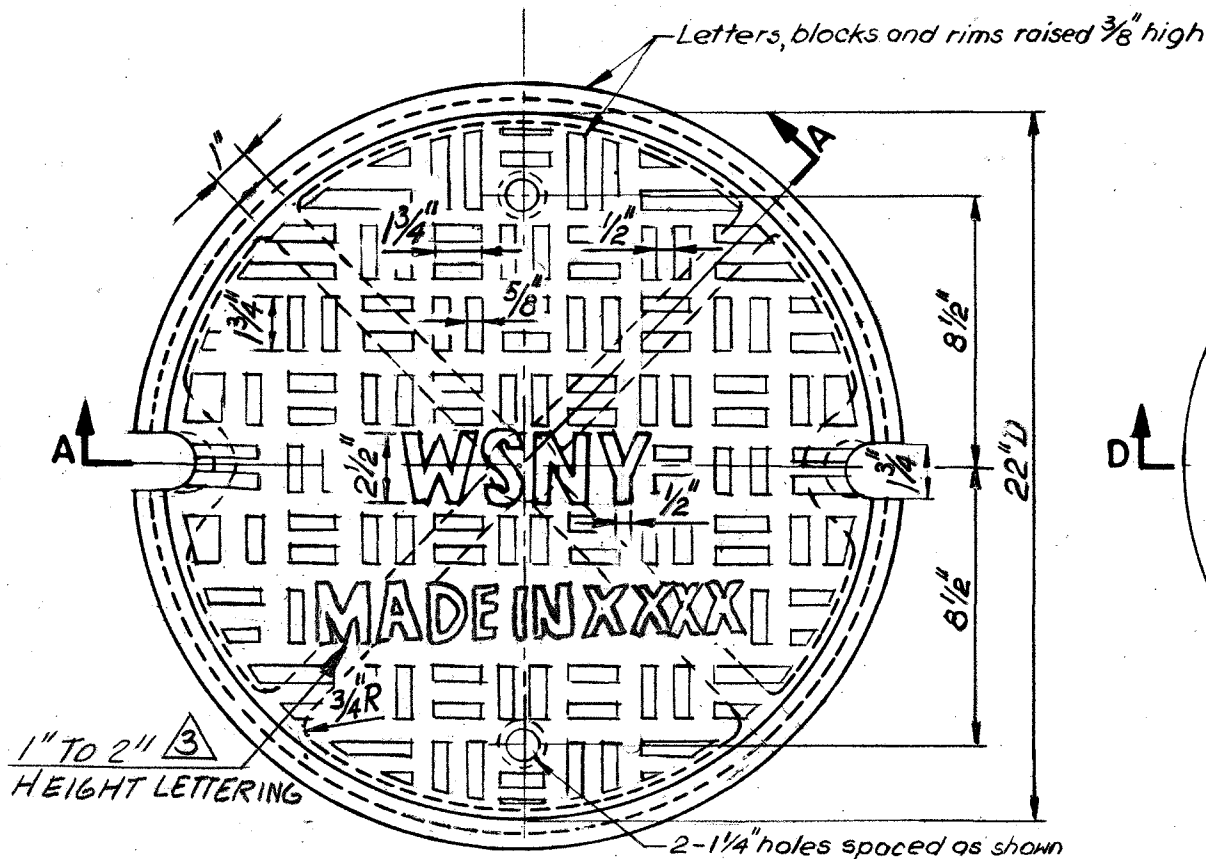
Edmund J. ...  
Deputy Director

City of New York  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY  
FOUNDATIONS  
FOR VALVE BOXES

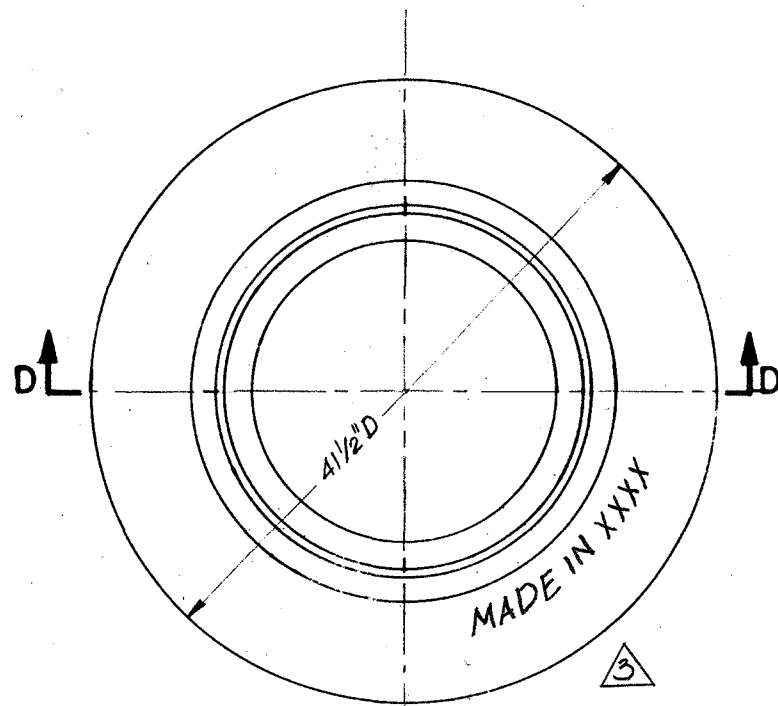
SCALE: 1" = 1'-0"  
FEBRUARY, 1984

11576-A-Z

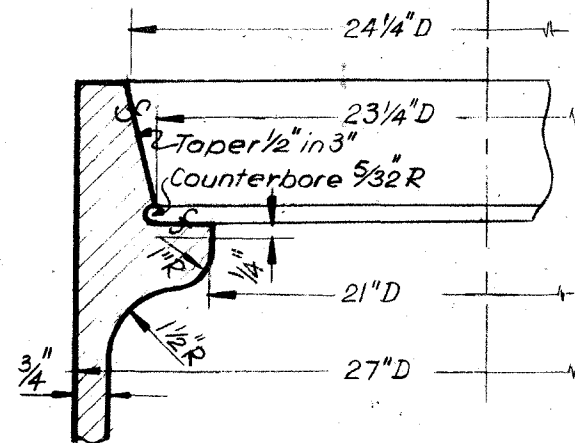




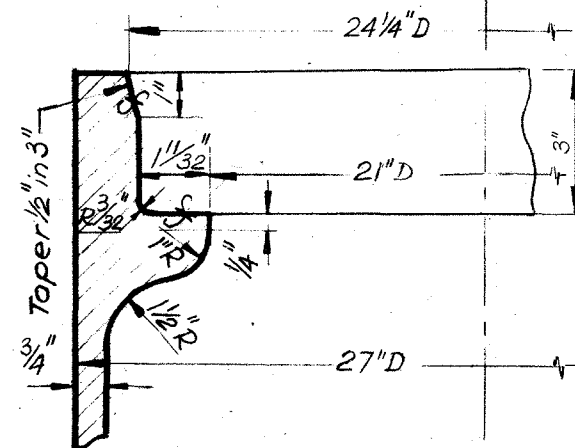
TOP VIEW



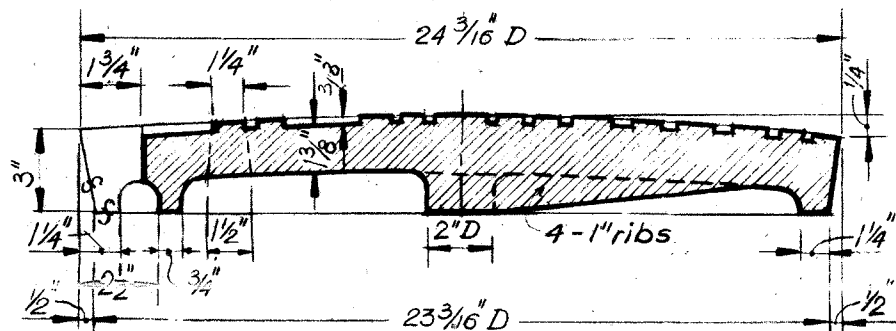
TOP VIEW



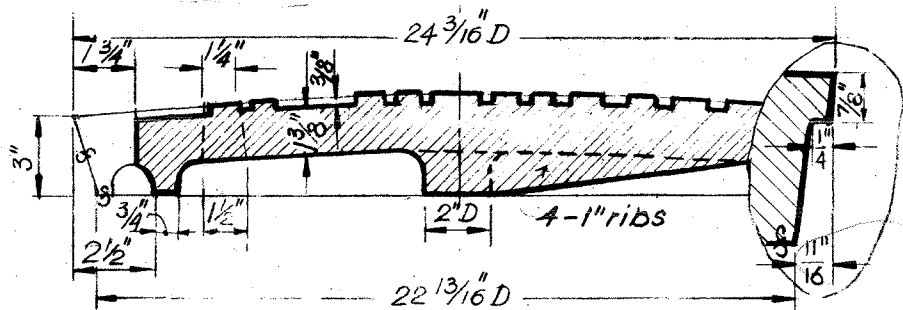
DETAIL OF SEAT TYPE I.



DETAIL OF SEAT TYPE II.



SECTION A-A TYPE A



SECTION A-A TYPE B

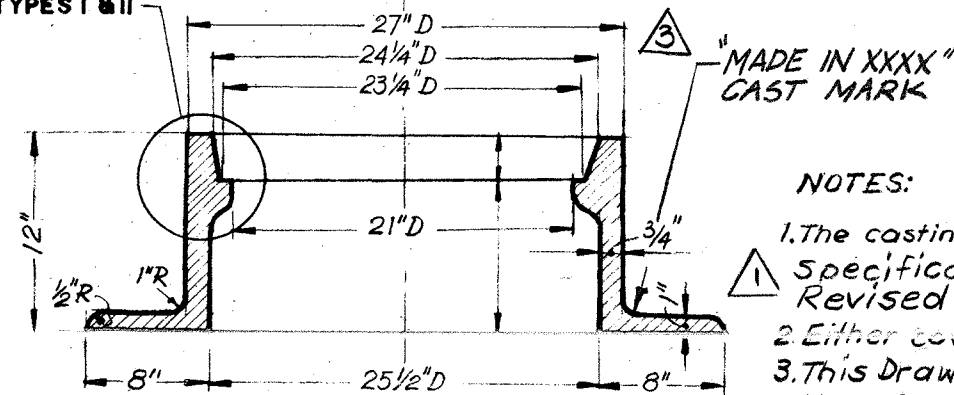
MANHOLE COVERS

CAST IRON

Cover std. Wt. - 226#  $\triangle$   
Min. Wt. - 208#  $\triangle$

Walter C. Fitzpatrick  
Chief of Design

SEE DETAIL OF SEAT TYPES I & II



SECTION D-D

MANHOLE HEAD

CAST IRON

- $\triangle$  12" head std. wt. - 513#
- $\triangle$  " " min. wt. - 472#
- $\triangle$  6" " std. wt. - 416#
- " " min. wt. - 383#

NOTES:

1. The casting shall conform to DEP Standard Specifications for Iron Castings; Revised to 2003. Latest Revision  $\triangle$
2. Either cover fits both seat types I and II.
3. This Drawing supersedes Drawing No. 13547-A-Z.

City of New York  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

WIDE FLANGE MANHOLE HEAD & COVER

CAST IRON

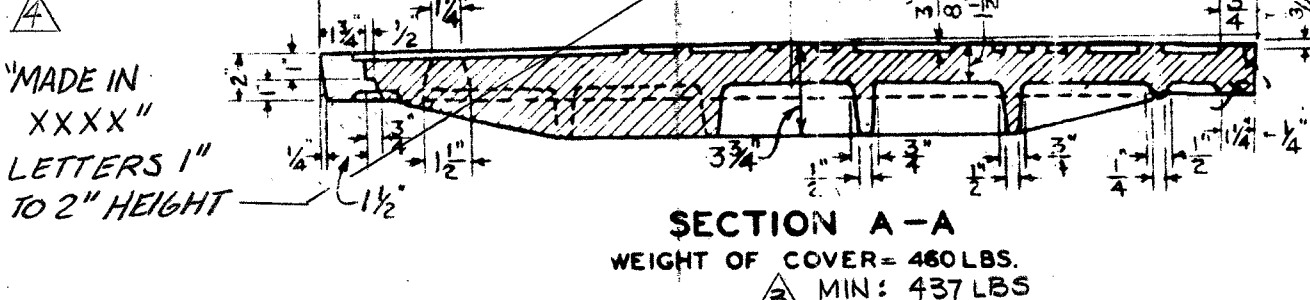
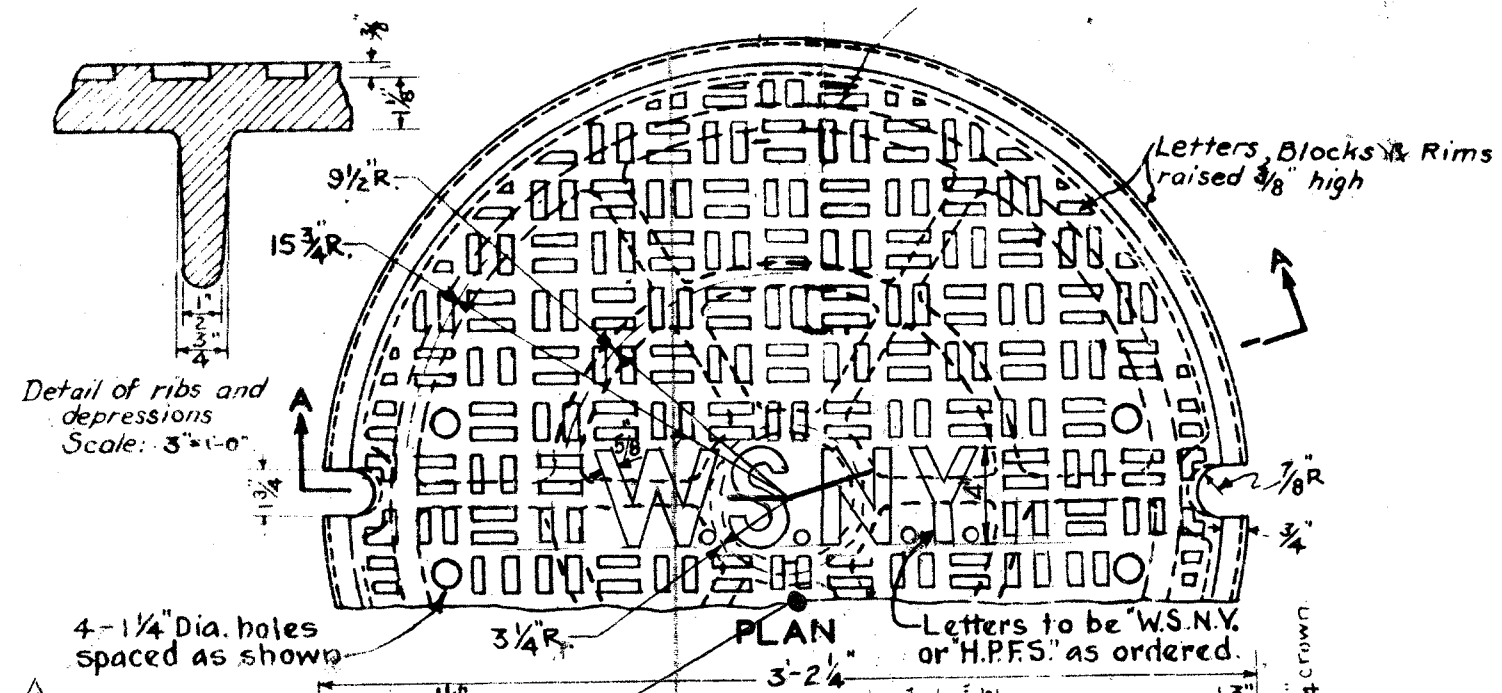
NOT TO SCALE

JANUARY, 1983

Edward C. Schneider  
Deputy Director

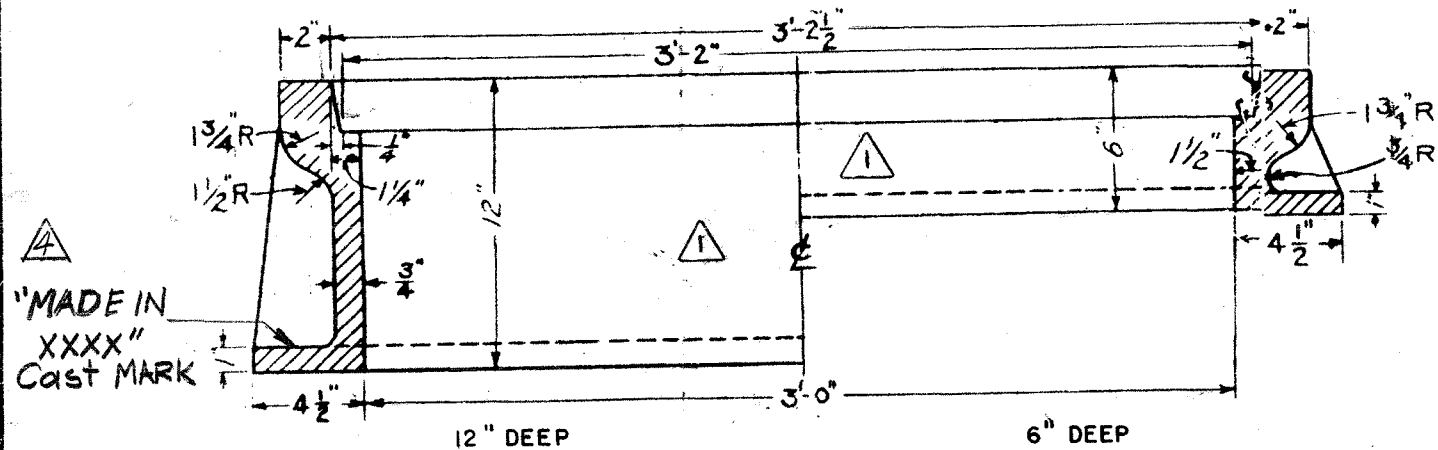
No.	DATE	REVISIONS
$\triangle$ 3	9/09/09	ADDED ORIGIN CAST MARK
$\triangle$ 2	6/27/03	ADDED MINIMUM WEIGHT
$\triangle$ 1	5/15/03	CHANGED REFERENCE TO STD. SPEC'S.

Blocks to be  $\frac{5}{8} \times 1\frac{3}{4}$ "  
 $\frac{1}{2}$ " space between blocks



**NOTE 1.**

The casting shall conform to DEP standard specifications for Iron Castings; Rev. 6/2003, Latest Revision

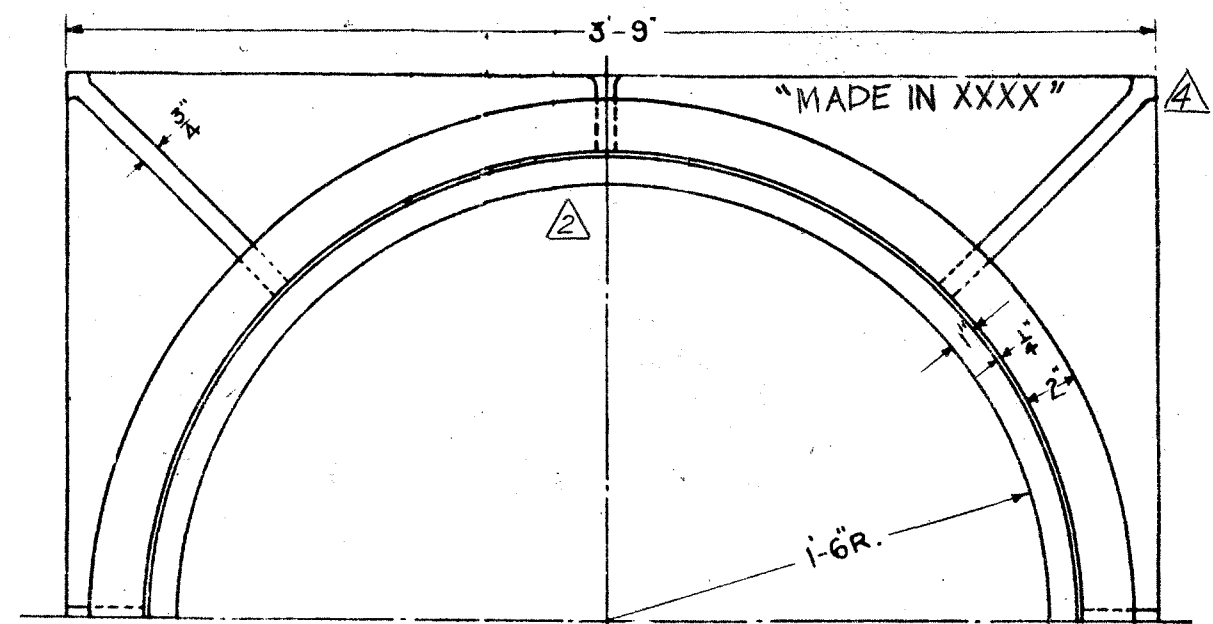


**MANHOLE FRAME**

To be furnished with either round or square base and 6" or 12" deep, as called for.

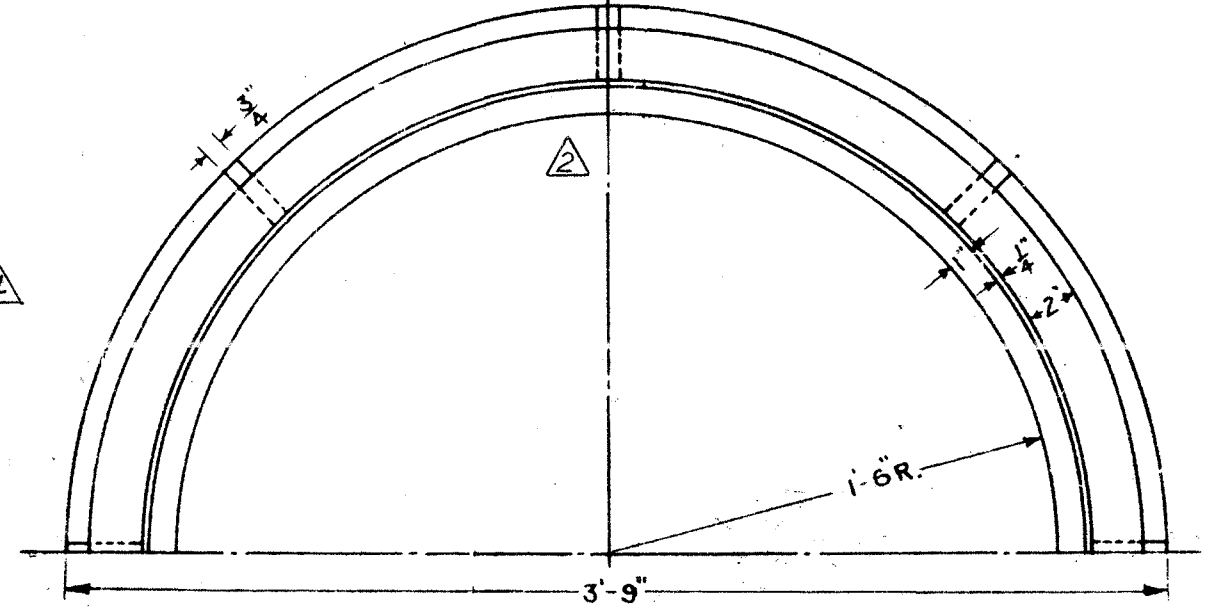
NO.	DATE	REVISIONS
3	6-27-03	Added minimum weight.
2	5-15-03	Added Note 1
1	12-19-85	Deleted holes for ladder rungs.

Drawn by S.E.M. & R.J.C.  
 Traced by S.E.M.  
 Checked by M.A.W.



**PLAN OF FRAME, SQUARE TYPE**

- WEIGHT OF FRAME 12" DEEP = 810 LBS.
- WEIGHT OF FRAME 12" DEEP - MIN. 770 LBS
- WEIGHT OF FRAME 6" DEEP = 640 LBS.
- WEIGHT OF FRAME 6" DEEP - MIN. 608 LBS



**PLAN OF FRAME, ROUND TYPE**

- WEIGHT OF FRAME 12" DEEP = 645 LBS.
  - WEIGHT OF FRAME 12" DEEP - MIN. 613 LBS.
  - WEIGHT OF FRAME 6" DEEP = 510 LBS.
  - WEIGHT OF FRAME 6" DEEP - MIN. 485 LBS.
- City of New York

DEPARTMENT OF ENVIRONMENTAL PROTECTION

**LARGE MANHOLE FRAME & COVER**

SCALE:  $1\frac{1}{2}'' = 1'-0''$

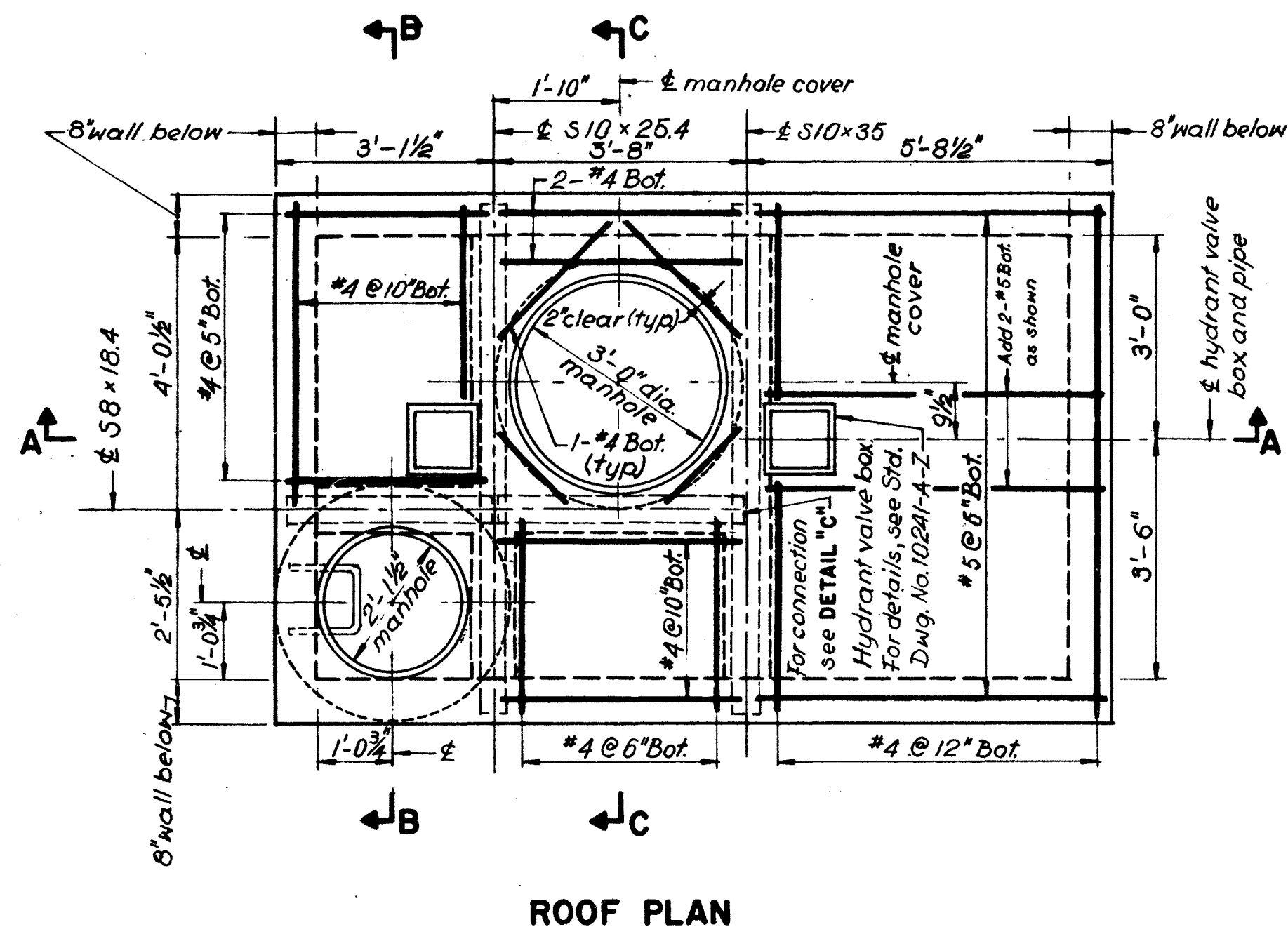
SEPT. 1951

*Harry Hollander*  
 DIVISION ENGINEER  
 DIV. OF INVESTIGATION & DESIGN

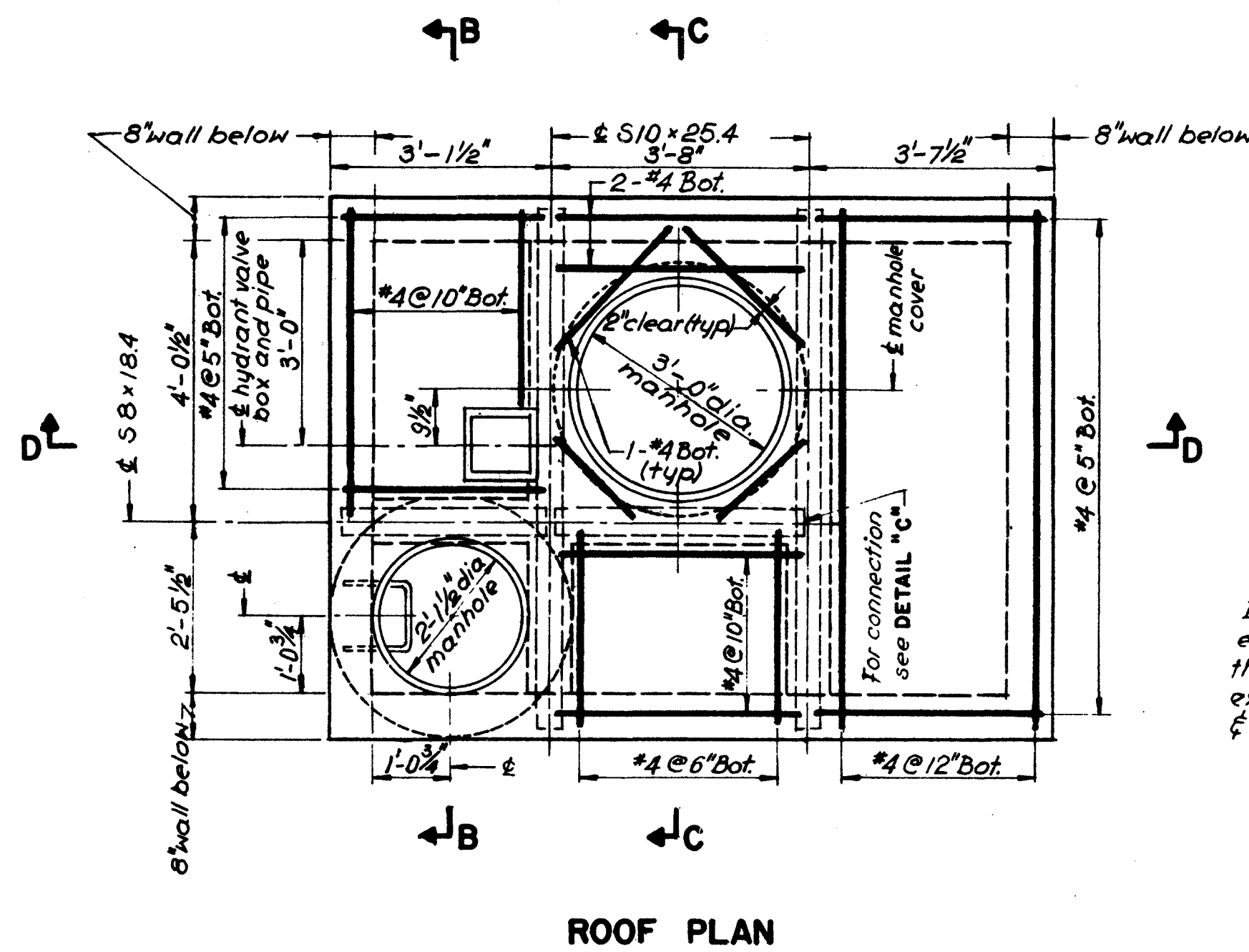
*Edward J. Clark*  
 CHIEF ENGINEER

18583-7

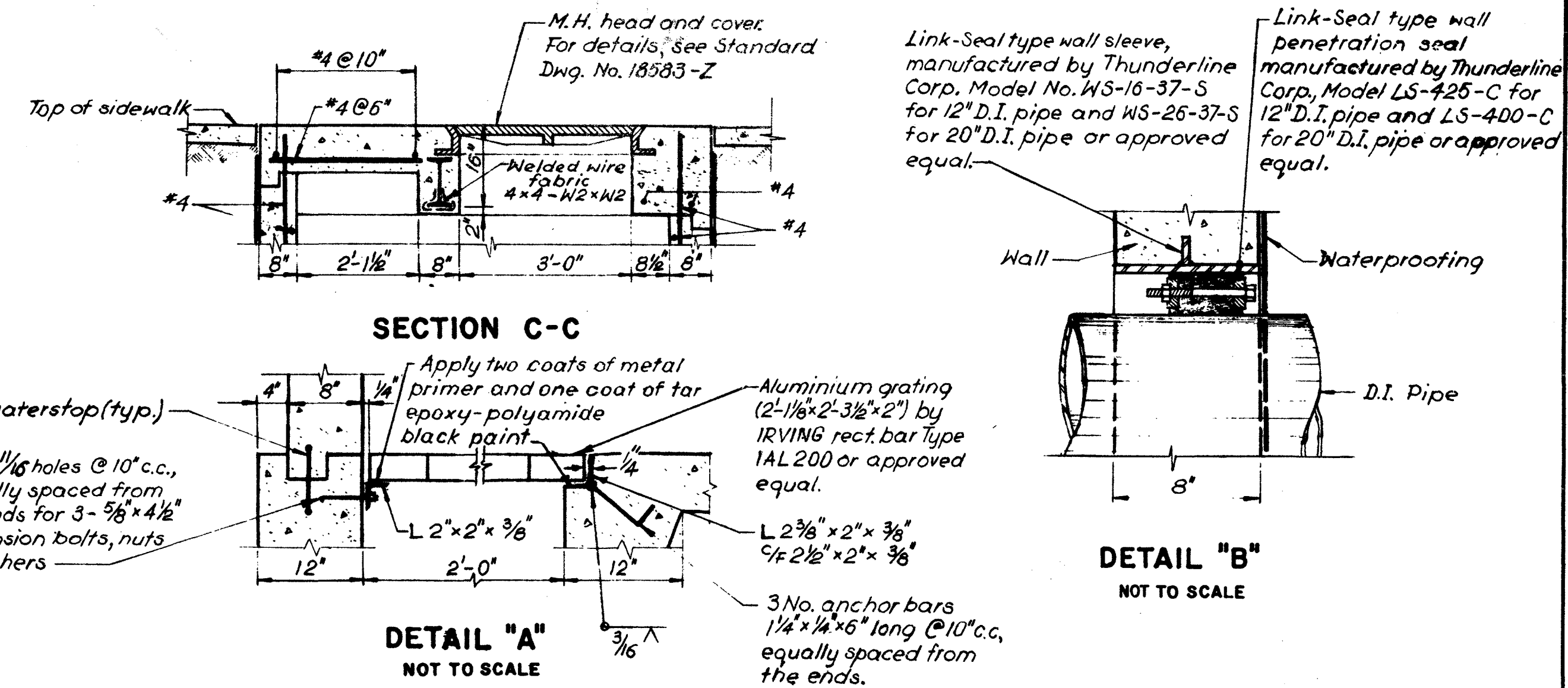




ROOF PLAN



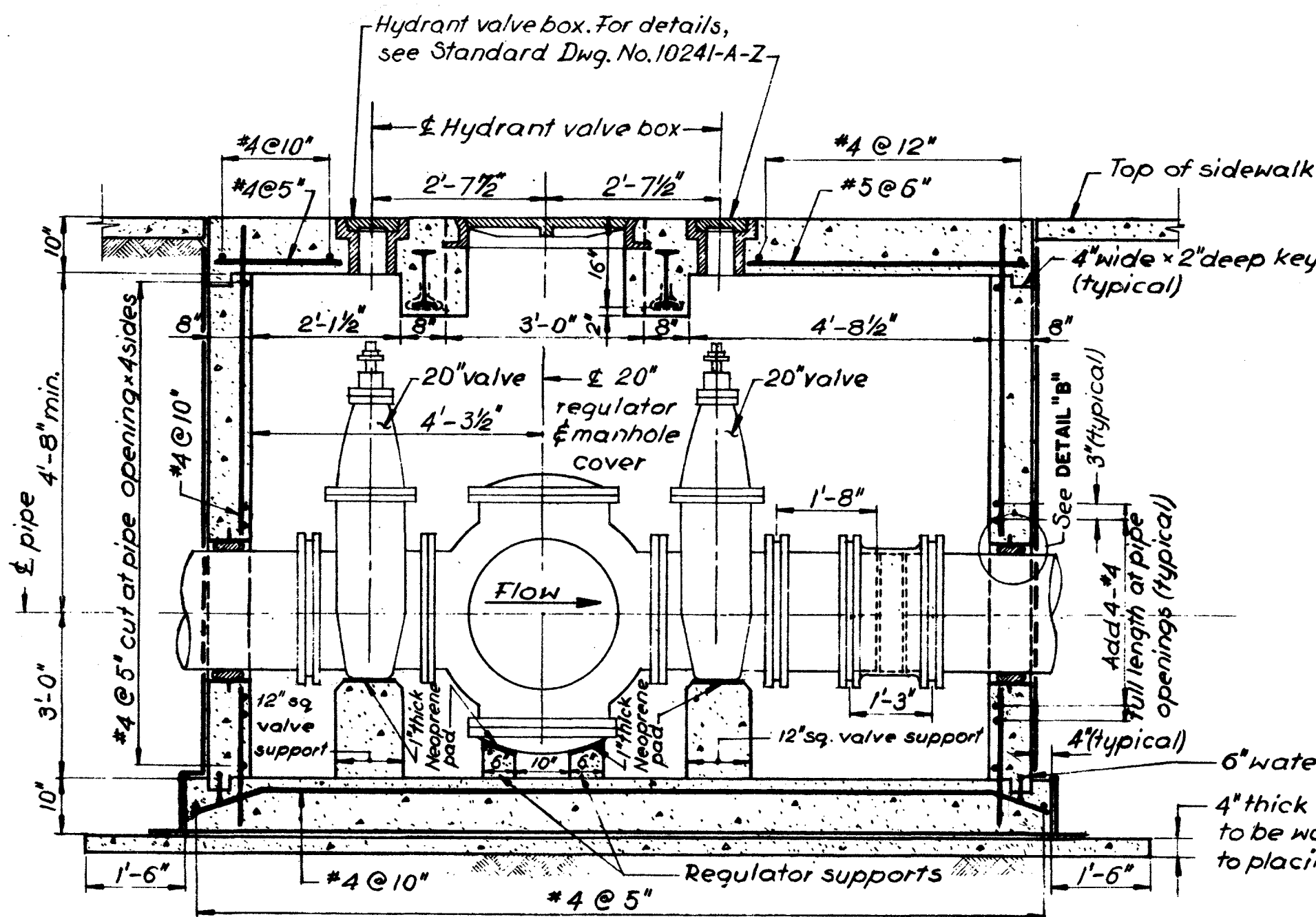
ROOF PLAN



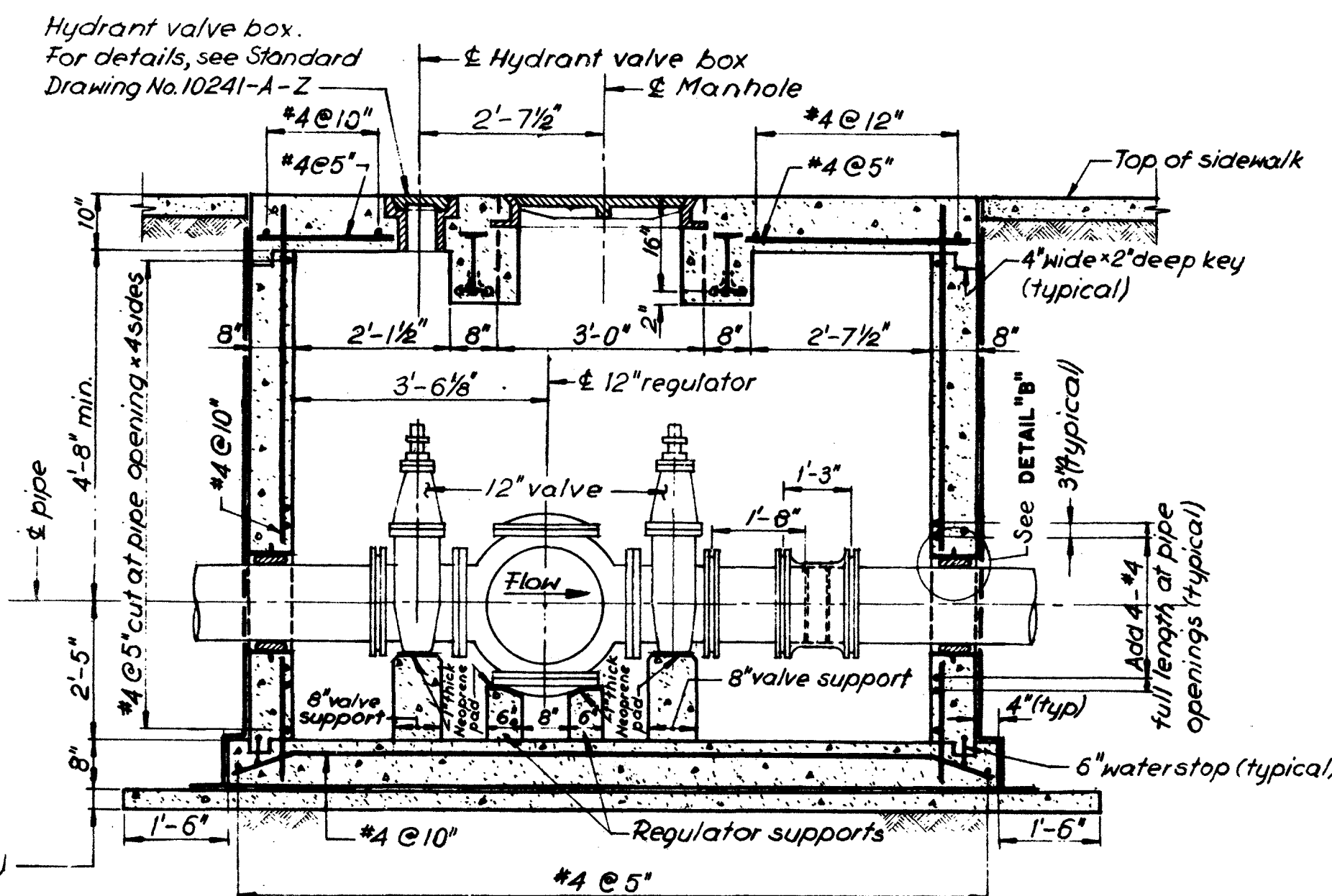
SECTION C-C

DETAIL "A"  
NOT TO SCALE

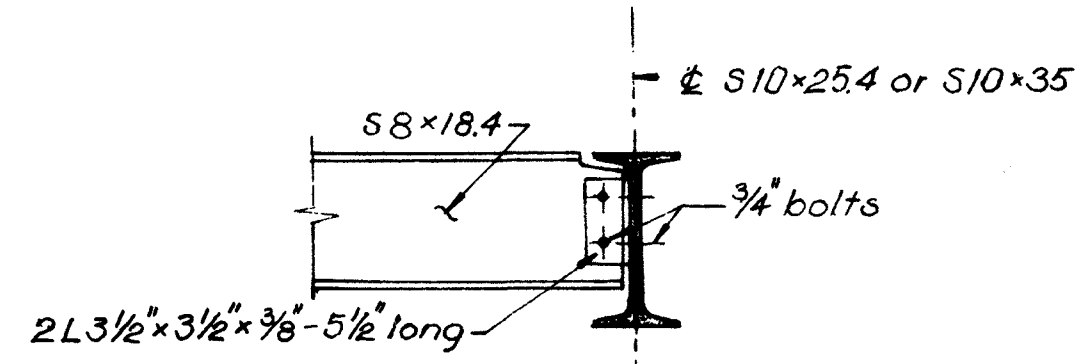
DETAIL "B"  
NOT TO SCALE



SECTION A-A  
20" REGULATOR CHAMBER



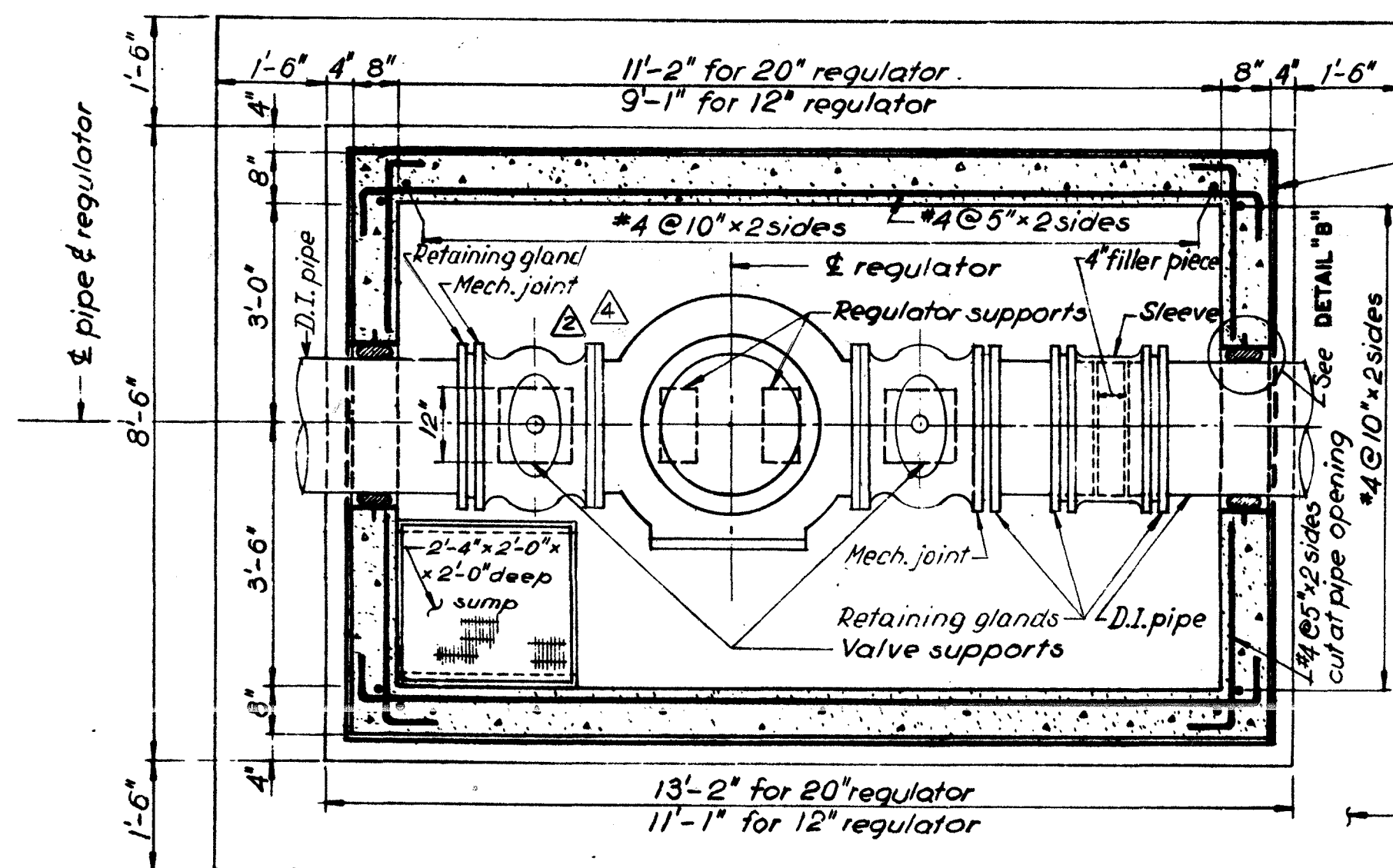
SECTION D-D  
12" REGULATOR CHAMBER



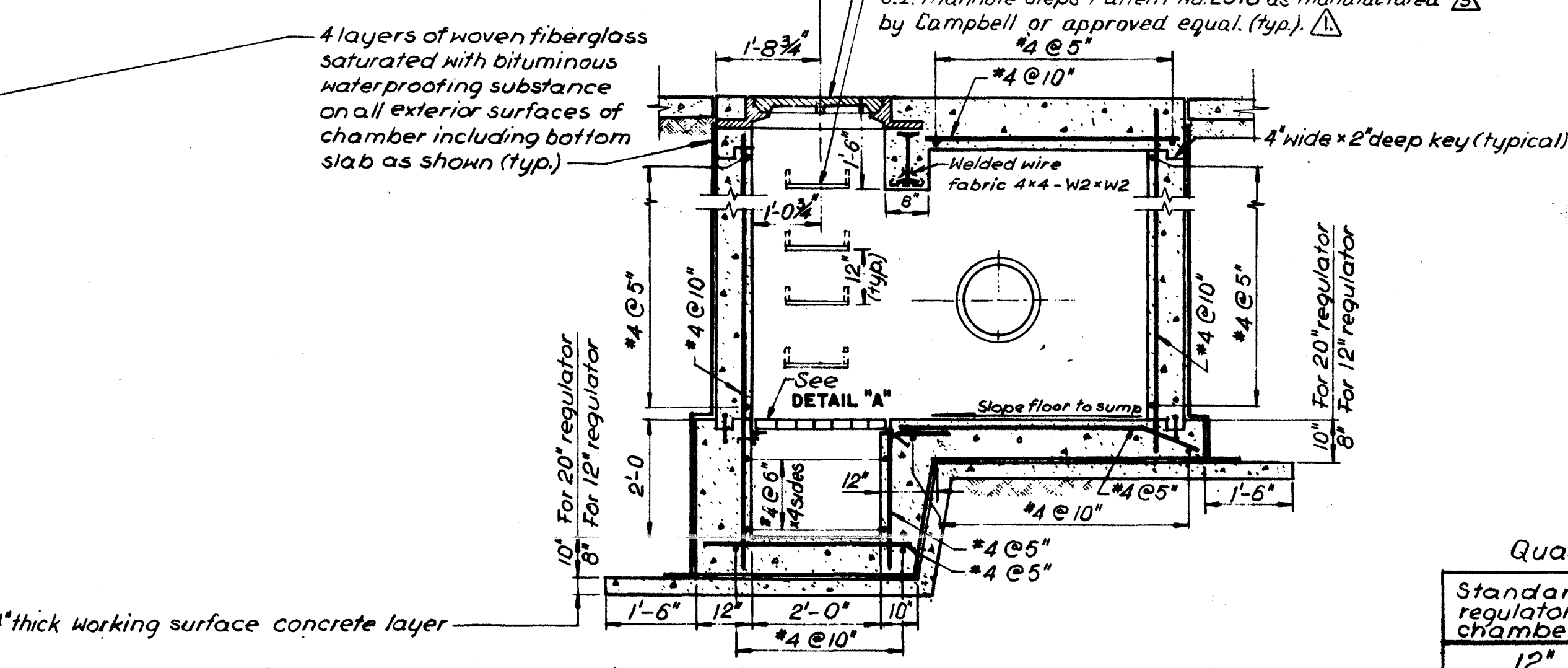
DETAIL "C"  
NOT TO SCALE

STRUCTURAL NOTES:

- The minimum compressive strength of cast in place concrete,  $f'_c$  shall be 3500 p.s.i. at 28 days.
- Air-entraining agents may be used in the concrete subject to the approval of the Engineer.
- The allowable concrete slump shall be 2 to 4 inches.
- Steel for reinforcing concrete and anchor bars shall be Grade 60, and shall conform to the requirements of Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- Steel reinforcement may be slightly moved or bent in the field to clear waterstops, anchors, obstructions and openings as approved by the Engineer.
- The concrete cover for steel reinforcement shall be as follows:
  - Formed surfaces not exposed to earth, water or weather - 1/2"
  - At keys - 1"
- Where bars are to be spliced or embedded, the length of the splice or embedment shall comply with the latest edition of the Manual of Standard Practice of the American Concrete Institute.
- Construction joints shall be provided with 6-inch P.V.C. waterstop where indicated on the drawing or as ordered by the Engineer.
- All exposed corners and edges of the structure shall be chamfered one inch, except where otherwise noted.
- The invert slab of the chamber shall be float finished.
- Structural steel shall conform to the latest edition of Standard Specifications for Structural Steel, ASTM Designation A 36.
- Carbon steel sump grating supports shall be hot-dip galvanized after fabrication.
- This drawing supersedes drawing No. 19840-Y.



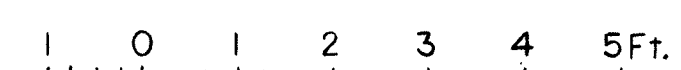
FLOOR PLAN  
FOR 12" & 20" REGULATOR CHAMBERS



SECTION B-B  
FOR 12" & 20" REGULATOR CHAMBERS

Quantities for estimating

Standard regulator chambers	Concrete (cu.yd.)	Reinforcing steel (lbs)
12"	11.73	2.26
20"	14.60	2.55



NO.	DATE	REVISIONS	APP'D BY	TITLE
11-23-98		Eliminated flange insulation.		AB
3-9-94		Changed steps Pattern No.		
6-29-93		Added Insulated flange joint		
2-4-88		Changed steps manufacturer.		

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

STANDARD REGULATOR CHAMBERS

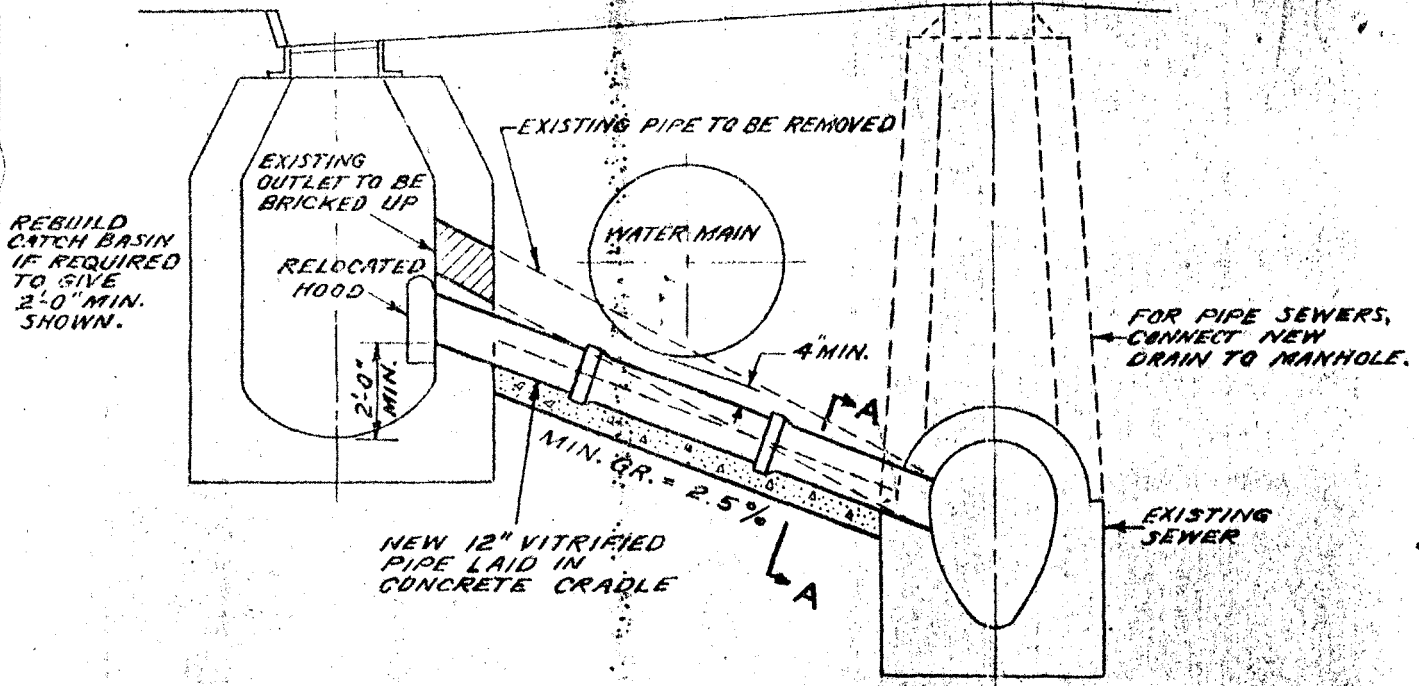
SCALE: 1/2" = 1'-0" DATE: SEPTEMBER, 1983 SHEET: 1 OF 1

Drawn by: K.K.  
Checked by: C.A.

Stephen Gyimari  
DIVISION ENGINEER

Kalter C. Fitzpatrick  
CHIEF DESIGNER

Edward C. Blodgett  
DEPUTY DIRECTOR

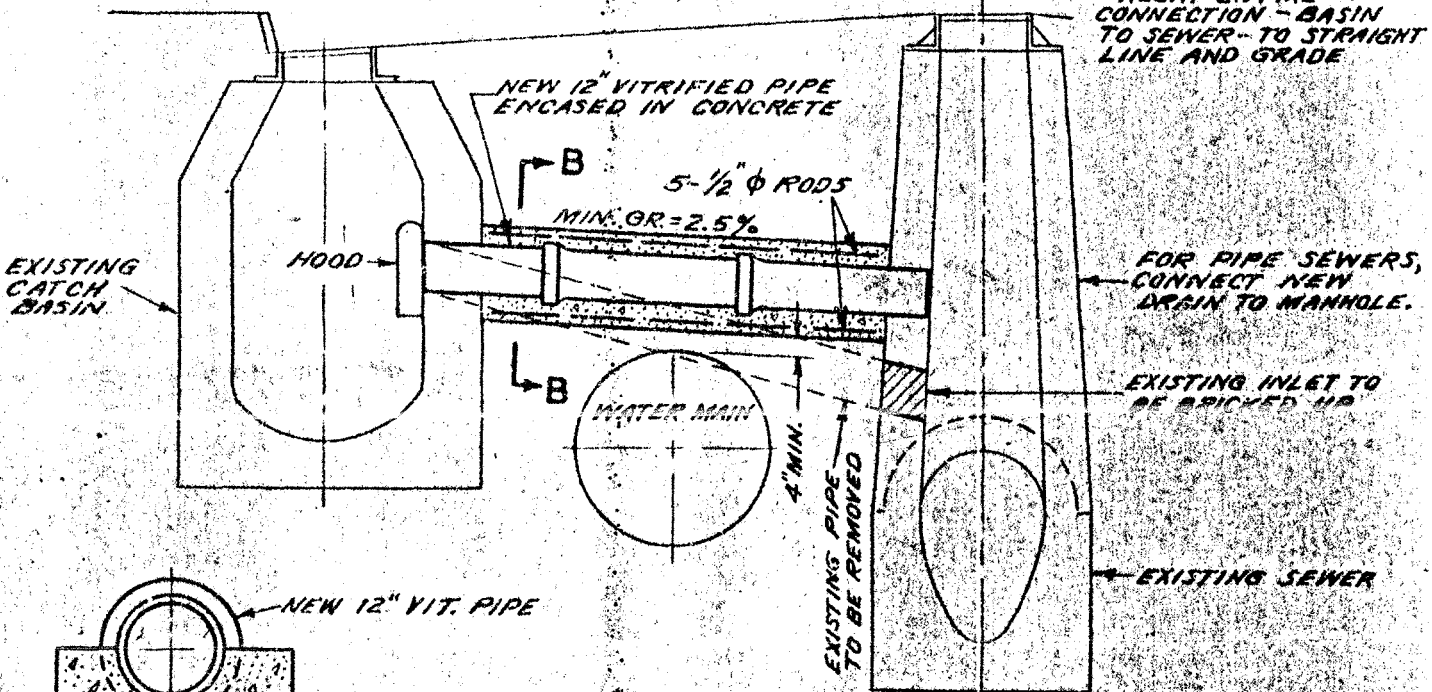


REBUILD  
CATCH BASIN  
IF REQUIRED  
TO GIVE  
2'-0" MIN.  
SHOWN.

NEW 12" VITRIFIED  
PIPE LAID IN  
CONCRETE CRADLE

FOR PIPE SEWERS,  
CONNECT NEW  
DRAIN TO MANHOLE.

NOTE:  
RELAY ENTIRE  
CONNECTION - BASIN  
TO SEWER - TO STRAIGHT  
LINE AND GRADE



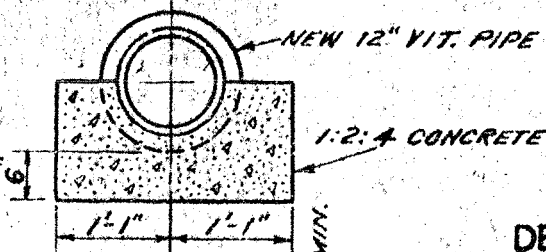
EXISTING  
CATCH  
BASIN

NEW 12" VITRIFIED PIPE  
ENCASED IN CONCRETE

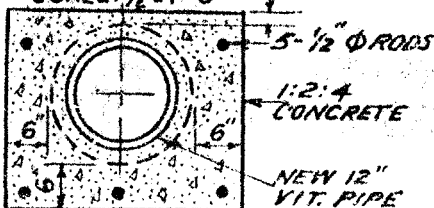
FOR PIPE SEWERS,  
CONNECT NEW  
DRAIN TO MANHOLE.

EXISTING INLET TO  
BE BRICKED UP

EXISTING SEWER



SECTION A-A  
SCALE: 1/2" = 1'-0"



SECTION B-B  
SCALE: 1/2" = 1'-0"

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

STANDARD METHODS  
FOR RECONSTRUCTING  
CATCH BASIN CONNECTIONS

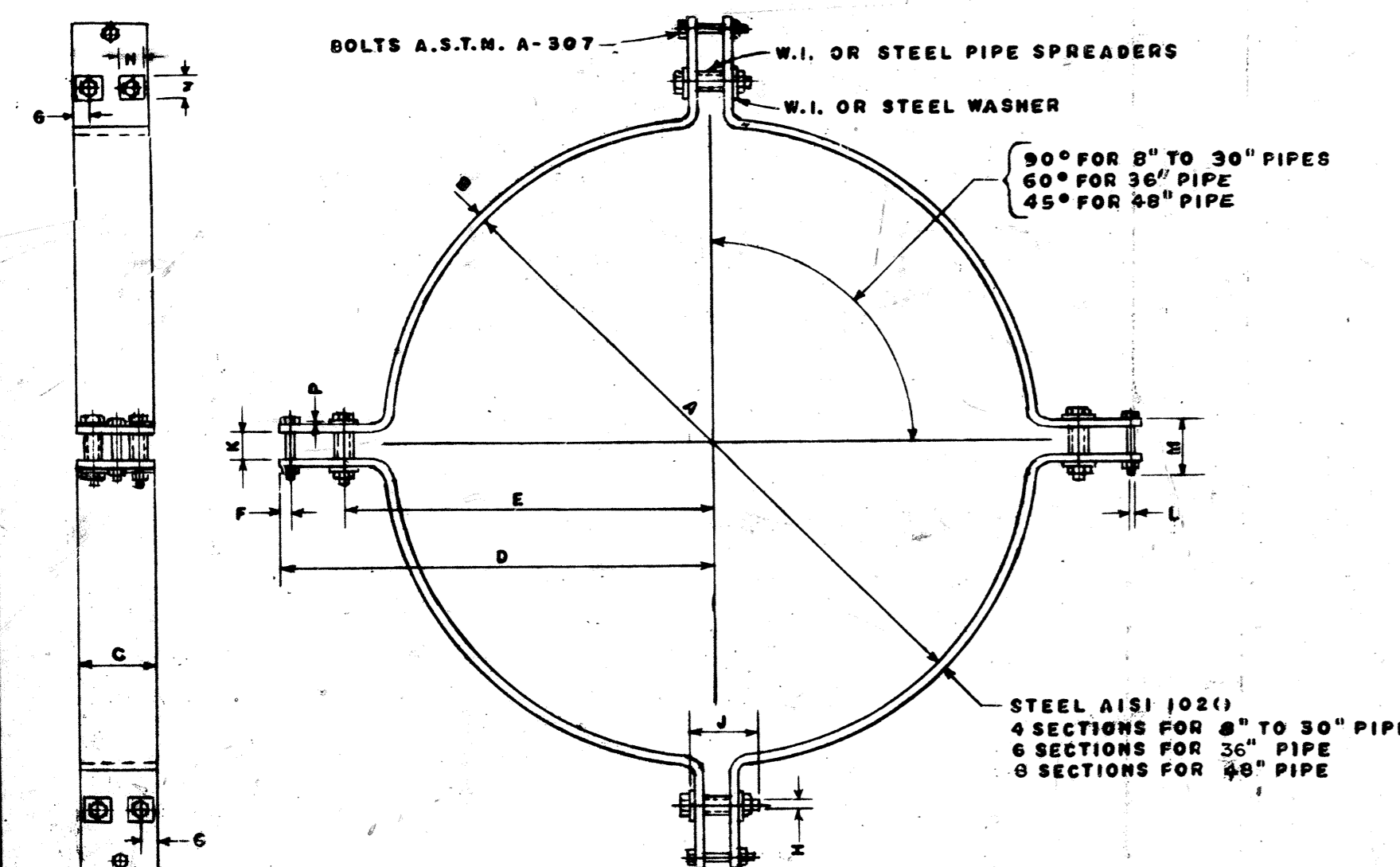
SCALE: 1/4" = 1'-0" EXCEPT AS NOTED

JAN. 1952

DRAWN BY: R.J.C.  
TRACED BY: R.J.C.  
CHECKED BY: M.H.

*Harry Hollander* *Edward J. Clark*  
DIVISION ENGINEER CHIEF ENGINEER  
DIVISION OF INVESTIGATION & DESIGN





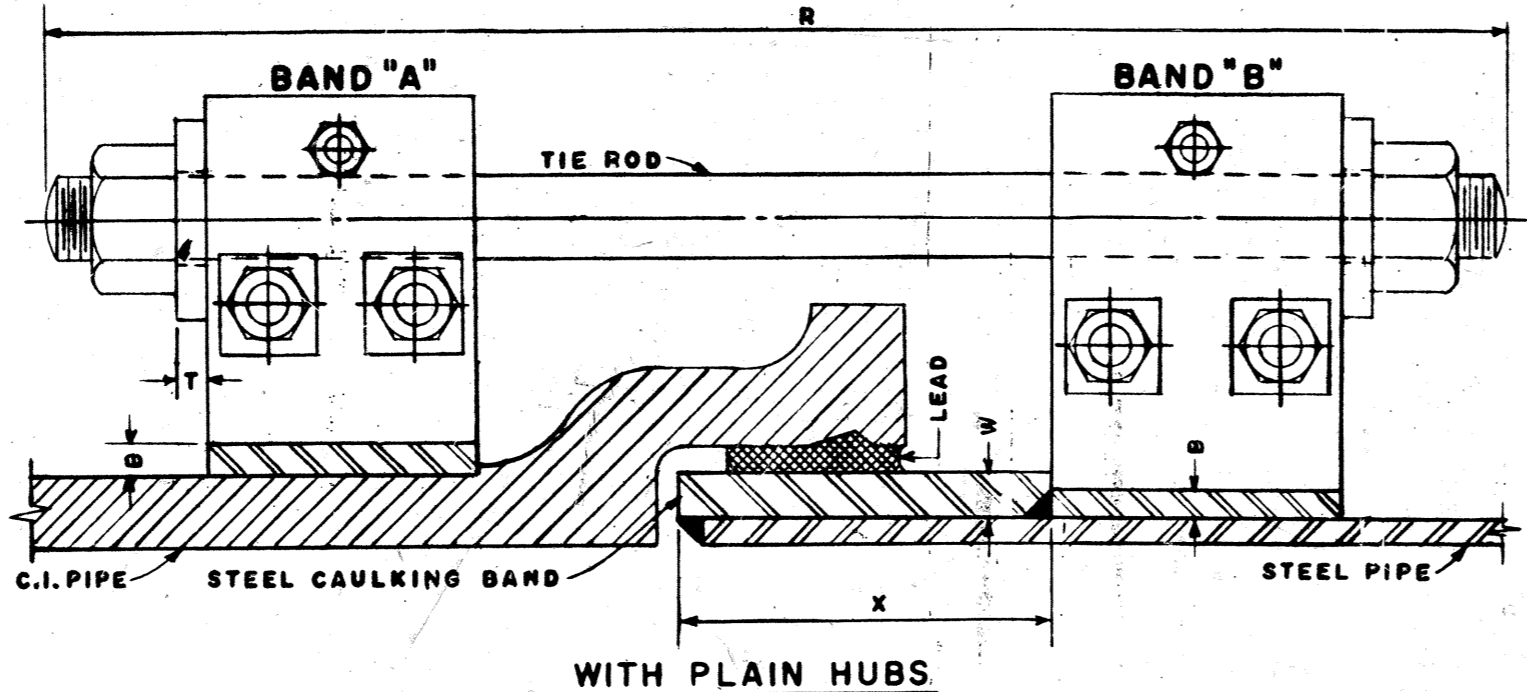
DETAIL OF BANDS

NOTE: ALL HOLES DRILLED 1/8" LARGER THAN DIAMETER OF BOLT.  
 BANDS TO BE BENT ONLY WHEN AT A CHERRY-RED TEMPERATURE CONDITION.  
 2- ALL PARTS OF THE BAND TO BE HOT DIP GALVANIZED AFTER FABRICATION AND BEFORE ASSEMBLY AS PER A.S.T.M. SPEC. A-123-59.

TIE RODS AND WASHERS

NOM. PIPE SIZE	TIE ROD		WASHER			WT. OF RODS, WASHERS AND NUTS FOR:		ADDITIONAL WT. FOR EACH 1" INCREASE OF "R" AND "S"
	DIA.	R	T	U	V	R	S	
8	3/4	21	1/4	7/8	2 1/4	15	12	0.50
12	1	22	1/4	1 1/8	3	27	22	0.89
16	1	24	3/8	1 1/8	3 1/2	34	28	0.89
20	1	25	1/2	1 1/8	3 3/4	39	33	0.89
24	1 3/8	26	5/8	1 1/2	4 1/4	74	63	1.68
30	1 3/4	29	5/8	1 7/8	4 1/2	121	96	2.72
36	1 3/4	30	5/8	1 7/8	4 3/4	190	153	4.09
48	1 3/4	31	5/8	1 7/8	4 3/4	258	209	5.45

ALL DIMENSIONS IN INCHES AND WEIGHTS IN POUNDS

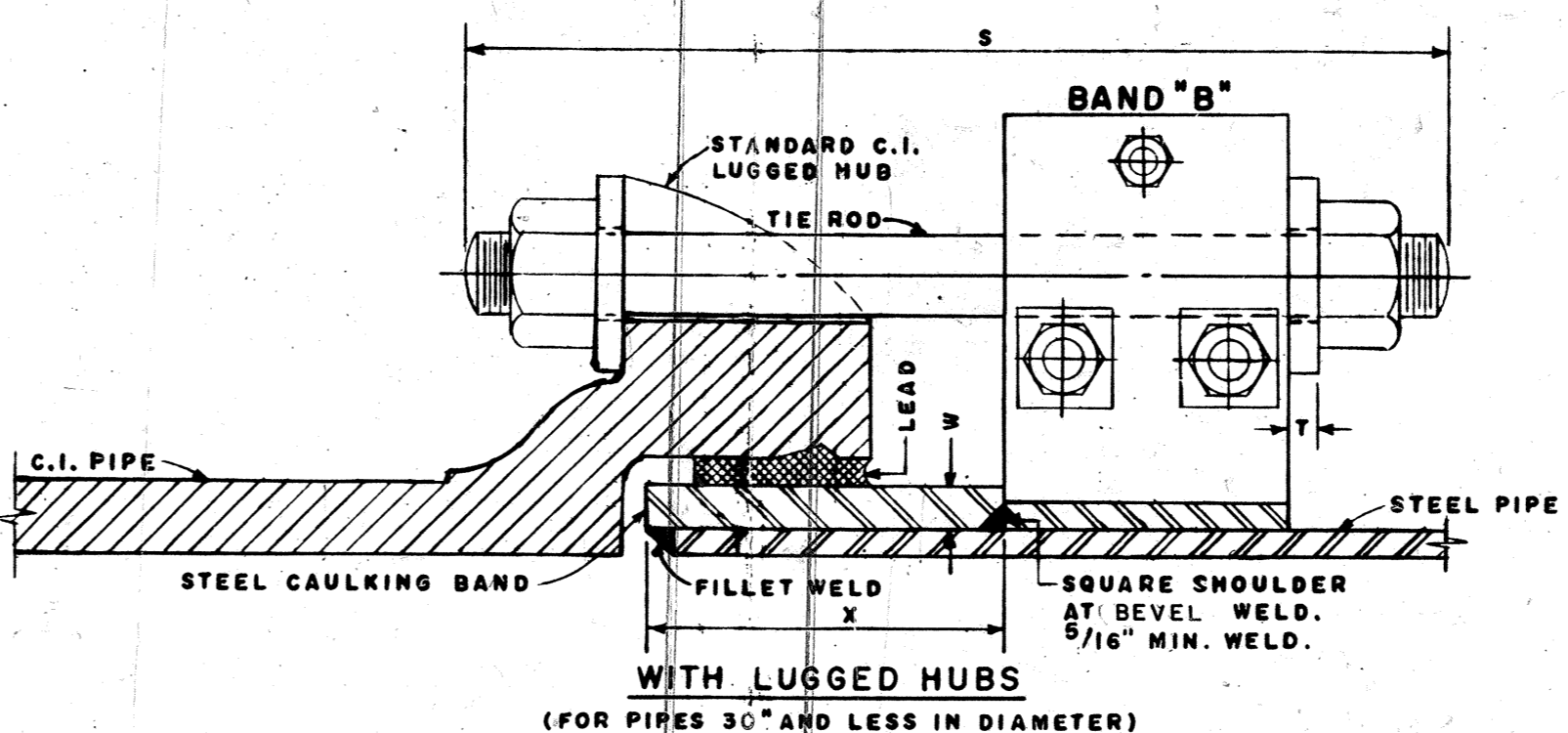


WITH PLAIN HUBS

BAND "A" FOR CAST IRON PIPE

NOM. PIPE SIZE	A	B	C	D	E	F	G	MAIN BOLTS			SMALL BOLTS			SPREADER I.D.	WASHER N	WT. OF BARS	WT. COMPLETE	
								NO.	H	J	NO.	L	M					K
8	9 1/8	1/2	4 1/2	10 9/16	7 15/16	1	1	8	7/8	3 1/2	4	5/8	3	1 1/4	2	1/4	32	39
12	12 3/4	1/2	5	11 11/16	10 5/10	1	1	8	7/8	4	4	5/8	3 1/2	1 1/2	2	1/4	50	55
16	17 1/4	1/2	5 1/2	16 19/32	13 7/32	1	1	8	7/8	4	4	5/8	3 1/2	1 1/2	2	1/4	64	78
20	21 1/2	1/2	6	18 7/16	15 1/16	1	1 1/4	8	7/8	4	4	5/8	3 1/2	1 1/2	2	1/4	82	96
24	26	1/2	6 1/2	20 29/32	17 5/32	1	1 1/4	8	7/8	4 1/2	4	5/8	3 1/2	1 7/8	2	1/4	93	108
30	32 1/4	5/8	7	24 5/8	20 1/2	1	1 1/4	8	7/8	5	4	5/8	4 1/2	1 2 1/4	2	1/4	151	168
36	38 1/2	3/4	8	27 31/32	23 23/32	1	1 1/2	12	7/8	5	6	5/8	4 1/2	1 2 1/4	2	1/4	275	300
48	51 1/4	3/4	8	35 1/8	30 7/8	1	1 1/2	16	7/8	5	8	5/8	4 1/2	1 2 1/4	2	1/4	385	418

ALL DIMENSIONS IN INCHES AND WEIGHTS IN POUNDS



WITH LUGGED HUBS (FOR PIPES 30" AND LESS IN DIAMETER)

BAND "B" FOR STEEL PIPE

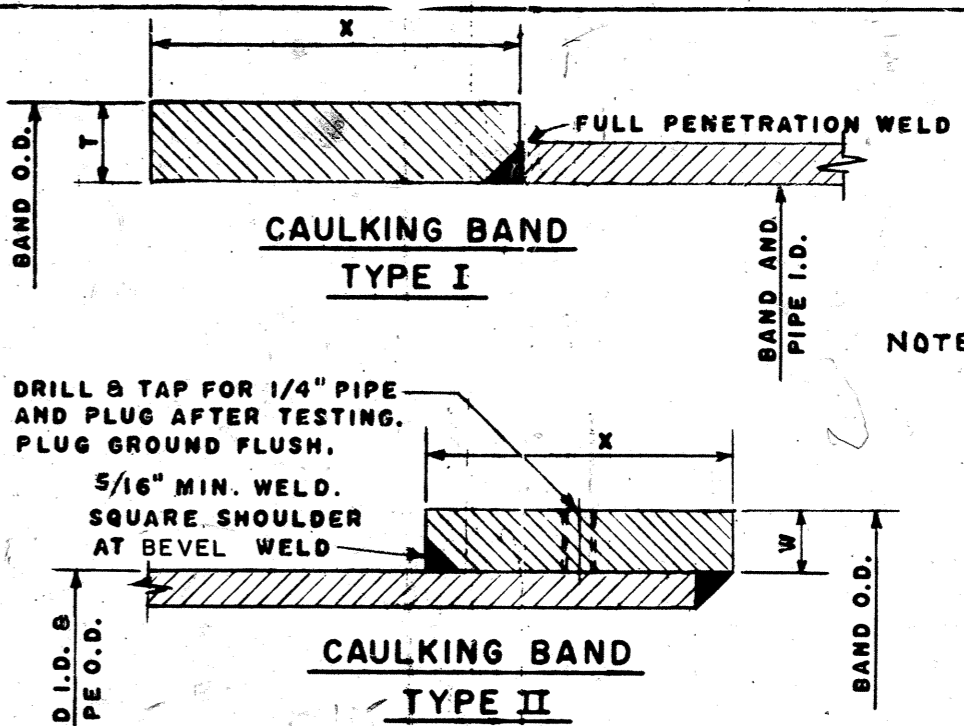
NOM. PIPE SIZE	A	B	C	D	E	F	G	MAIN BOLTS			SMALL BOLTS			SPREADER I.D.	WASHER N	WT. OF BARS	WT. COMPLETE	
								NO.	H	J	NO.	L	M					K
8	8 5/8	1/2	4 1/2	10 9/16	7 3/16	1	1	8	7/8	3 1/2	4	5/8	3	1 1/4	2	1/4	32	39
12	12 3/4	1/2	5	11 11/16	10 1/10	1	1	8	7/8	4	4	5/8	3 1/2	1 1/2	2	1/4	50	55
16	16	1/2	5 1/2	16 32	13 19/32	1	1	8	7/8	4	4	5/8	3 1/2	1 1/2	2	1/4	66	79
20	20	1/2	6	18 7/16	14 5/16	1	1 1/4	8	7/8	4	4	5/8	3 1/2	1 1/2	2	1/4	82	90
24	24	1/2	6 1/2	20 29/32	16 25/32	1	1 1/4	8	7/8	4 1/2	4	5/8	3 1/2	1 7/8	2	1/4	94	109
30	30	5/8	7	24 5/8	19 7/8	1	1 1/4	8	7/8	5	4	5/8	4 1/2	1 2 1/4	2	1/4	154	170
36	36 3/4	3/4	8	27 31/32	22 31/32	1	1 1/2	12	7/8	5	6	5/8	4 1/2	1 2 1/4	2	1/4	282	307
48	49	3/4	8	35 1/8	29 7/8	1	1 1/2	16	7/8	5	8	5/8	4 1/2	1 2 1/4	2	1/4	403	436

ALL DIMENSIONS IN INCHES AND WEIGHTS IN POUNDS

NOTE: ALL SIZES OF STEEL PIPES UP TO AND INCLUDING 30" ARE MILL SIZES. THICKNESS OF STEEL PIPE VARIES WITH SIZE OF PIPE AS INDICATED IN DEPT. STEEL PIPE SPECIFICATIONS.

REFERENCE DRAWINGS: 10221-Z, SHEET 1, AND 10236-A-Z.

THIS DRAWING SUPERSEDES DWG. NO. 20731-Z-A AND 20731-Z-B.



CAULKING BAND FOR LOW PRESSURE BELL

NOM. PIPE SIZE	BAND O.D.	X	TYPE I		TYPE II	
			T	BAND I.D. PIPE I.D.	W	BAND I.D. PIPE O.D.
8	9 1/8	6 1/2	9/16	8	1/4	8 5/8
12	13 1/4	6 1/2	5/8	12	1/4	12 3/4
16	17 1/4	6 1/2	1	15 1/4	5/8	16
20	21 1/2	6 1/2	1 1/8	19 1/4	3/4	20
24	25 3/4	6 1/2	1 1/4	23 1/4	7/8	24
30 O.D.	31 1/4	7	1 1/2	27 1/4	1 1/8	30
30 I.D.	32 1/4	7	1 1/8	30	3/4	30 3/4
36 O.D.	38 1/2	7	5/8	35 1/4	1/4	36
36 I.D.	38 1/2	7	1/4	36	7/8	36 3/4
48 I.D.	51 1/4	7 1/2	5/8	48	1 1/8	49

ALL DIMENSIONS IN INCHES

CAULKING BAND FOR HIGH PRESSURE BELL

NOM. PIPE SIZE	BAND O.D.	X	TYPE I		TYPE II	
			T	BAND I.D. PIPE I.D.	W	BAND I.D. PIPE O.D.
8	9 1/2	6 1/2	3/4	8	7/16	8 5/8
12	14	6 1/2	1	12	5/8	12 3/4
16	18 1/2	6 1/2	5/8	15 1/4	1/4	16
20	23	6 1/2	1 1/8	19 1/4	1 1/2	20
24	27 3/4	6 1/2	2 1/4	23 1/4	1 7/8	24

ALL DIMENSIONS IN INCHES

NOTE: ALL WELDS TO BE CONTINUOUS. STEEL CAULKING BAND MAY BE TYPE I OR TYPE II AS SHOWN.

2- REVISED 5-29-85: FILLET WELD CHANGED TO BEVEL WELD.  
 1- REVISED 6-16-80: DIMENSIONS G, D, E, CHANGED TO ACCOMMODATE BELL JOINT CLAMP

CITY OF NEW YORK  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF WATER SUPPLY

STANDARD METHOD OF CONNECTIONS BETWEEN STEEL AND C.I. PIPE

NOT TO SCALE MARCH 1965

*Morris Bush* ACT. DIVISION ENGINEER  
*Edward J. Clark* CHIEF ENGINEER  
 DIVISION OF INVEST. & DESIGN

# SYMBOLS

1-12-83

MAINS		
	EXISTING      NEW	
96 inch		
84 "		
72 "		
66 "		
60 "		
54 "		
48 "		
42 "		
36 "		
30 "		
24 "		
20 "		
16 "		
14 "		
12 "		
10 "		
8 "		
6 "		
4 "		
2 "		

Existing Main to be lowered \* \* \* \*

Mains with an "S" superimposed on their respective sizes are steel water mains

Mains with a "C" superimposed on their respective sizes are concrete water mains

APPURTENANCES ON MAINS		
	EXISTING      NEW	
Hydrant		
Valve		
Valve (closed)		
Check Valve		
Reducer		
Connection		
Cap		
Plug		
Blow-off		
Access M.H.		
Roundabout		
Regulator		
Venturi Meter		
Tap for air vent		

ELECTROLYSIS TEST CONNECTION		
Curb test box		
Welded Conn.		

MISCELLANEOUS	
Sewer & Manhole	
Catch basin & Conn.	
Storm Sewer	
COMBINED SEWER	
Sanitary Sewer	
Chamber	
Test Pits	
Test Borings	

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

## STANDARD SYMBOLS

TO BE USED ON ALL PLANS & MAPS

MARCH - 1938  
REVISED JAN. - 1973  
APR. - 1982

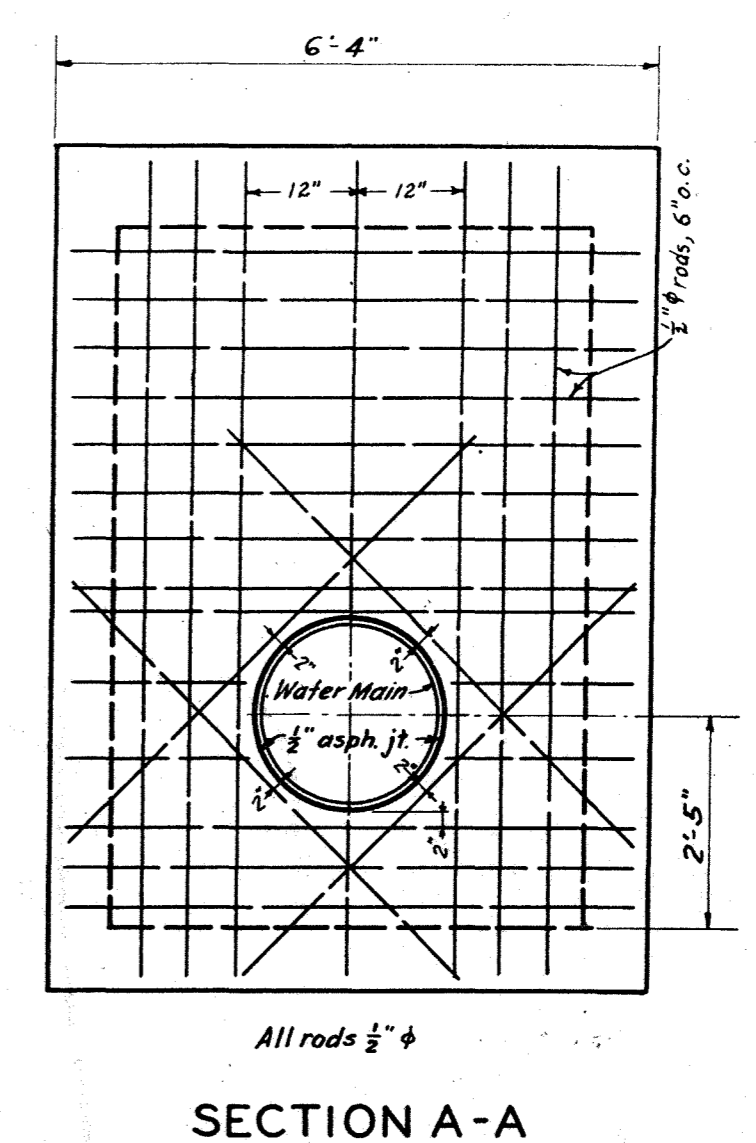
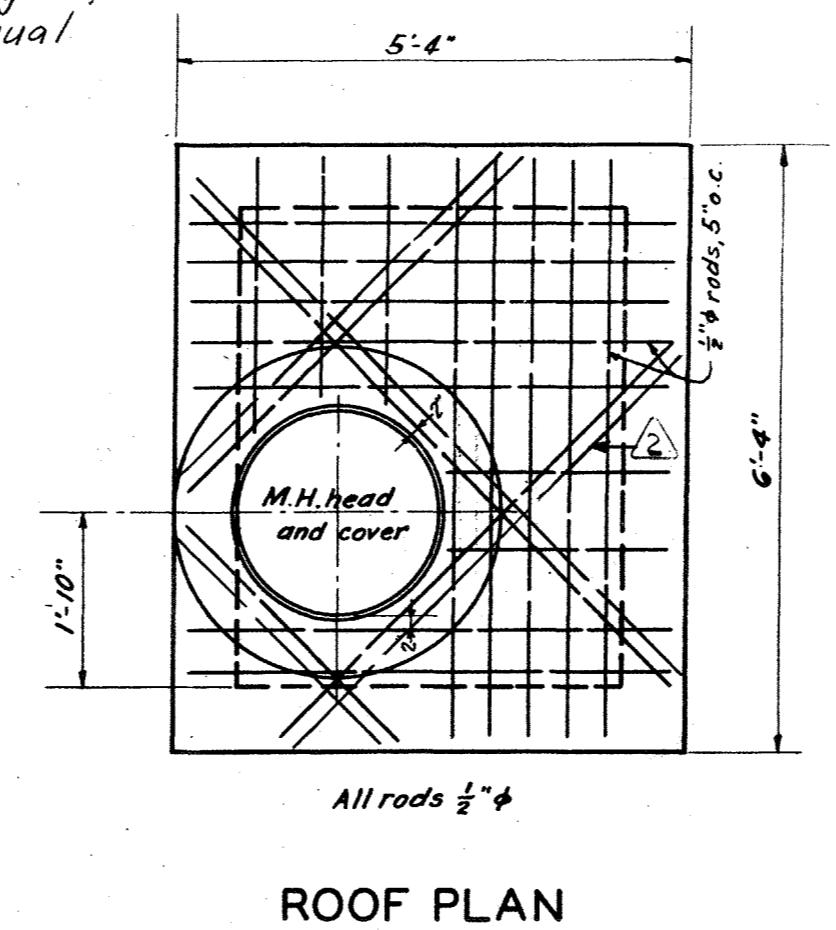
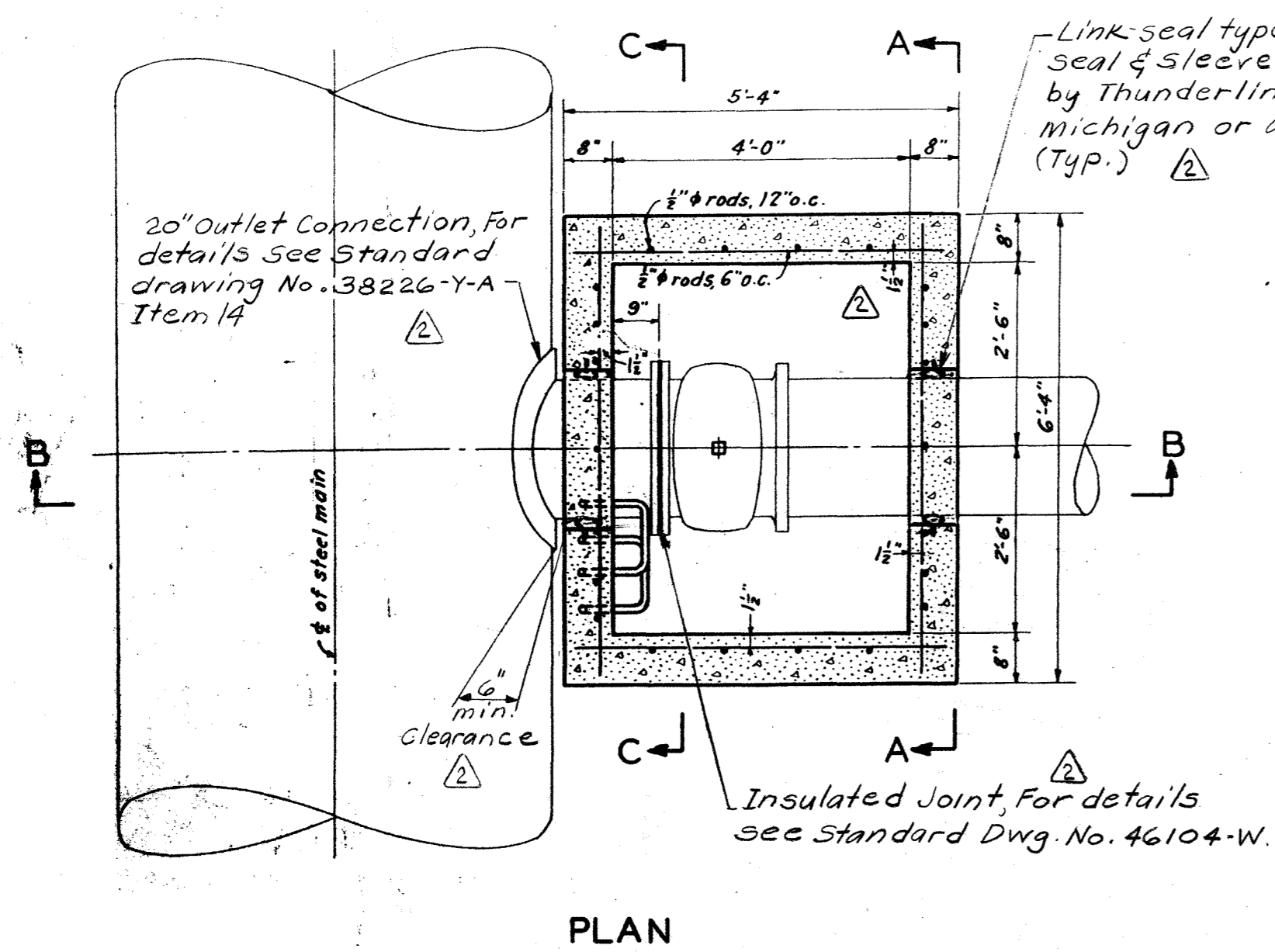
*T. Hallermer* *Patrick Smith*  
DIVISION ENGINEER      ACTING CHIEF ENGINEER

DIVISION OF W.V. DESIGN & STATISTICS      26438-2-A

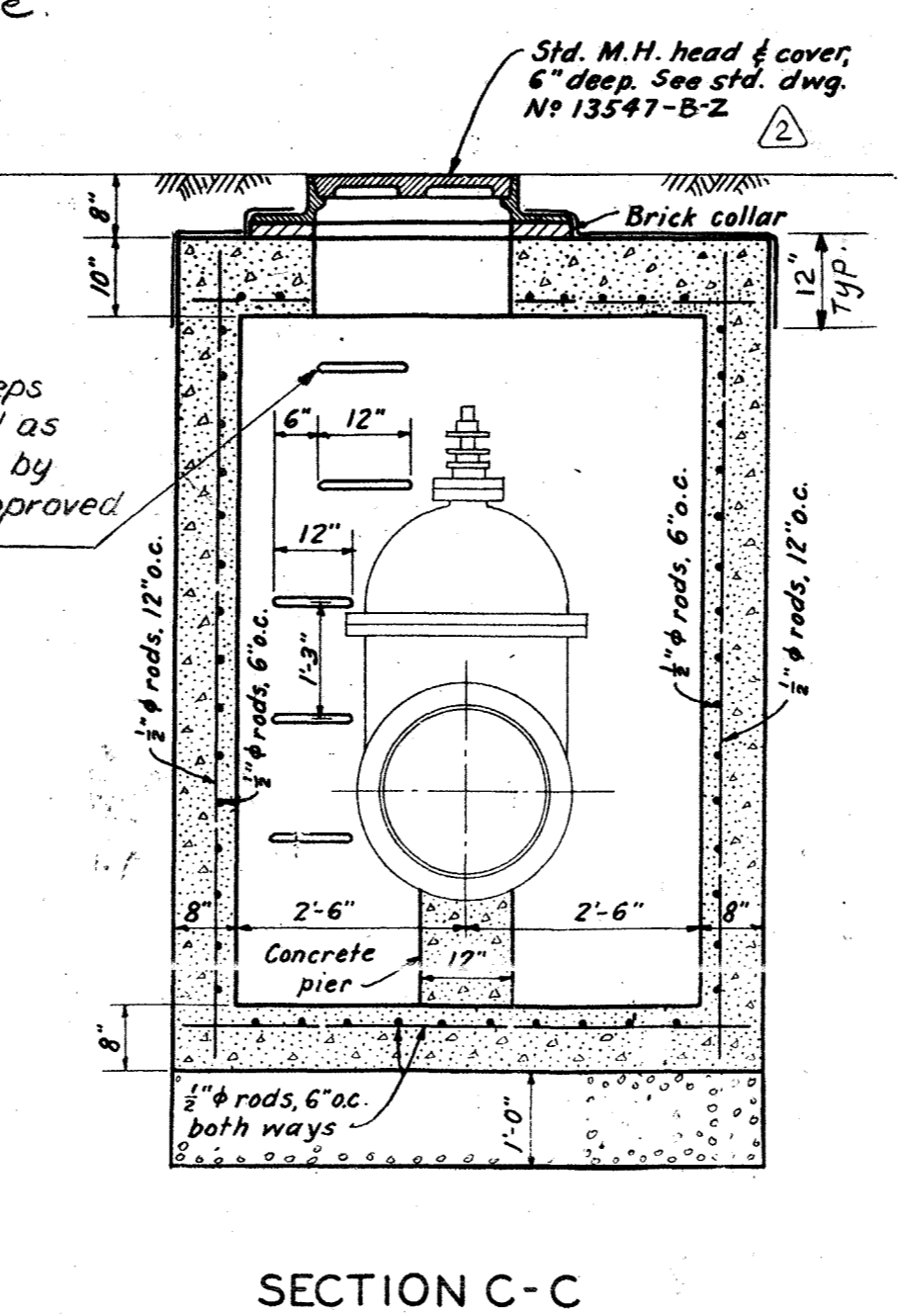
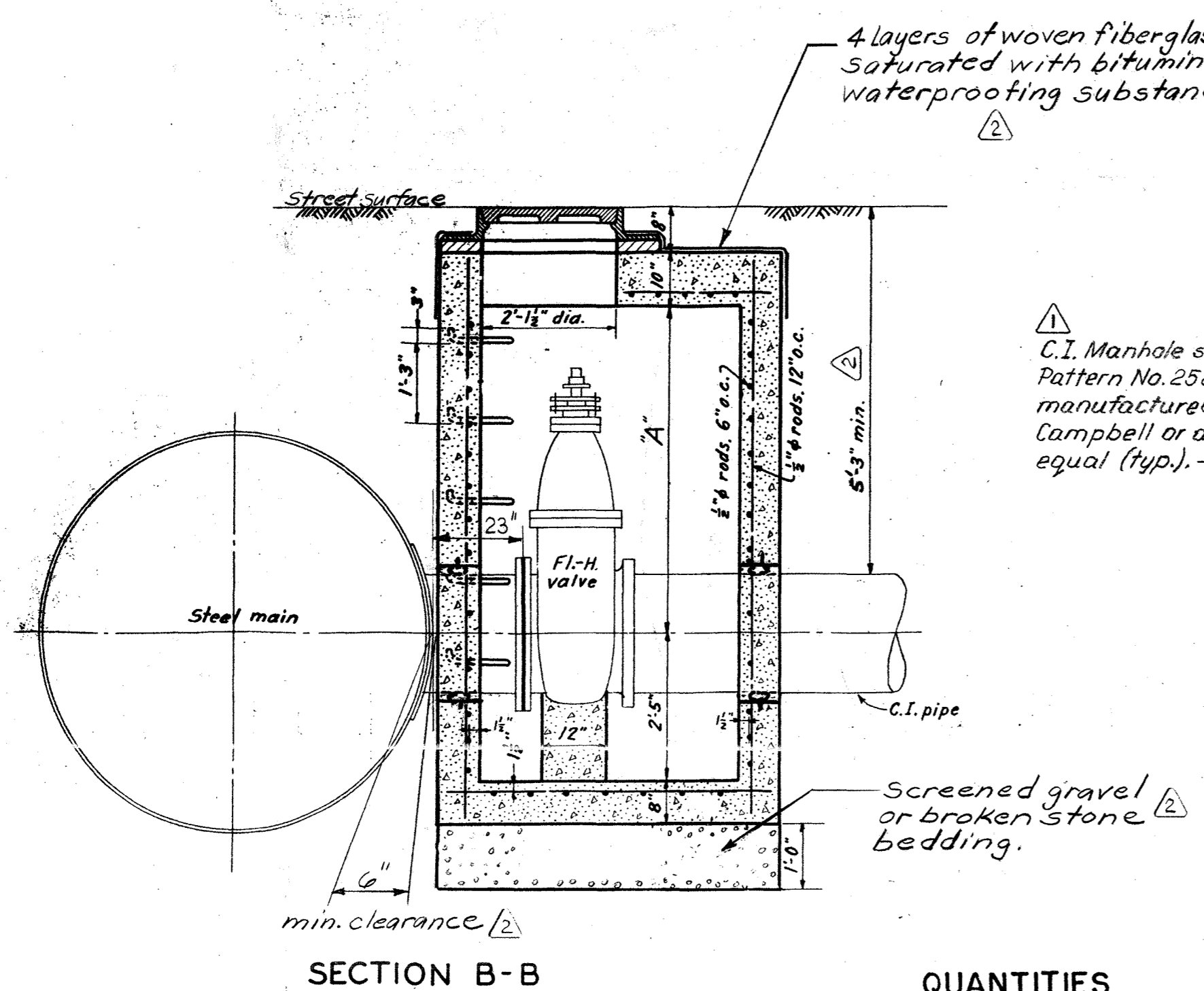
DRAWN BY J.M.W.  
CHECKED BY G.J.

Note: Existing shown lightly,  
new work shown dark.





- NOTES:
1. THE CHAMBER SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF APPLICABLE STANDARD WATER MAIN SPECIFICATIONS AND AS SHOWN ON THE DRAWING TO THE SATISFACTION OF THE ENGINEER.
  2. PAYMENT FOR ALL WORK, EQUIPMENT AND MATERIAL REQUIRED SHALL BE THE LUMP SUM BID, FOR THE ITEM PROVIDED IN THE SCHEDULE OF BID PRICES UNLESS OTHERWISE INDICATED ON THE DRAWING.
  3. CONCRETE SHALL BE CLASS 35.



QUANTITIES

CONCRETE CU. YDS.	STEEL LBS.	"A"
5.23	514	4'-6"
5.74	566	5'-6"

NO.	DATE	REVISIONS	APPROVED	TITLE
1-24-89		Added Notes and Revisions as Marked	<i>ECC</i>	DEP. DIR.
2-4-88		Changed steps manufacturer	<i>ECC</i>	DEP. DIR.

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY AND  
WASTEWATER COLLECTION

**STANDARD CHAMBER  
FOR  
20" CONNECTION VALVES  
ON STEEL MAINS**

SCALE: 1/2"=1'-0"      DATE: JUNE, 1952

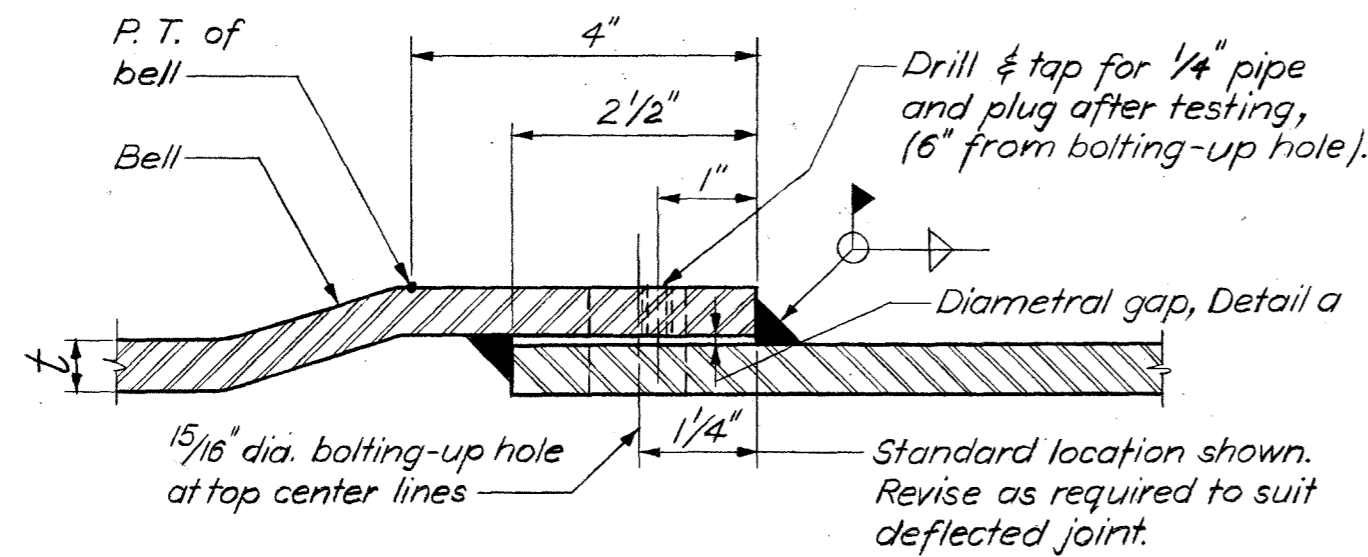
*Harry Hollander*      *Edward Clark*  
DIVISION ENGINEER      CHIEF ENGINEER  
DIVISION OF INVESTIGATION & DESIGN

DRAWN BY J.M.W.  
TRACED BY J.M.W.  
CHECKED BY L. Caplan

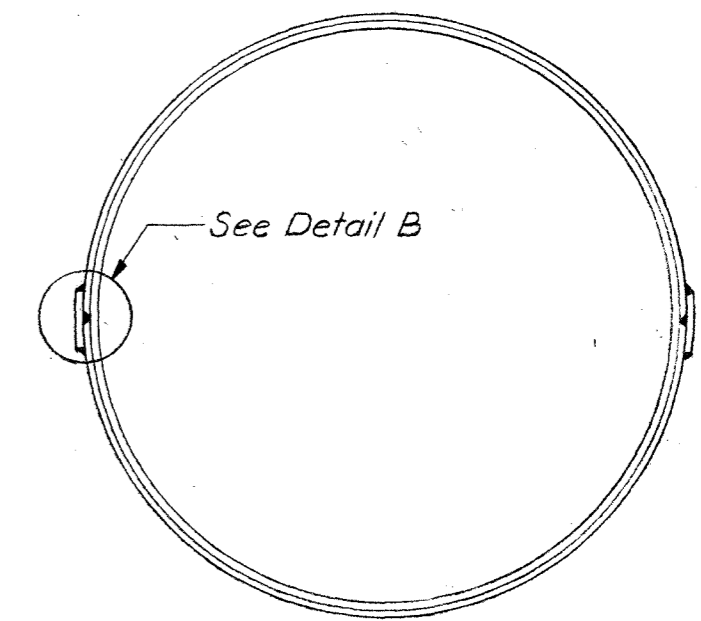
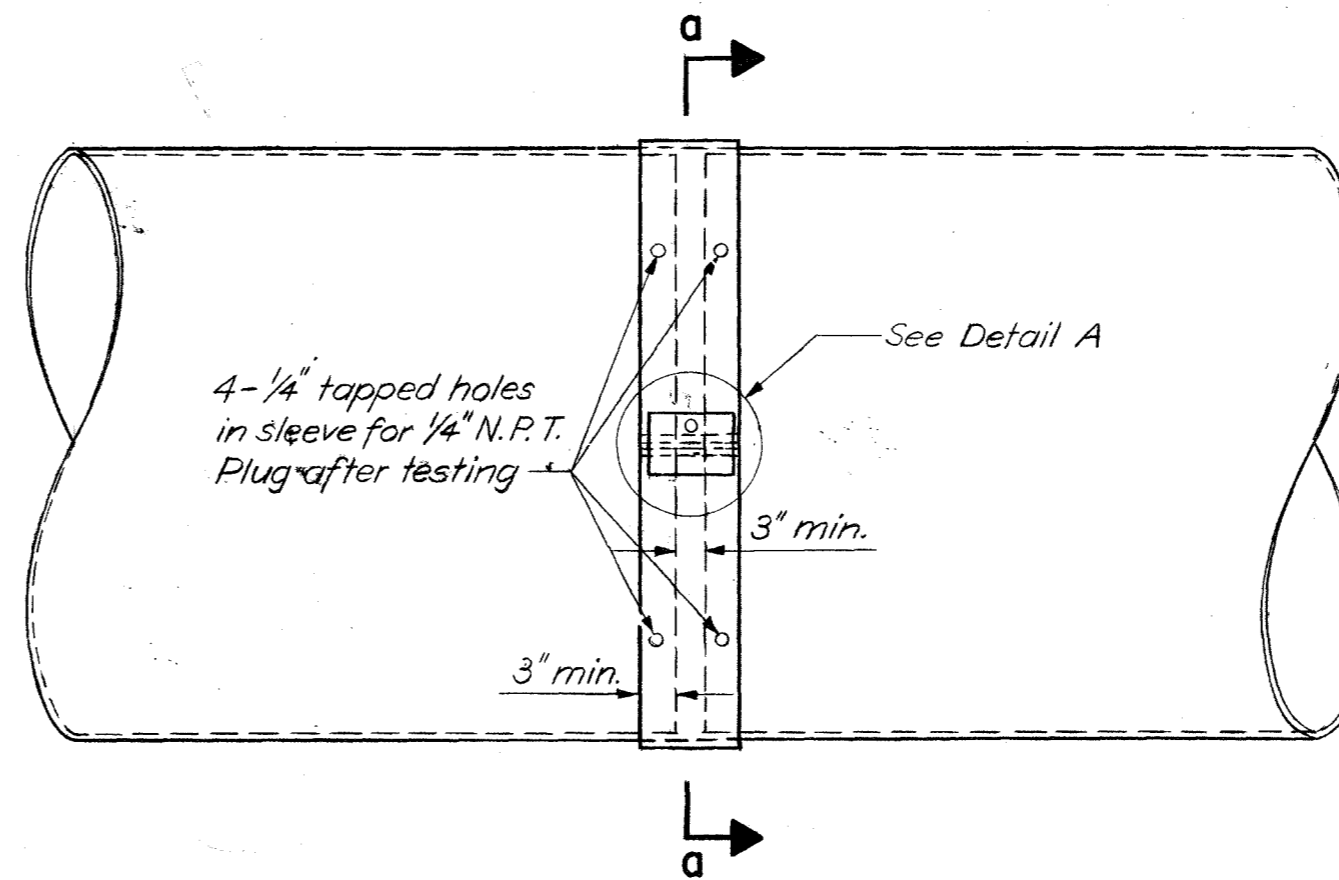
*M. G. Weisman*



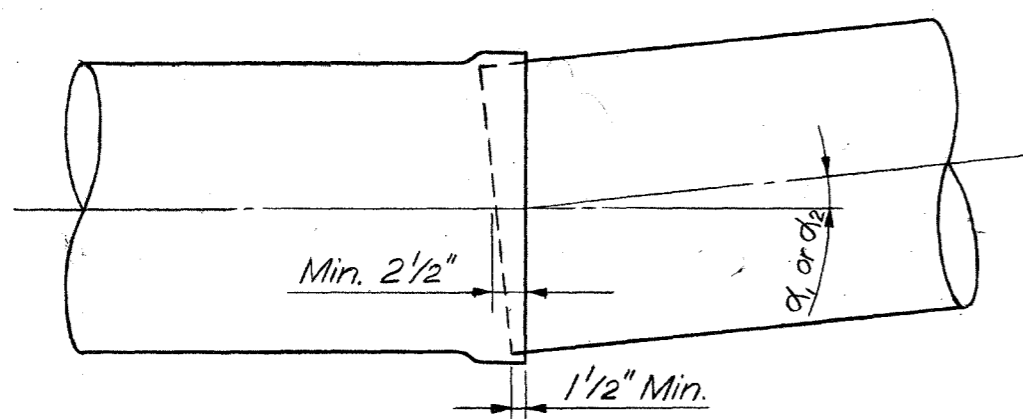




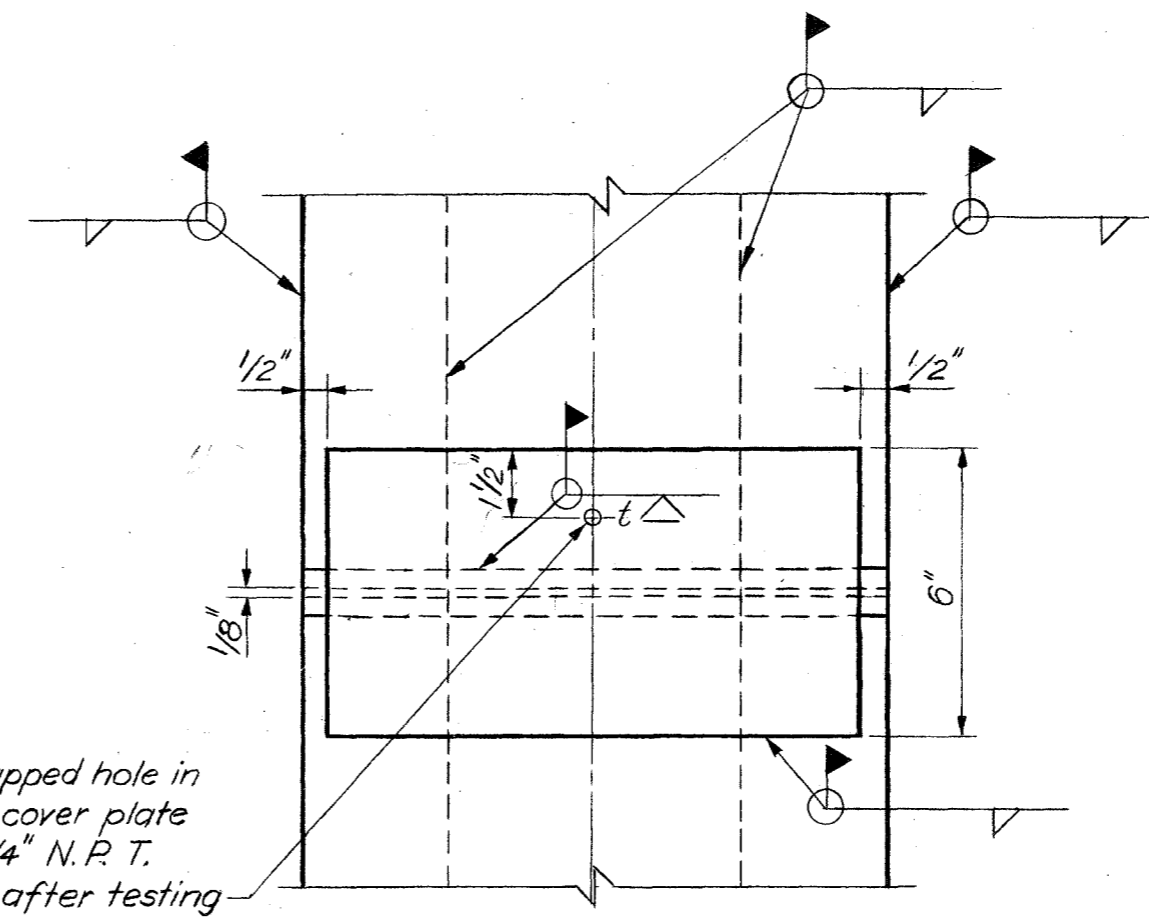
**FILLET WELDED FIELD LAP JOINT  
EXPANDED END OR BELL TYPE**



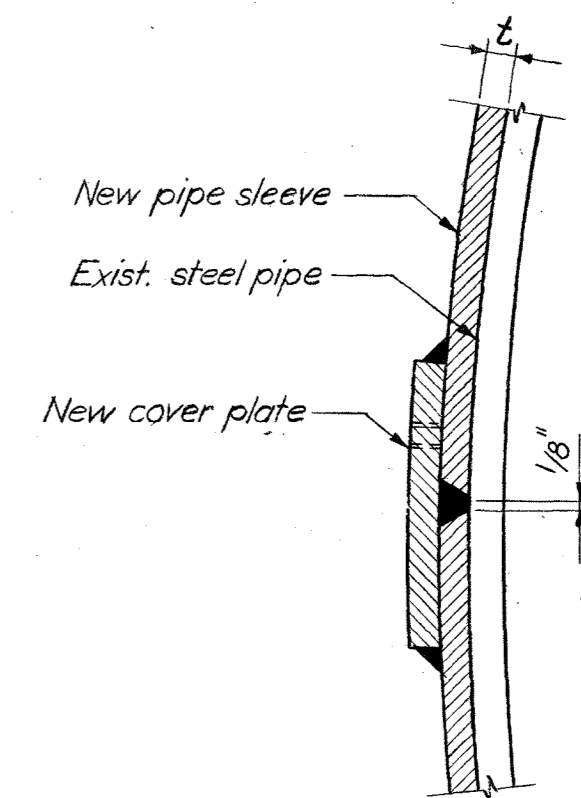
**SECTION a-a**



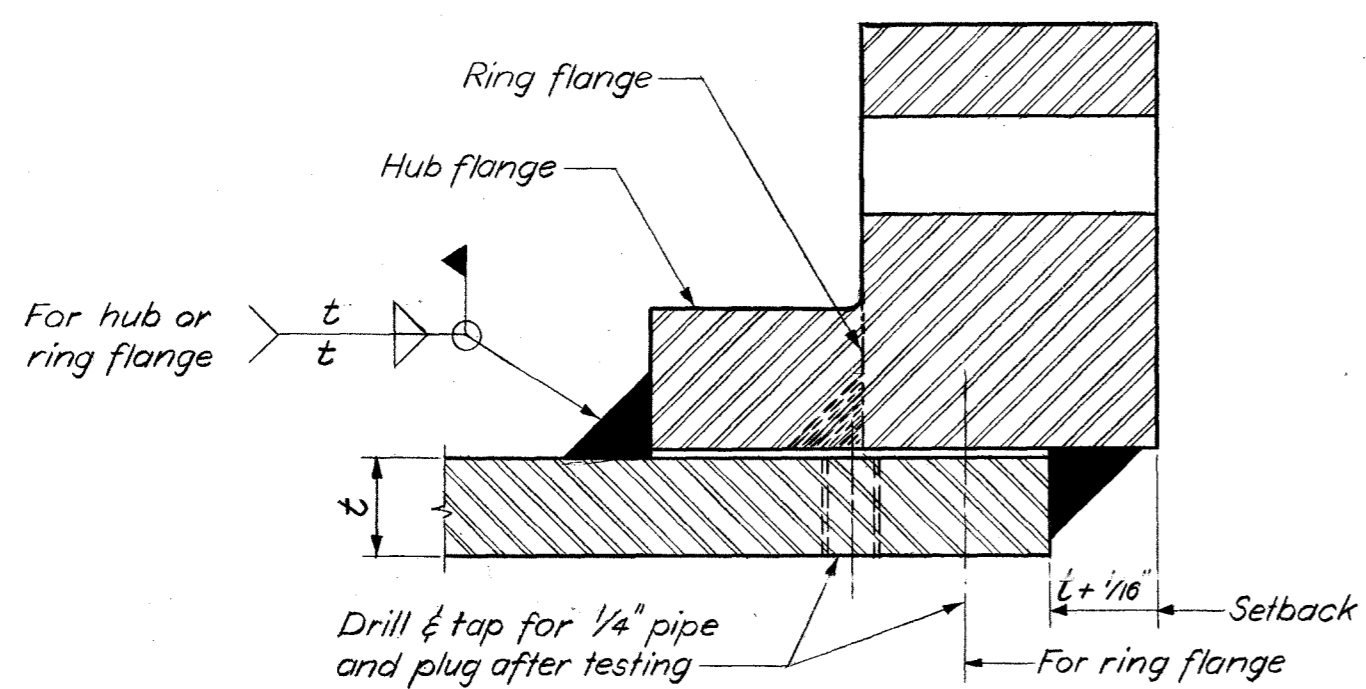
**DEFLECTED JOINT**  
(See Table and Notes for maximum permissible deflection angles.)



**DETAIL A**

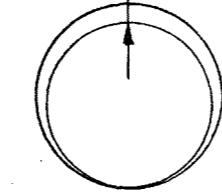


**DETAIL B**



**TYPICAL SLIP-ON FLANGED JOINT**

Diametral gap  
1/8" max., 1/16" min.



**DETAIL a**

PIPE DIAMETER	MAXIMUM PERMISSIBLE DEFLECTION ANGLES, $\alpha_1$ & $\alpha_2$		PIPE DIAMETER	MAXIMUM PERMISSIBLE DEFLECTION ANGLES, $\alpha_1$ & $\alpha_2$	
	$\alpha_1$ See Notes	$\alpha_2$		$\alpha_1$ See Notes	$\alpha_2$
			66	2.1°	1.5°
30	3.2°	1.8°	76	2.0°	1.4°
36	2.9°	1.7°	78	1.8°	1.4°
42	2.8°	1.7°	84	1.7°	1.4°
48	2.7°	1.6°	90	1.5°	1.4°
54	2.6°	1.6°	96	1.4°	1.3°
60	2.3°	1.5°	102	1.4°	1.3°

Up to 54" diameter  $\alpha_1$  is based on maximum allowable diametral gap of 1/8", and over 54"  $\alpha_1$  is based on available length in the straight portion of bell.  $\alpha_2$  is based on a minimum required diametral gap of 1/16".

**NOTES:**

- Pipe sleeve and cover plates shall be of same thickness as steel being joined.
- All plugs shall be ground flush.
- All welds shall be continuous.
- t = thickness as specified.
- Butt welded joints to be full penetration weld.
- Size of all fillet welds shall be 5/16" minimum.

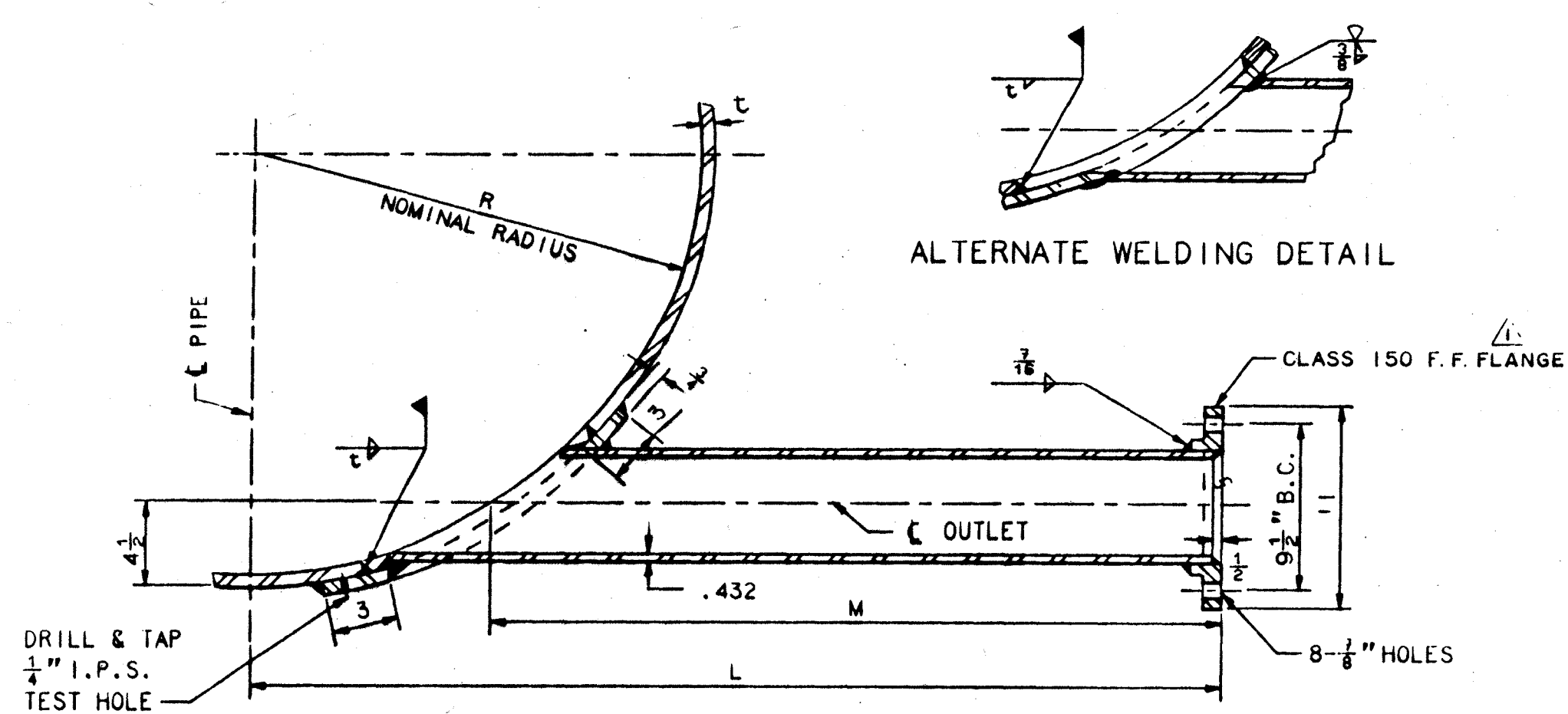
NO.	DATE	REVISIONS	APP'D BY	TITLE
City of New York DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WATER SUPPLY <b>JOINTS FOR STEEL WATER MAINS</b> NOT TO SCALE MAY, 1984 This drawing supersedes Dwg. Nos. 35310-B-Z and 42061-Z.				

Drawn by: A. S.  
Checked by: D. R. B.

*Stephen G. Simon* P.E.  
Division Engineer

*Walter C. Fitzpatrick* P.E.  
Chief of Design

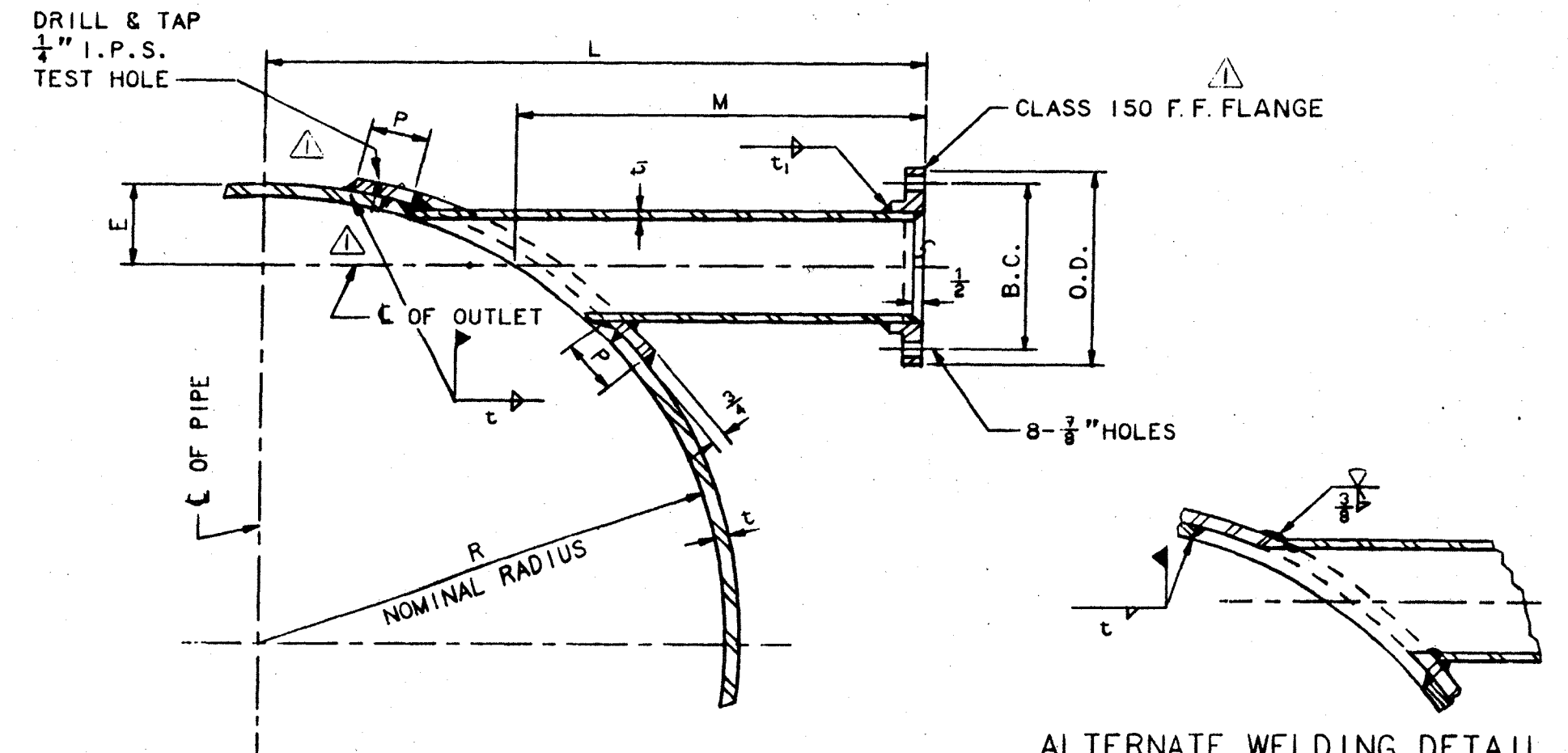
*David S. Schaefer* P.E.  
Deputy Director



DIA.	R	L	M	WT. (LBS)
30	15	45	34±	121
36	18	48	36±	126
48	24	54	40±	135
60	30	60	43±	145
72	36	66	48±	156

6" BLOW-OFF OUTLET  
SCHEDULE NO. 80

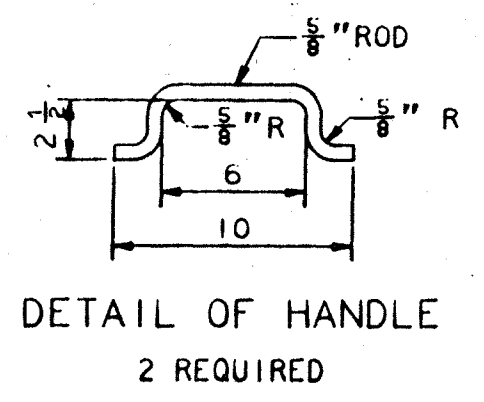
NOTE: DIMENSION M VARIES SLIGHTLY WITH PIPE THICKNESS t



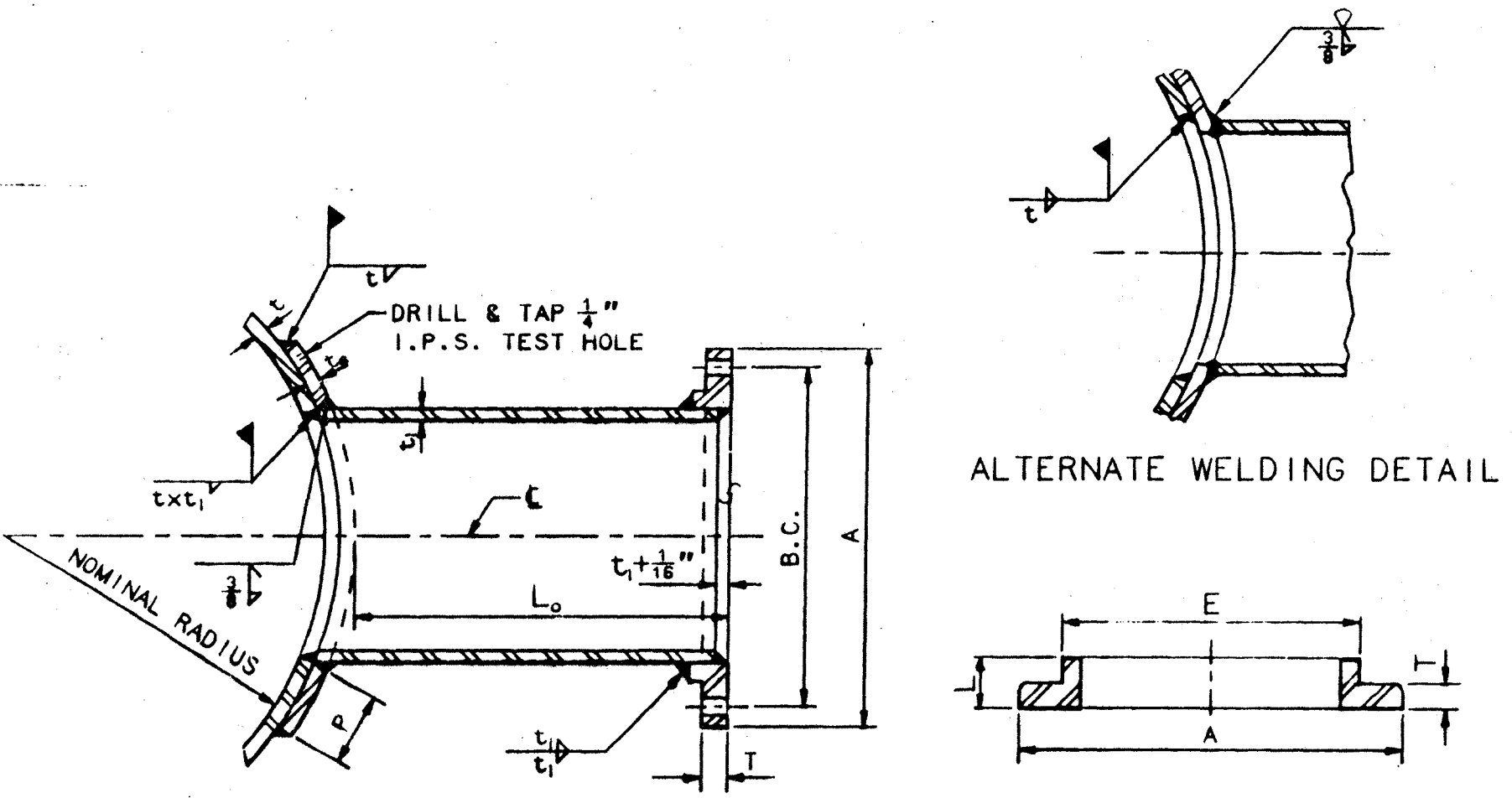
PIPE DIA. D	L		M		WT. (LBS)		E	t <sub>1</sub>	P	B.C.		O.D.		
	6"A.C.	8"A.C.	6"A.C.	8"A.C.	6"A.C.	8"A.C.				6"A.C.	8"A.C.	6"A.C.	8"A.C.	
30	25	25	14 1/2	13 1/2	74	115								
36	28	28	16	15	78	124								
48	34	34	20	18 3/4	88	138	4 1/2	5 1/2	.432	.500	3	4	9 1/2	11 1/4
60	40	40	24 1/4	22 3/4	98	156								
72	46	46	28 1/2	27	107	174								

6" AND 8" STEEL AIRCOCK OUTLET

NOTE: DIMENSION M VARIES SLIGHTLY WITH PIPE THICKNESS t



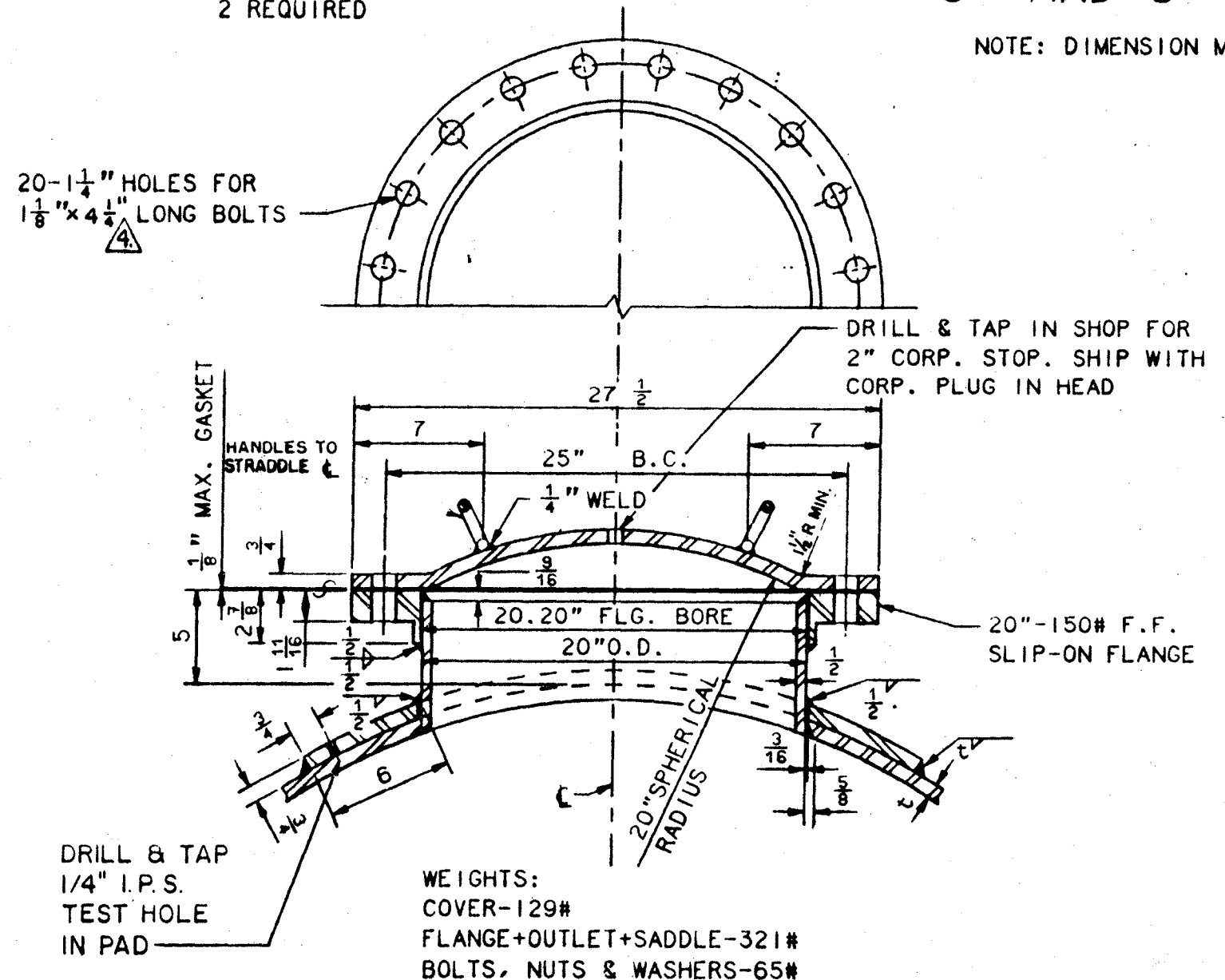
DETAIL OF HANDLE  
2 REQUIRED



NOM. OUTLET PIPE SIZE	OUTLET PIPE O.D.	L	SCHED. NO. & THICKNESS	SADDLE FLANGE		SLIP-ON OR WELDING NECK F.F. FLANGE			A	E	L	T	WT. W/O FLANGE
				t	P	I.D.	B.C.	BOLT HOLES NO.					
6	6.625	18	80	4	6.72	9 1/2	8	1 3/8	150	7 3/4	1 3/8	1	100
8	8.625	23	80	4	8.72	11 1/4	8	1 3/8	150	13 1/2	1 3/8	1 1/8	129
12	12.750	23	80	4	12.88	17	12	1 1/2	150	19	2 1/8	1 1/4	250
16	16	28	80	4	16.16	21 1/4	16	1 1/2	150	23 1/2	2 7/8	1 1/2	370
20	20	28	80	4	20.20	25	20	1 1/2	150	27 1/2	2 7/8	1 1/2	520
24	24	28	80	4	24.25	29 1/2	20	1 3/8	125	32	3 1/4	1 1/2	683
30	30	28	80	4	30.25	36	28	1 3/8	125	38 3/4	3 3/4	2 1/8	1051
36	36	28	80	4	36.25	42 3/4	32	1 3/8	125	46	3 3/4	2 3/8	1537
48	48	28	80	4	48.25	56	44	1 3/8	125	59 1/2	5 1/4	4 1/8	2437

STEEL OUTLET CONNECTION  
FOR PIPE 30" DIAMETER & LARGER

NOTE: 1. FLANGE DIMENSIONS SHALL CONFORM TO AWWA STANDARD ANSI/AWWA C-207-86 FOR STEEL HUB FLANGES, CLASS E.  
2. PIPES OF 30, 36 AND 48-INCH O.D. ARE USED FOR OUTLETS ONLY.



STEEL ACCESS MANHOLE  
FOR PIPE 30" DIAMETER & LARGER

WEIGHTS:  
COVER-129#  
FLANGE+OUTLET+SADDLE-321#  
BOLTS, NUTS & WASHERS-65#

ABBREVIATIONS:  
B.C. = BOLT CIRCLE  
F.F. = FLAT FACE  
I.D. = INSIDE DIAMETER  
O.D. = FLANGE OUTSIDE DIAMETER  
S.O. = SLIP-ON

- NOTES:
- FIELD WELDS ARE INDICATED BY THE STANDARD SYMBOL
  - ALL FILLET WELDS SHALL BE CONTINUOUS.
  - ALL FLANGE HOLES SHALL STRADDLE CENTER LINE.
  - ALL TEST HOLES SHALL BE PLUGGED AND ALL PLUGS GROUND FLUSH AFTER TESTING.
  - RING FLANGES CONFORMING TO AWWA STANDARD ANSI/AWWA C-207-86, CLASS E MAY BE USED IN LIEU OF HUB FLANGES AT NO ADDED COST TO THE CITY OF NEW YORK
  - MAXIMUM SIZE OUTLETS FOR STEEL PIPE USING COLLAR PLATE REINFORCEMENT:
- | PIPE DIA./in.        | 30 | 36 | 48 | 60 | 72 |
|----------------------|----|----|----|----|----|
| MAX. OUTLET DIA./in. | 20 | 24 | 30 | 36 | 48 |
- FOR OUTLETS EXCEEDING THE ABOVE LIMITS, DESIGN AND DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
  - ALL DIMENSIONS ARE IN INCHES.

THIS DRAWING SUPERSEDES DRAWING 38226-Y

NO.	DATE	REVISIONS	APPROVED BY
5	FEB. 93	ADDED NOTE FOR INSULATED JTS. BOLT HOLES	ME
4	July 89	Correction made for added	ME
3	Feb. 89	Corrections made	ME
2	Mar. 89	Revised L & M for 16" outlets	ME
1	March 88	Corrections made	ME

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

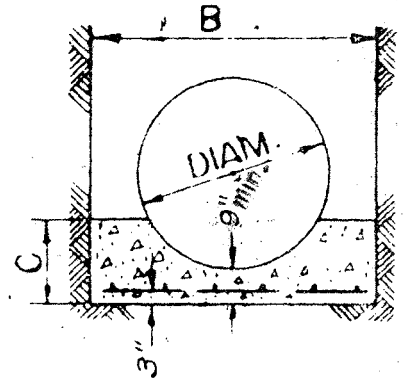
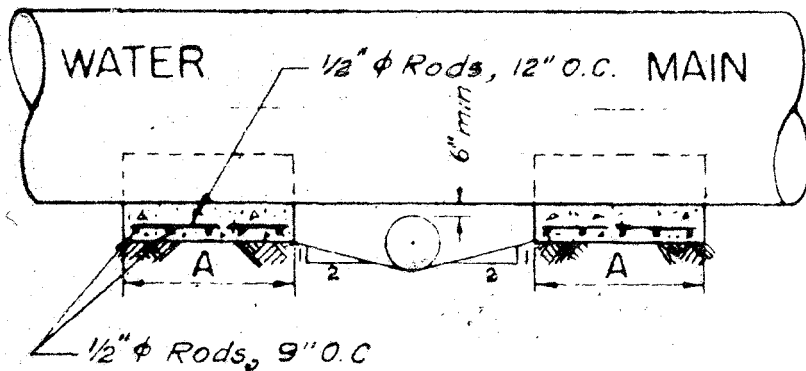
STANDARD FABRICATED  
CONNECTIONS FOR  
STEEL MAINS

SCALE: NO SCALE DATE: JUNE 1986 SHEET 1 OF 1

Stephen C. Fitzpatrick, P.E. CHIEF DESIGNER  
Edward C. Alford, P.E. DEPUTY DIRECTOR

DRAWN BY: A.S./CAD  
CHECKED BY: D.B.

Stephen Gyimay  
DIVISION ENGINEER



1. Where clearance between new water main and top of existing vitrified pipe sewer is more than 6" and less than 12", replace the vitrified pipe with cast iron pipe
2. Install concrete cradles where new water main crosses sewers 12" and larger where clearance between bottom of main and top of sewer is less than 12", or as directed.
3. Concrete cradles to be used at pipe sewers and other crossings as directed by the Engineer.
4. All digging to be done by hand within one foot of existing sewers or house connection drains.

MINIMUM DIMENSIONS & VOL.					
PIPE DIAMETER	A	B	C	CONCRETE CU. YDS.	STEEL LBS.
36"	3'-6"	5'-0"	1'-6"	1.59	50.1
48"	3'-6"	6'-0"	1'-9"	2.08	60.8
60"	4'-0"	7'-0"	2'-0"	3.01	76.1
72"	4'-0"	8'-0"	2'-3"	3.69	87.5

CITY OF NEW YORK  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 SUPPORTS FOR WATER MAIN  
 OVER PIPE CROSSING

NOT TO SCALE

JANUARY 1967

*o.k.*

*Myron Beebe*

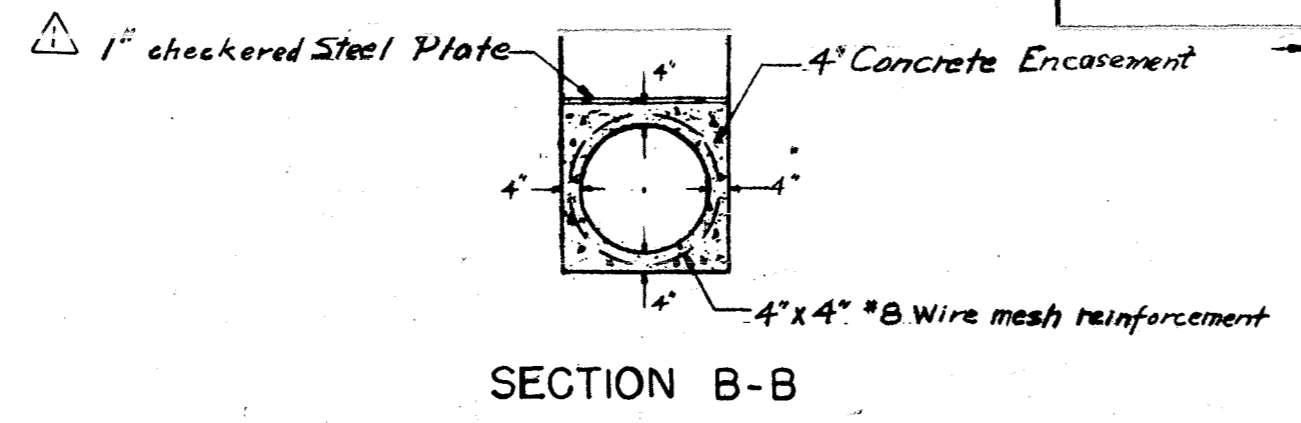
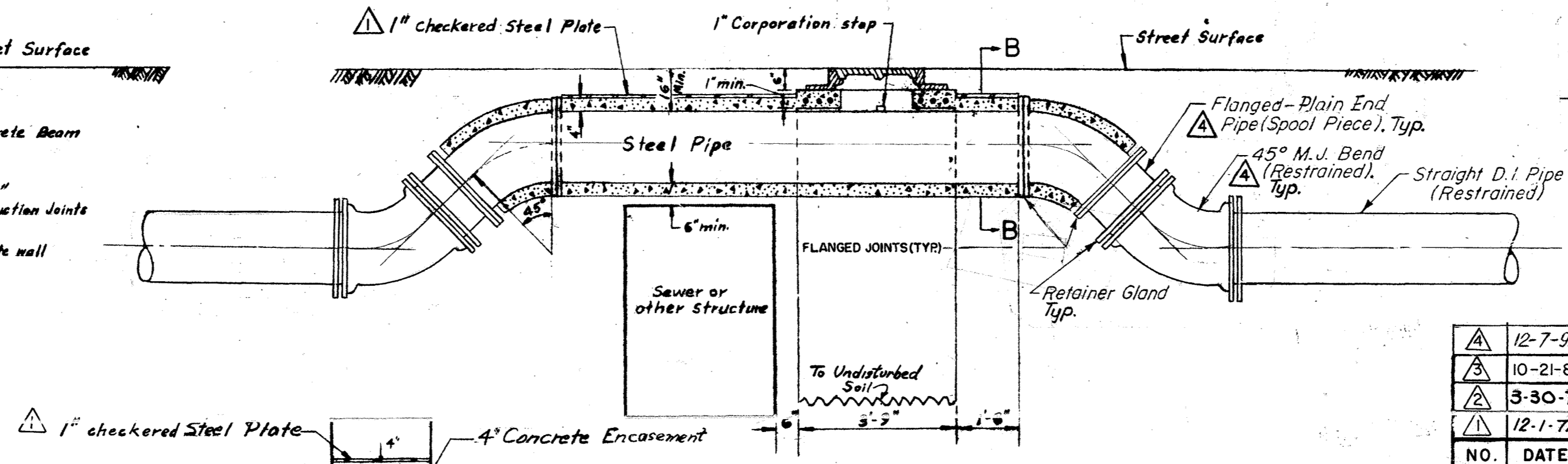
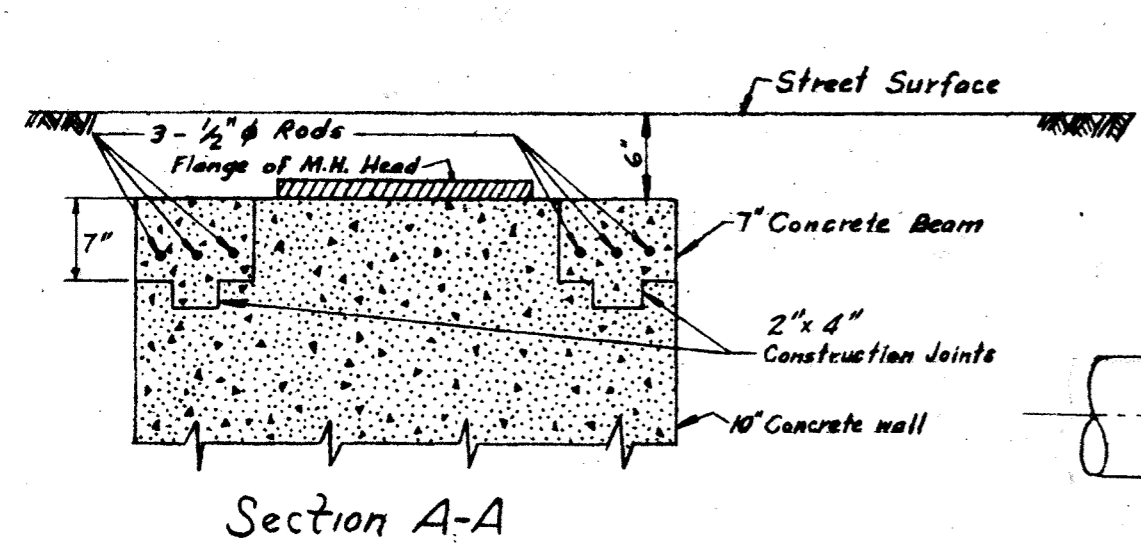
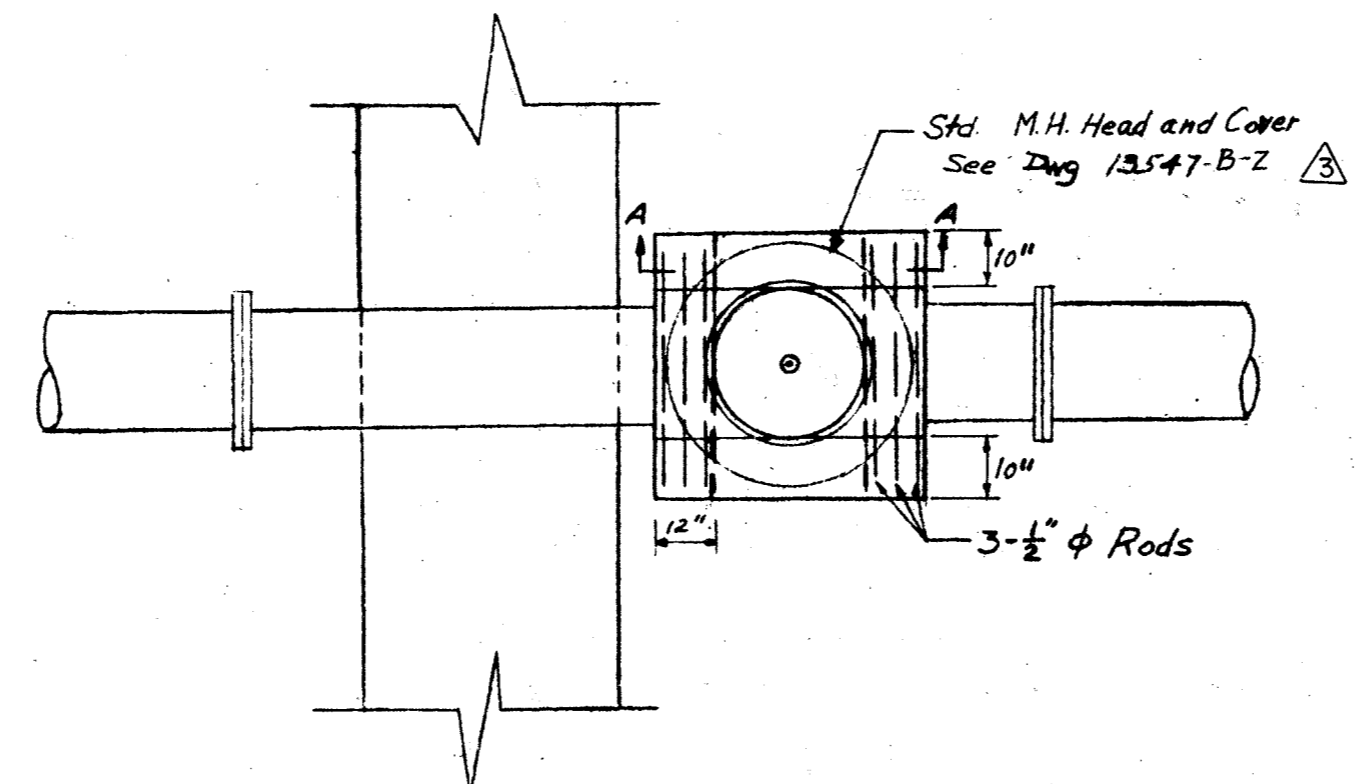
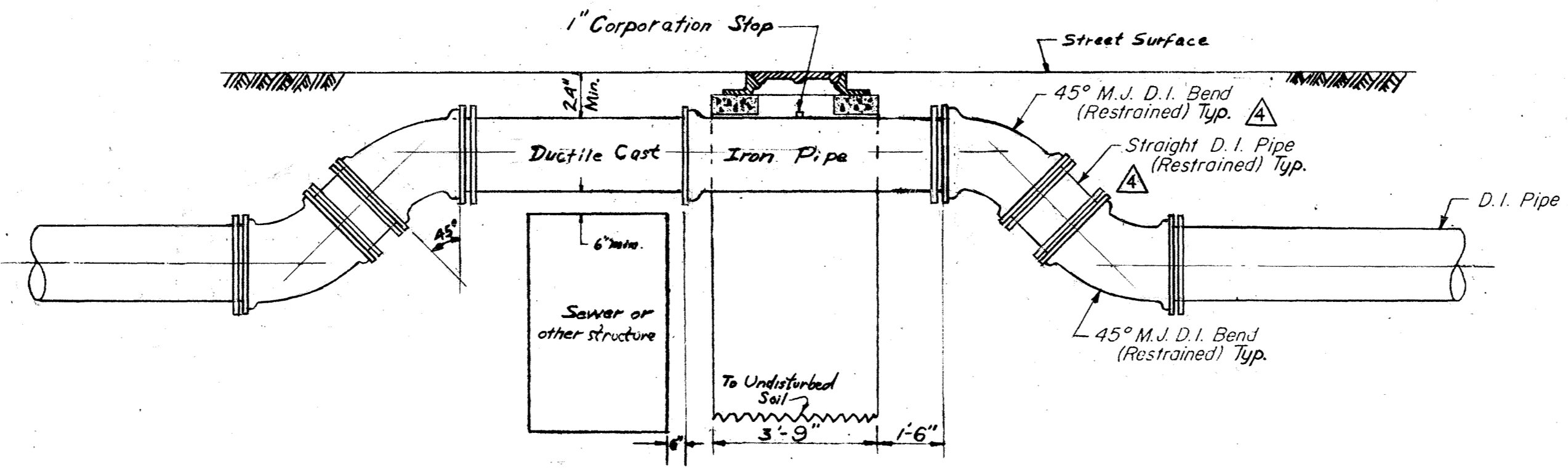
DIVISION ENGINEER  
 DIVISION OF INVESTIGATION AND DESIGN

*Abraham Grossman*  
 ad CHIEF ENGINEER

Drawn by: R.B.  
 Checked by: G.G.

38

26 40868-1



**NOTE**  
All pipe to be restrained in accordance with Department Standards and Specifications. See Dwg. No. 10239-A-Z, 44387-B-Z.

NO.	DATE	REVISIONS	DIVISION ENGINEER	CHIEF OF DESIGN	DEPUTY DIRECTOR
1	12-7-92	Changed C.I. Lugged Fitting to M.J. Fitting	P. B. B.	M.P.R.	J.E.
2	10-21-86	Changed St. Dwg. No. 43479-Z To 44387-B-Z, 13547-Z To 13547-B-Z	D. Bully	SKF	SKF
3	3-30-77	Ref. to standard drawing 43479-Z	D. B. 10-21-86	SKF	SKF
4	12-1-72	Checked steel plate thickness inc. from 1/4" to 1"	D. B. 10-21-86	SKF	SKF

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

SHALLOW CROSSING FOR WATER MAINS, 24" DIAMETER AND SMALLER

SCALE: NONE      DATE: MAY 1970      SHEET 1 OF 1

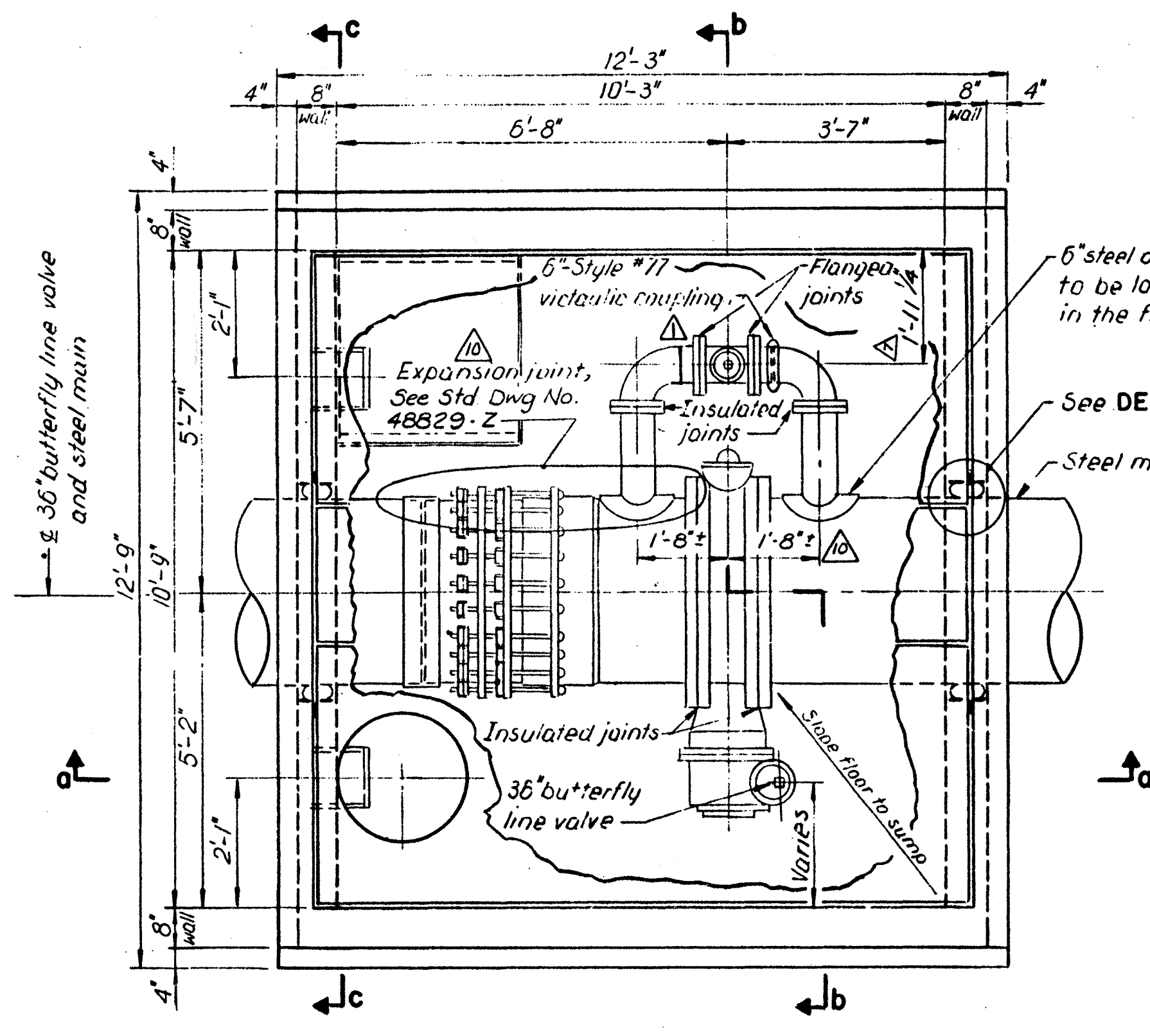
*Morris Becker*  
DIVISION ENGINEER  
DIVISION OF INVESTIGATION & DESIGN

*Abraham J. Swartzman*  
CHIEF ENGINEER

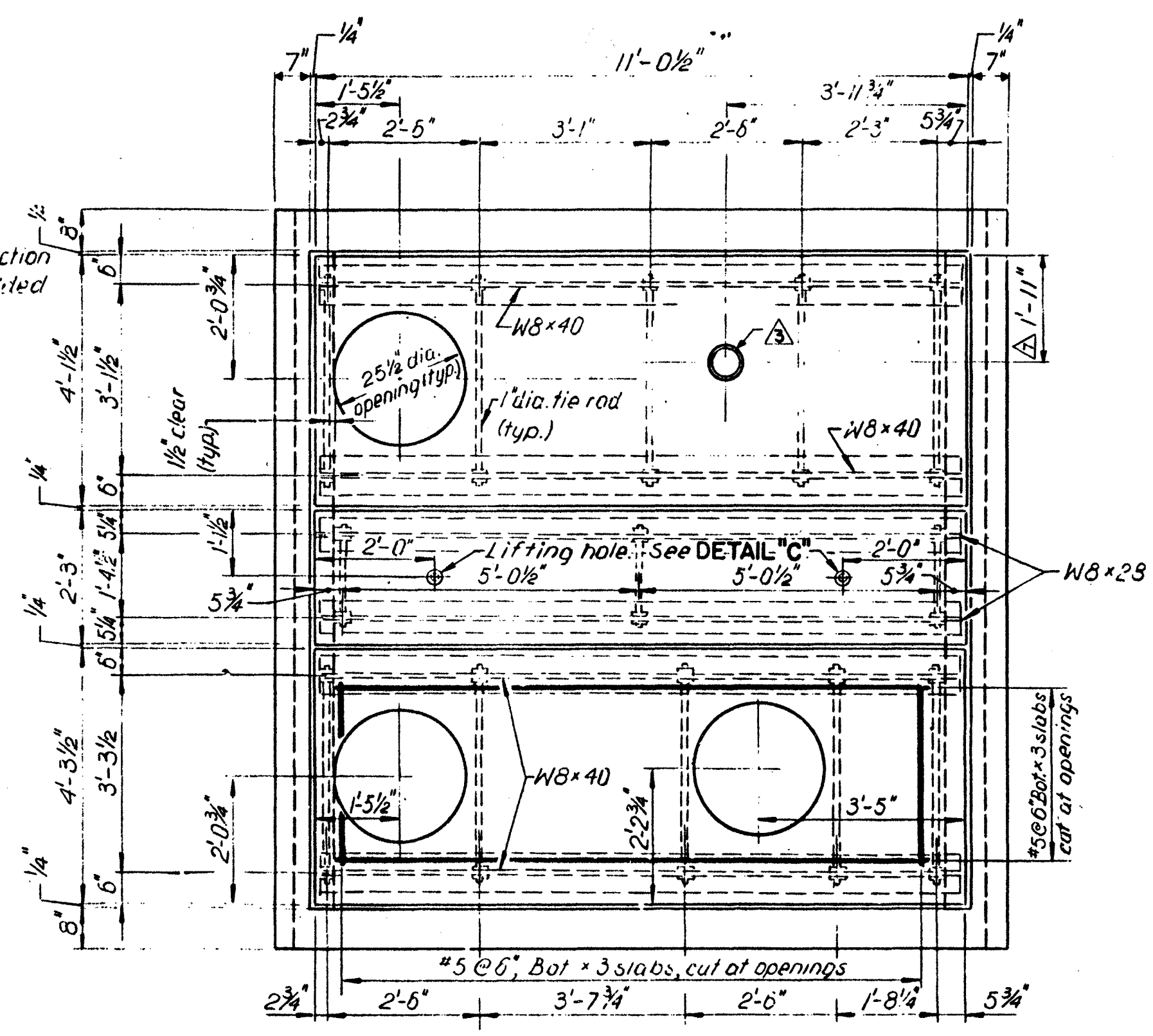
DRAWN BY: W.S. & J.M.  
CHECKED BY: P.T.

*Peter M. Termini*  
CIVIL ENGINEER

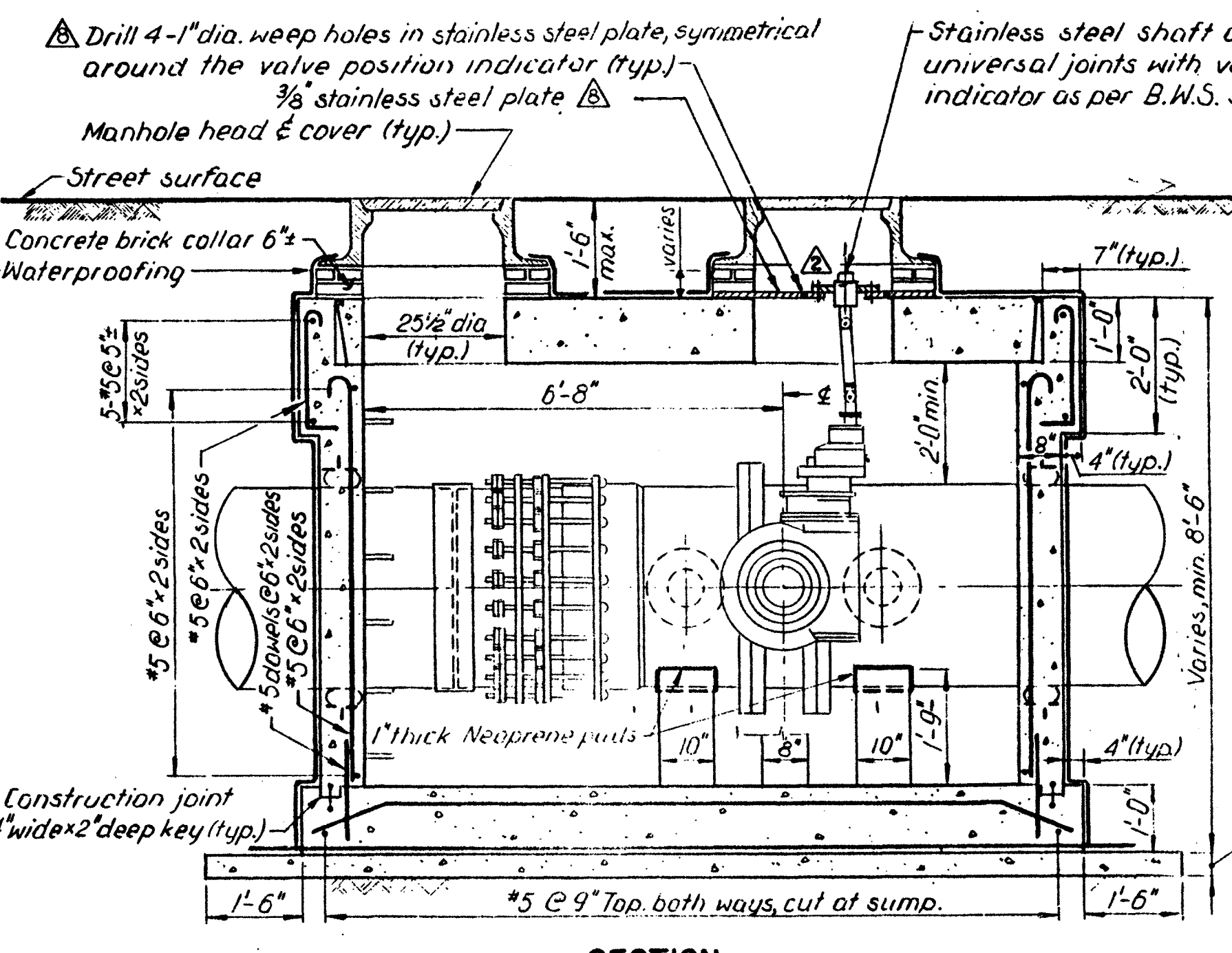




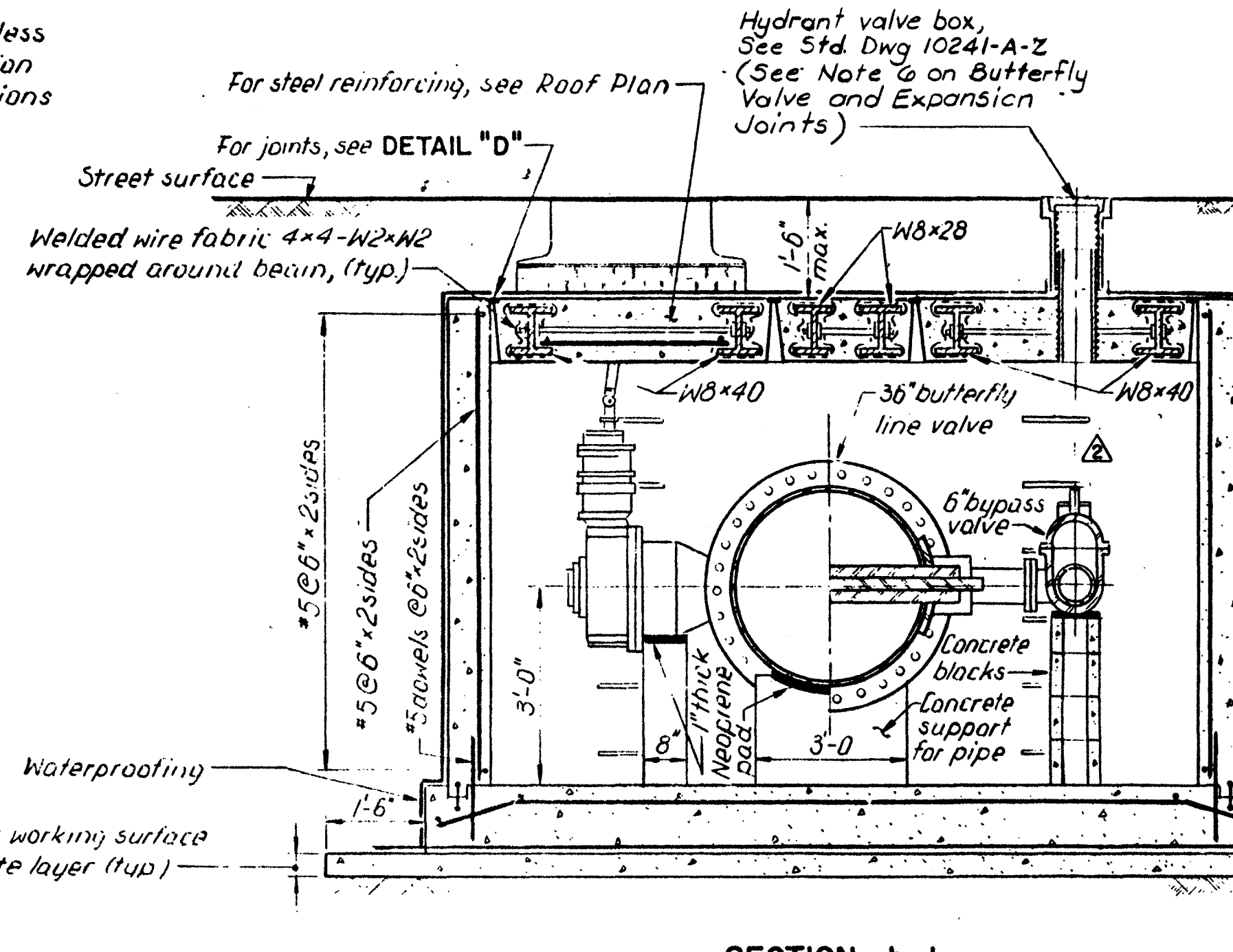
**PLAN**  
WORKING SURFACE CONCRETE LAYER NOT SHOWN



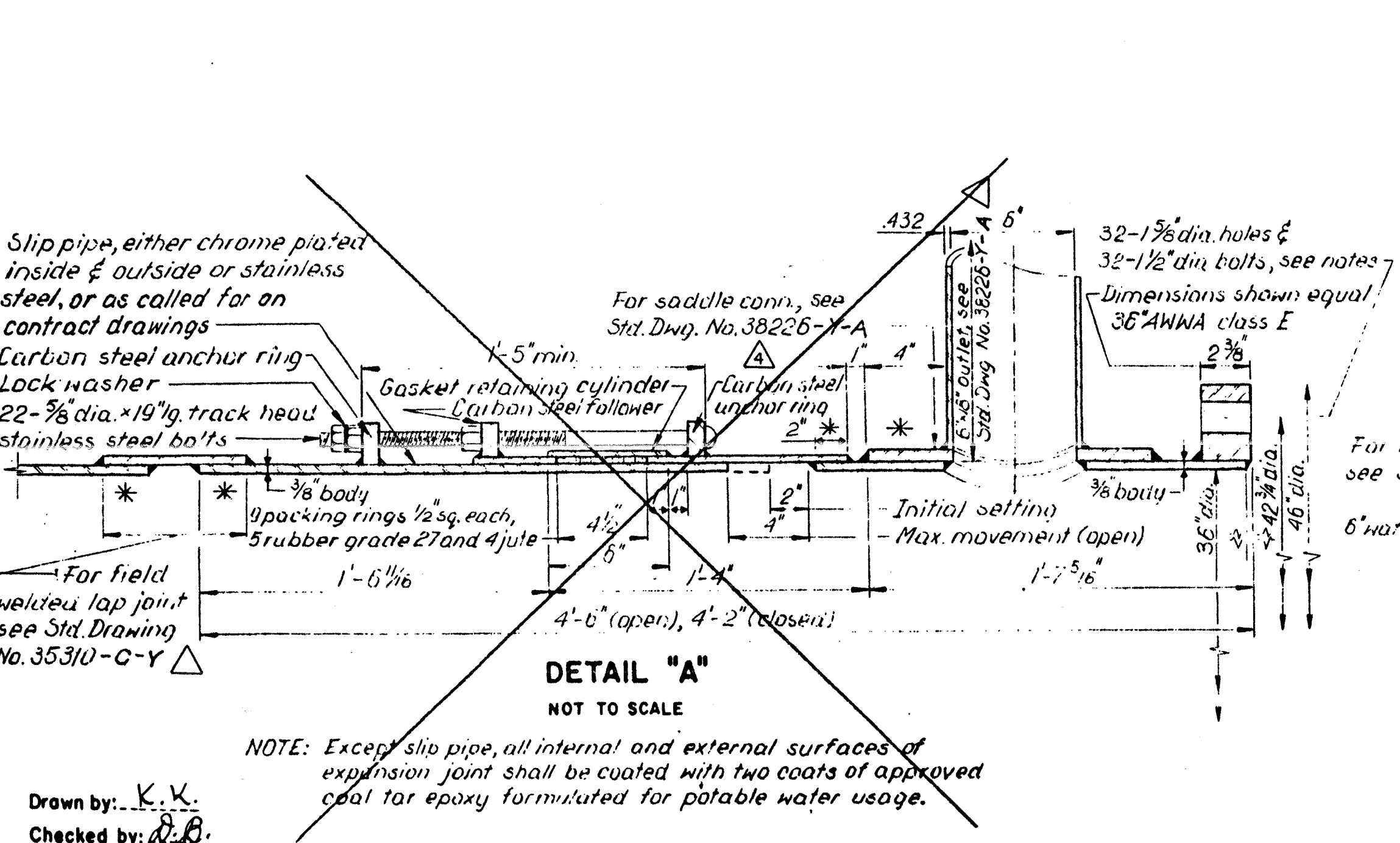
**ROOF PLAN**



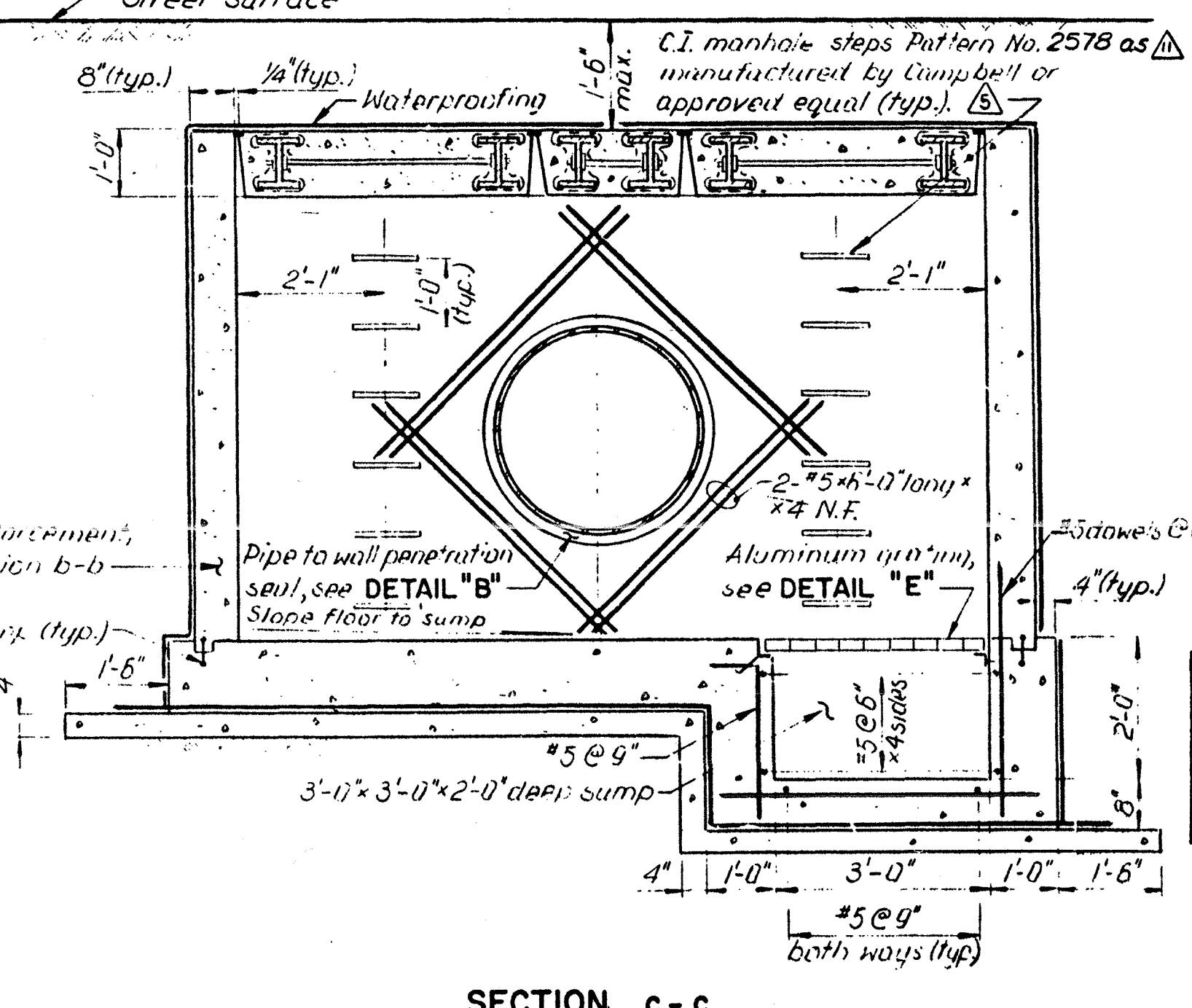
**SECTION a-a**



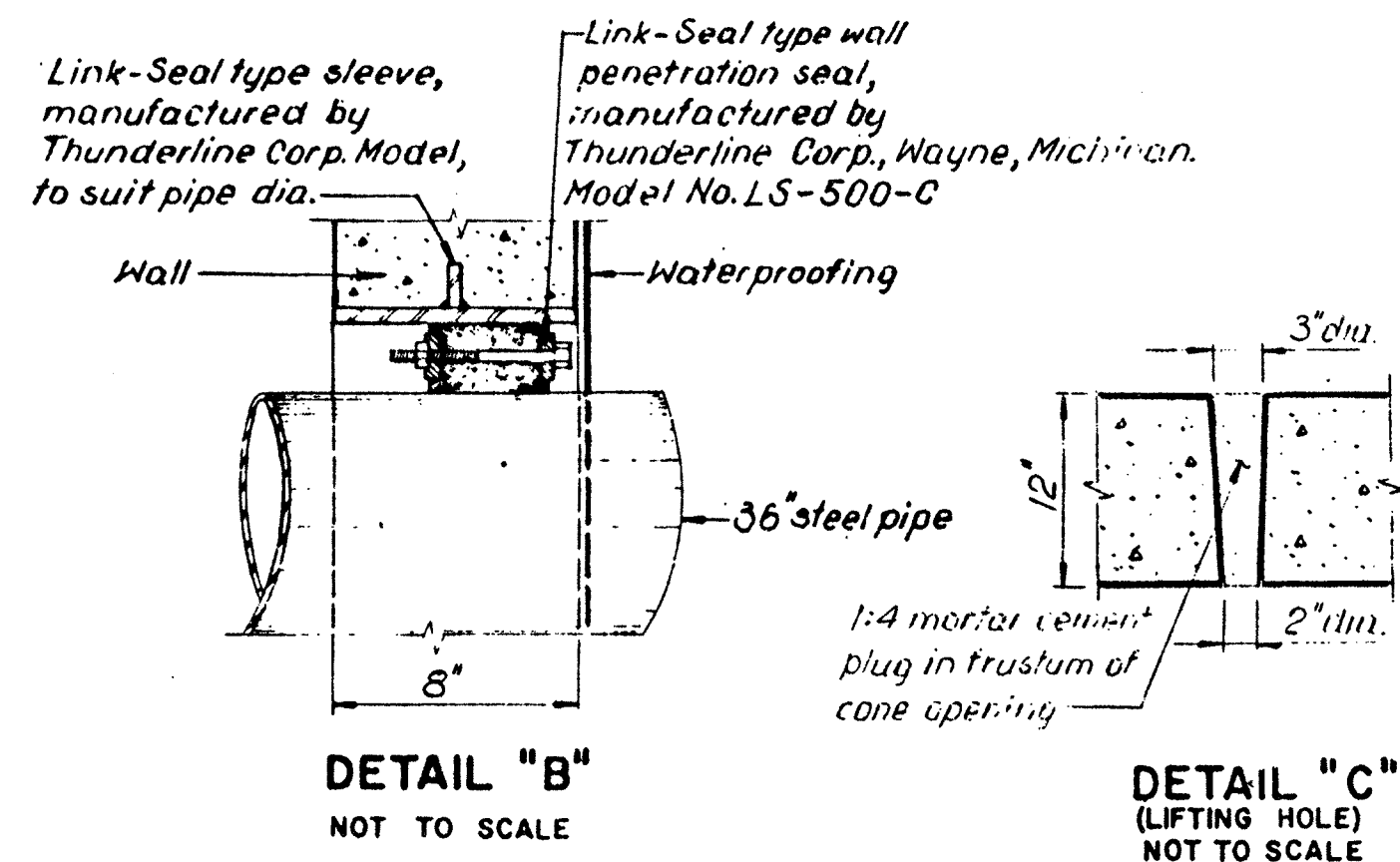
**SECTION b-b**



**DETAIL "A"**  
NOT TO SCALE

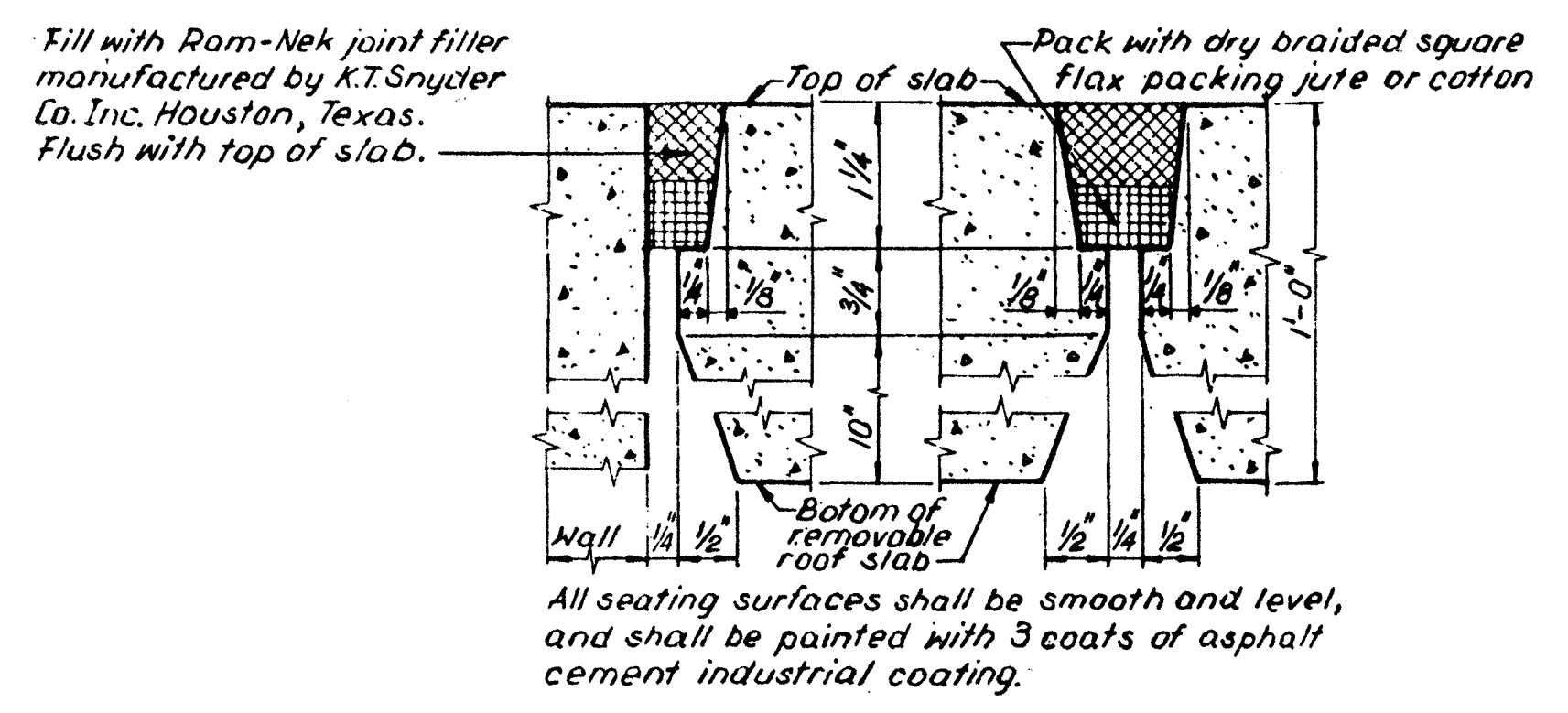


**SECTION c-c**

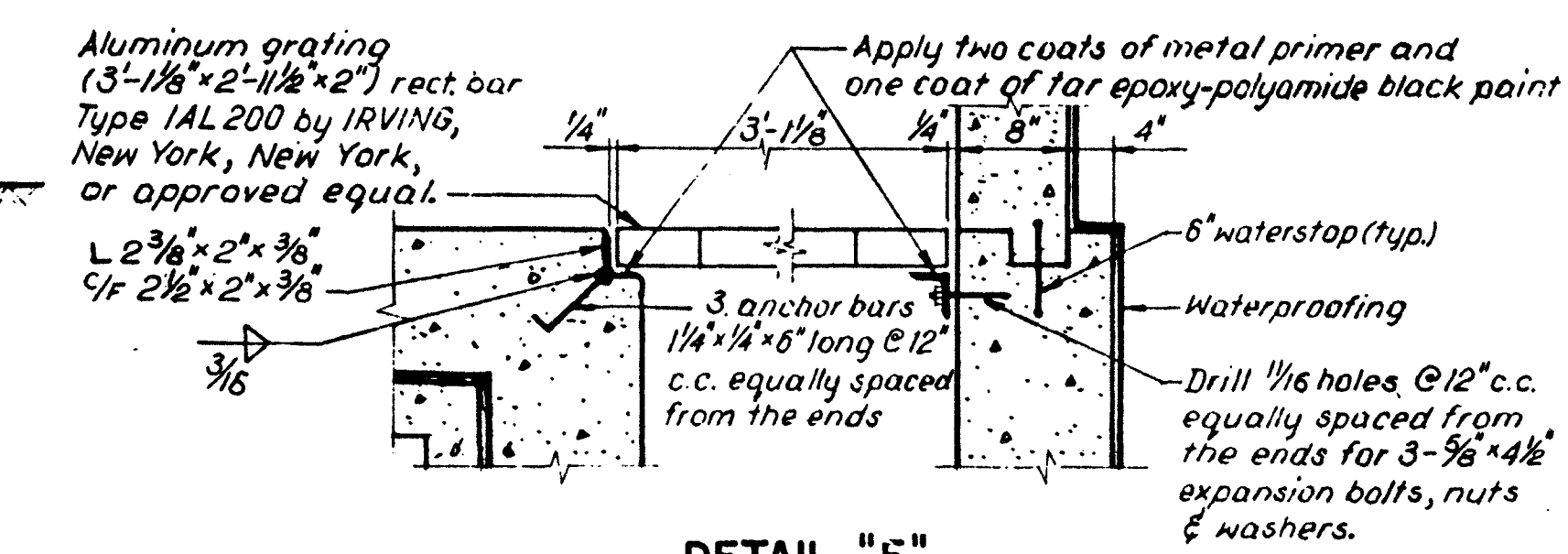


**DETAIL "B"**  
NOT TO SCALE

**DETAIL "C"**  
NOT TO SCALE



**DETAIL "D"**  
NOT TO SCALE



**DETAIL "E"**  
NOT TO SCALE

**REFERENCE DRAWINGS**

1. For insulated joints, see Drawing No. 46104-W
2. For 6" steel outlet connection, see Drawing No. 38226-YA
3. For flange thicknesses of standard fabricated connections for steel mains, see Drawing No. 38226-YA
4. For flange thicknesses of insulated flange joints, see Drawing No. 46104-W
5. For details of Expansion Joint, see Std. Drawing No. 48829-Z

**GENERAL NOTE**

This drawing shall not be scaled for the purpose of determining dimensions, but the dimensions marked on this drawing shall be followed.

**QUANTITIES FOR ESTIMATING**

Standard valve chamber	Concrete (cu. yd.)		Reinforcing steel (lbs.)
	constr. concrete	working surface	
<b>Totals</b>	19.33	3.24	2690
Per linear foot of wall section	1.10	—	194

**STRUCTURAL NOTES**

1. The minimum compressive strength of cast in place concrete,  $f'_c$ , shall be 3500 p.s.i. at 28 days. The minimum compressive strength of precast concrete,  $f'_c$ , shall be 4000 p.s.i. at 28 days.
2. Air-entraining agents may be used in the concrete, subject to the approval of the Engineer.
3. The allowable concrete slump shall be 2 to 4 inches.
4. Steel for reinforcing concrete and anchor bars shall be Grade 60, and shall conform to the requirements of the Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (ASTM A615 including Supplementary Requirements, S1).
5. Steel reinforcement may be slightly moved or bent in the field to clear waterstops, anchors, obstructions and openings as approved by the Engineer.
6. The minimum concrete cover for steel reinforcement shall be as follows:
  - a. Concrete poured on ground - 3"
  - b. Surfaces exposed to earth, water or weather - 2"
  - c. Formed surfaces not exposed to earth, water or weather - 1 1/2"
  - d. Slab not exposed to earth, water or weather - 1"
  - e. At keys - 1"
7. Where bars are to be spliced or embedded, the length of splice or embedment shall comply with the latest edition of the Manual of Standard Practice of the American Concrete Institute.
8. Construction joints shall be provided with 6-inch RVC waterstops where indicated on the drawing or as ordered by the Engineer.
9. All exposed corners and edges of the structure shall be chamfered one inch, except where otherwise noted.
10. The invert slab of the chamber shall be float finished.
11. Chamber floor to be sloped 1/8 inch per foot minimum, to the sump.
12. The chamber shall be waterproofed with 4 layers of woven fiberglass fabric saturated with bituminous waterproofing substance on all exterior surfaces, including bottom slab as shown on the drawing.

**NOTES ON BUTTERFLY VALVE**

1. Field joints, unless otherwise noted, shall be lap fillet welded as shown on Drawing No. 38226-YA
2. Hydrant valve box may be substituted with std. manhole, frame and cover (Std. Dwg. No. 15547-B-Z) if indicated on the Contract drawing or when, due to special field conditions, ordered by the Engineer.
3. For un-insulated joints, bolts, nuts & washers shall be carbon steel to meet the requirements of ASTM Designation A 307, Grade B for bolts & Grade A for heavy hex nuts and washers.
4. For insulated joints, bolts and washers shall be stainless steel type 304 and to meet the requirements of ASTM Designation A-193-BB Class BBA Class 1A; nuts shall be stainless steel type 303 and comply with the requirements of ASTM Designation A-194-BB Grade 8FA.

This Drawing supersedes Drawing No. 44015-X.

NO.	DATE	REVISIONS	APP'D BY	TITLE
2-28-94		Changed steps Pattern No.		
5-13-93		Referred to Std. Dwg. No. 48829-Z for Expansion Joint and revised notes and reference drawings.		
3-28-90		Revised notes for bolts		
2-28-88		Change to structure steel plate		
4-10-89		Revised dimensions for location of hydrant valve box		
2-4-80		Air test for welded lap joints		
2-4-80		Unchanged steps manufacturer		
10-20-86		Changed Std. Dwg. No. 38226-Y to 38226-YA, 29818-XA to 46104-W		
MAY 1986		Changed manhole to Std. Hydrant Valve Box		
JUNE 1985		Section a-a: lowered valve position indicator.		
		Section b-b: deleted valve position indicator and operator stem for 6" by-pass valve		
APR 1985		Omitted one Victaulic Coupling (See Plan)		

**CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY**

**STANDARD CHAMBER  
FOR  
36" BUTTERFLY LINE VALVE  
ON STEEL MAIN**

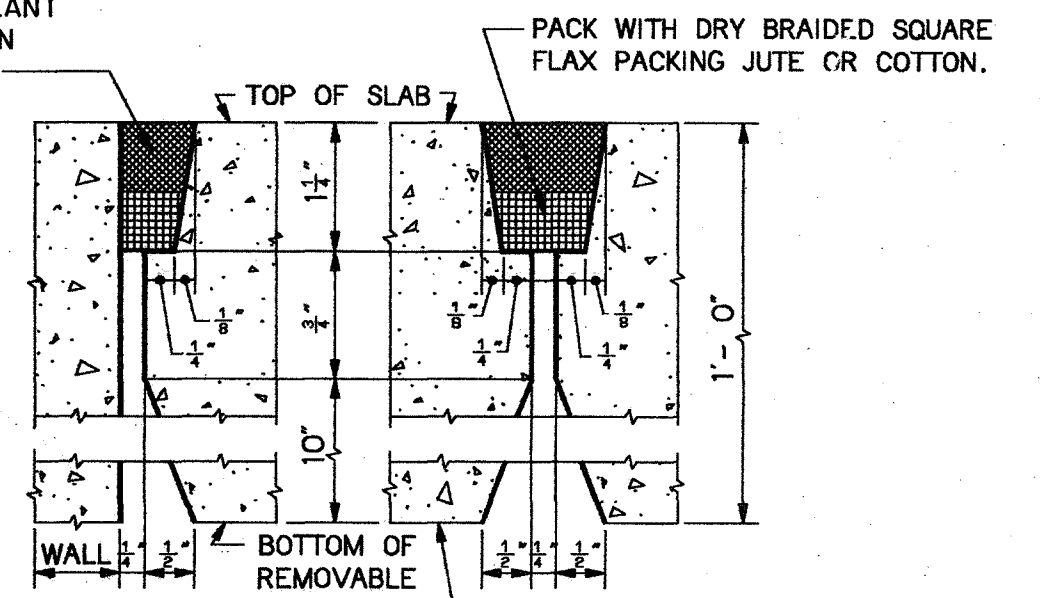
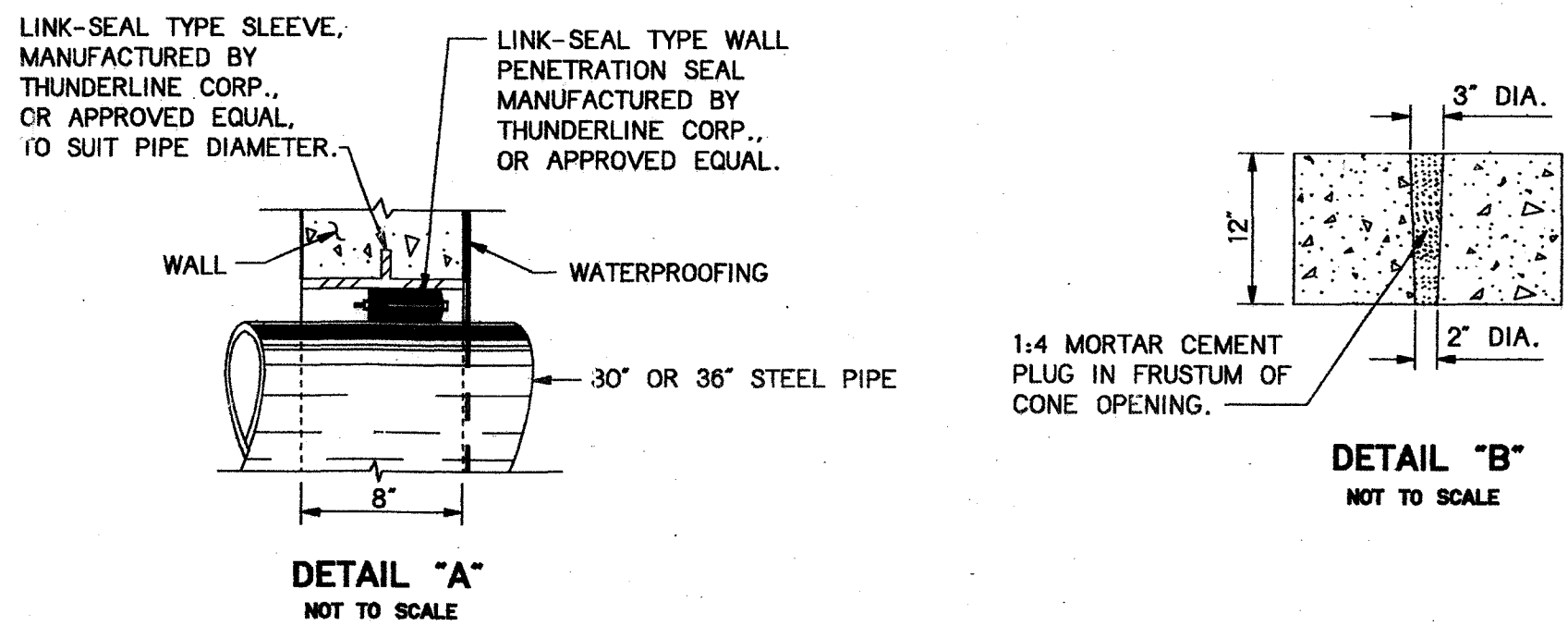
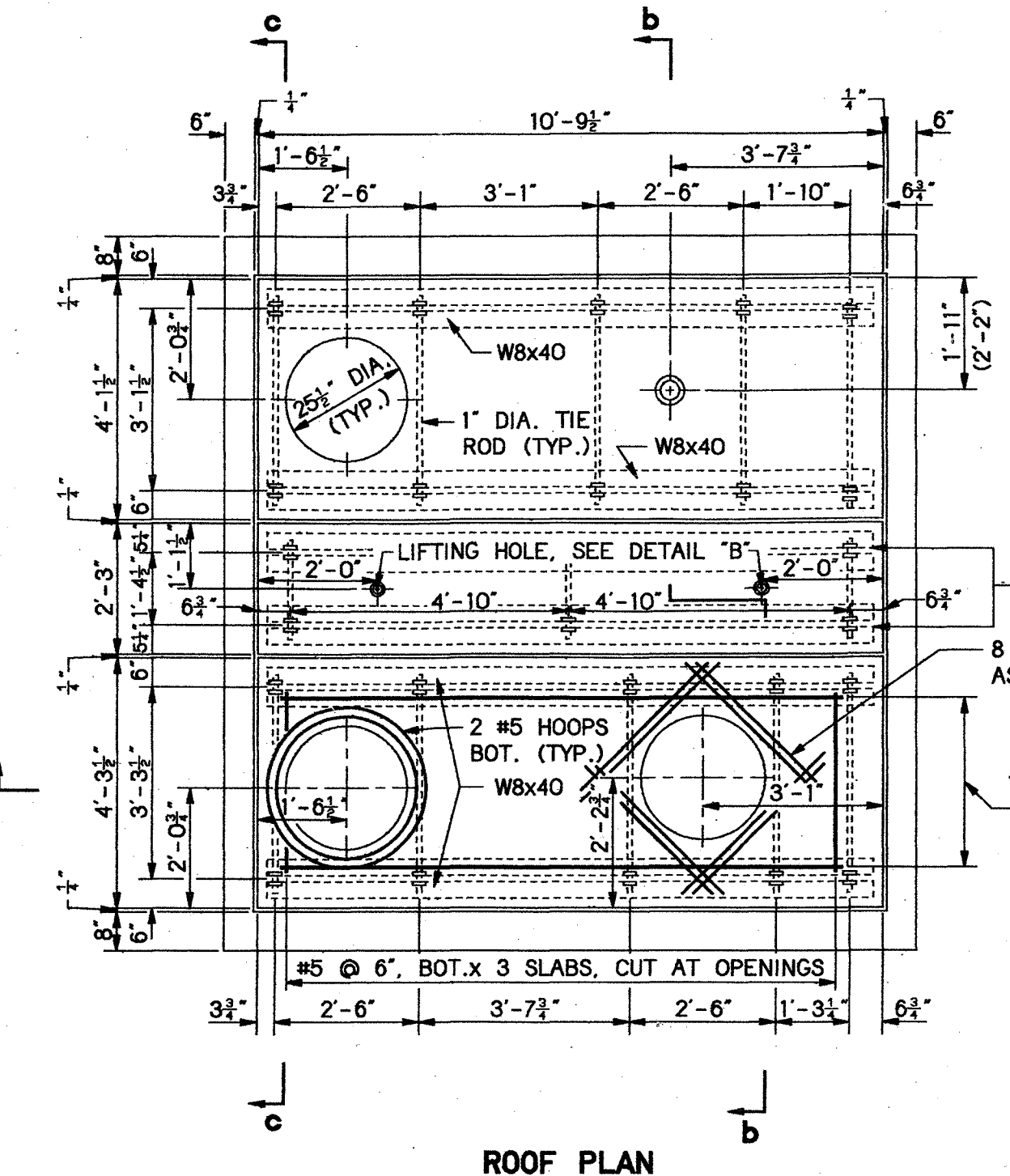
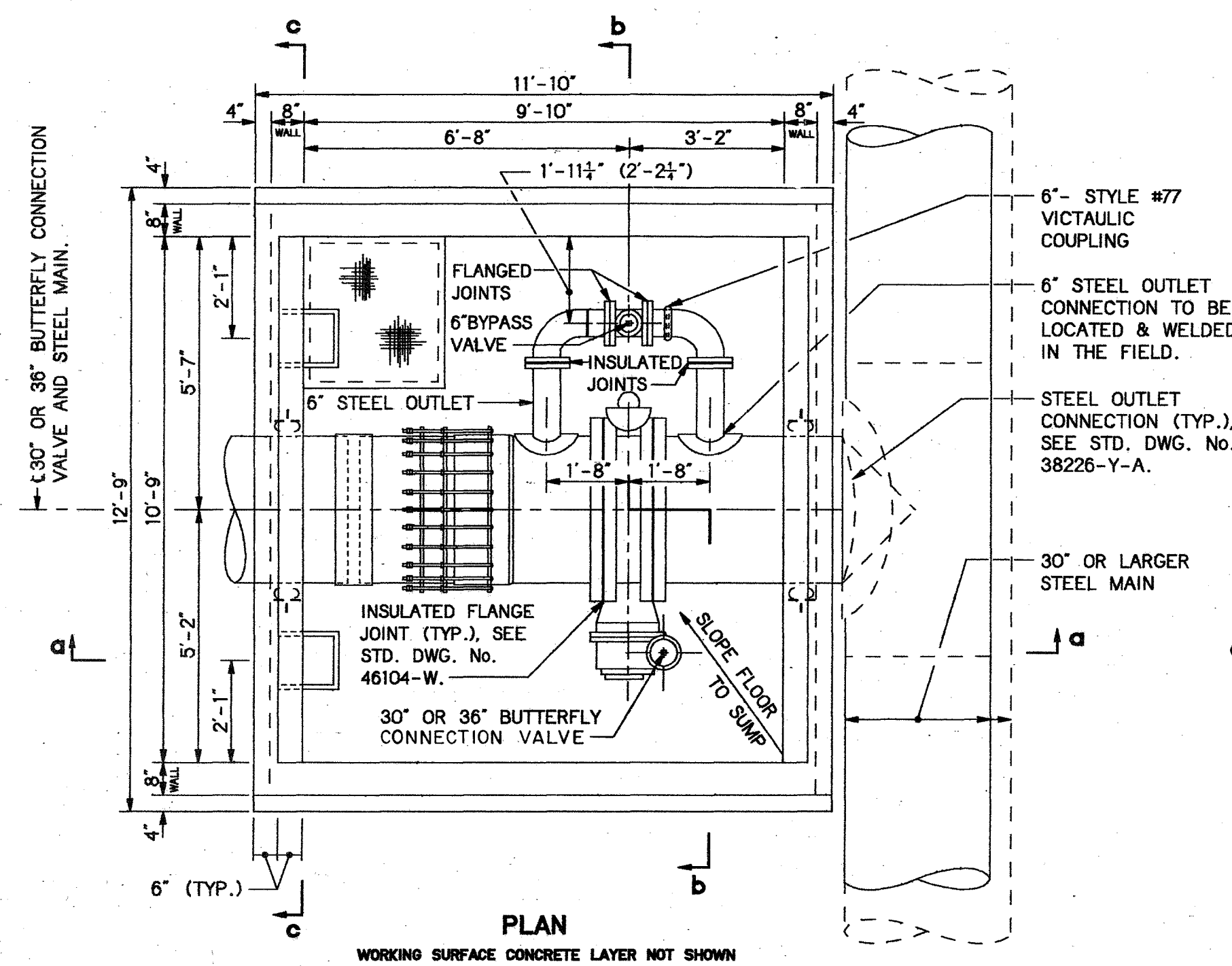
SCALE: 1/2" = 1'-0"    DATE: DECEMBER, 1984    SHEET: 1 OF 1

Walter F. ...    PE    CHIEF OF DESIGN  
 Charles E. ...    PE    DEPUTY DIRECTOR

44015-A-X

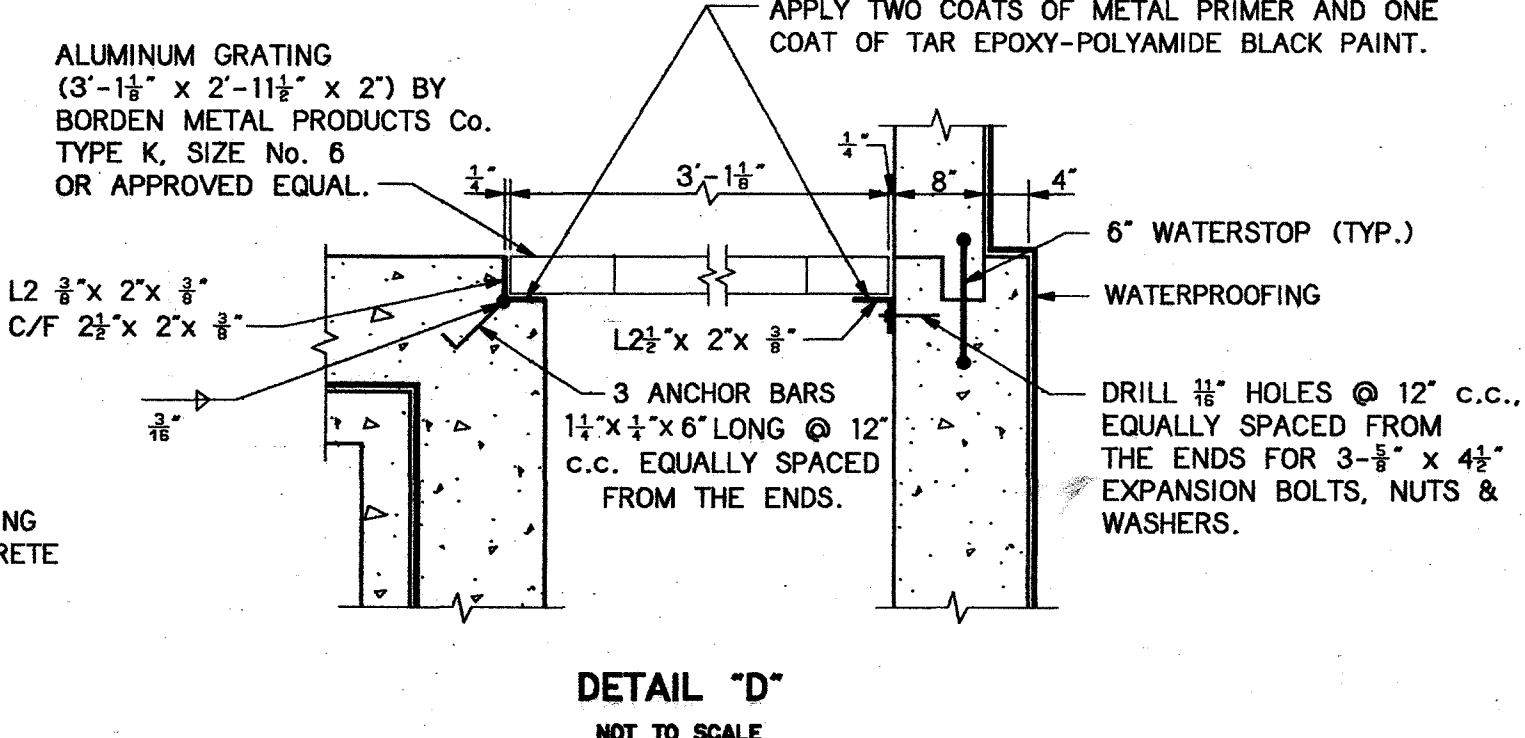
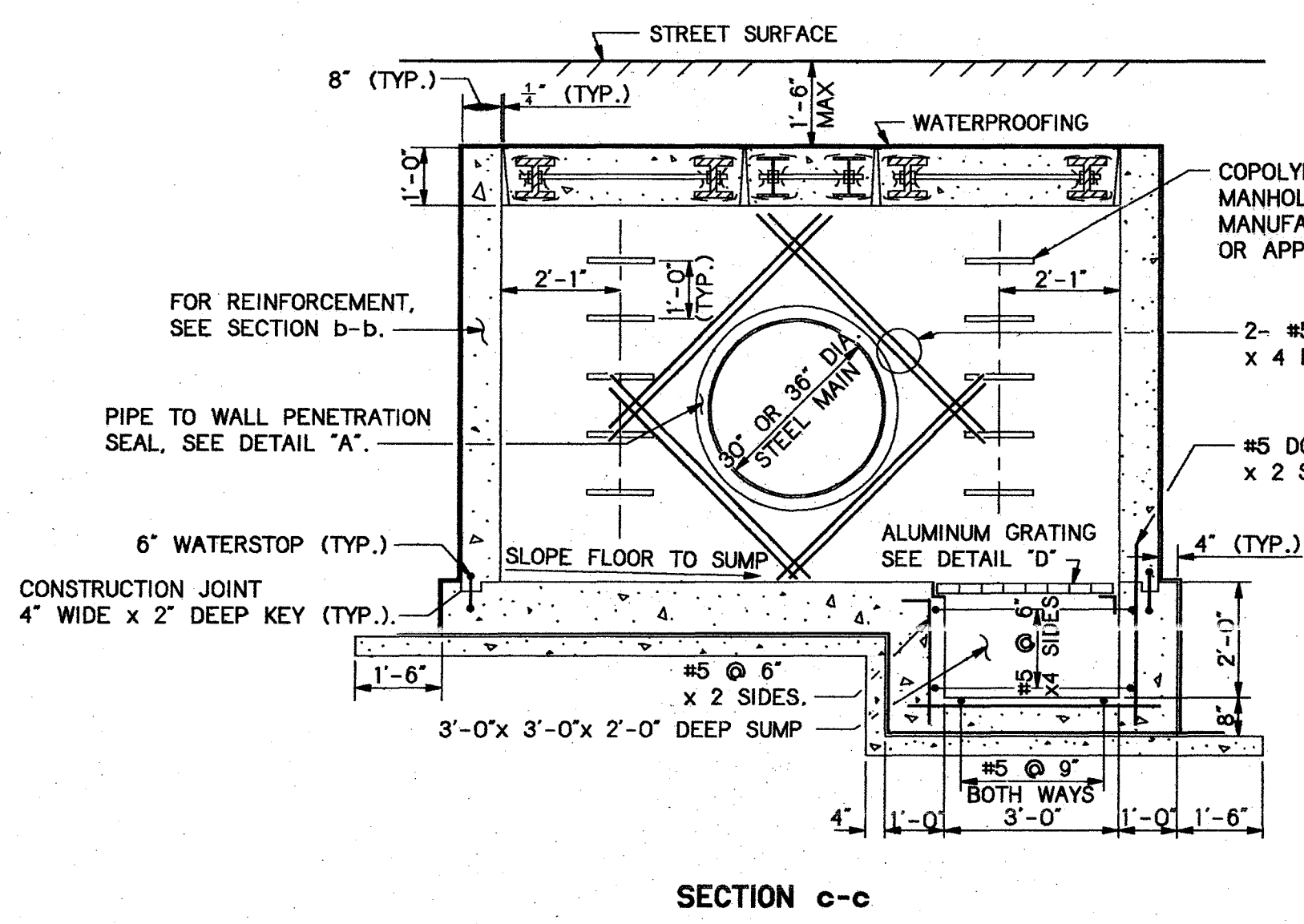
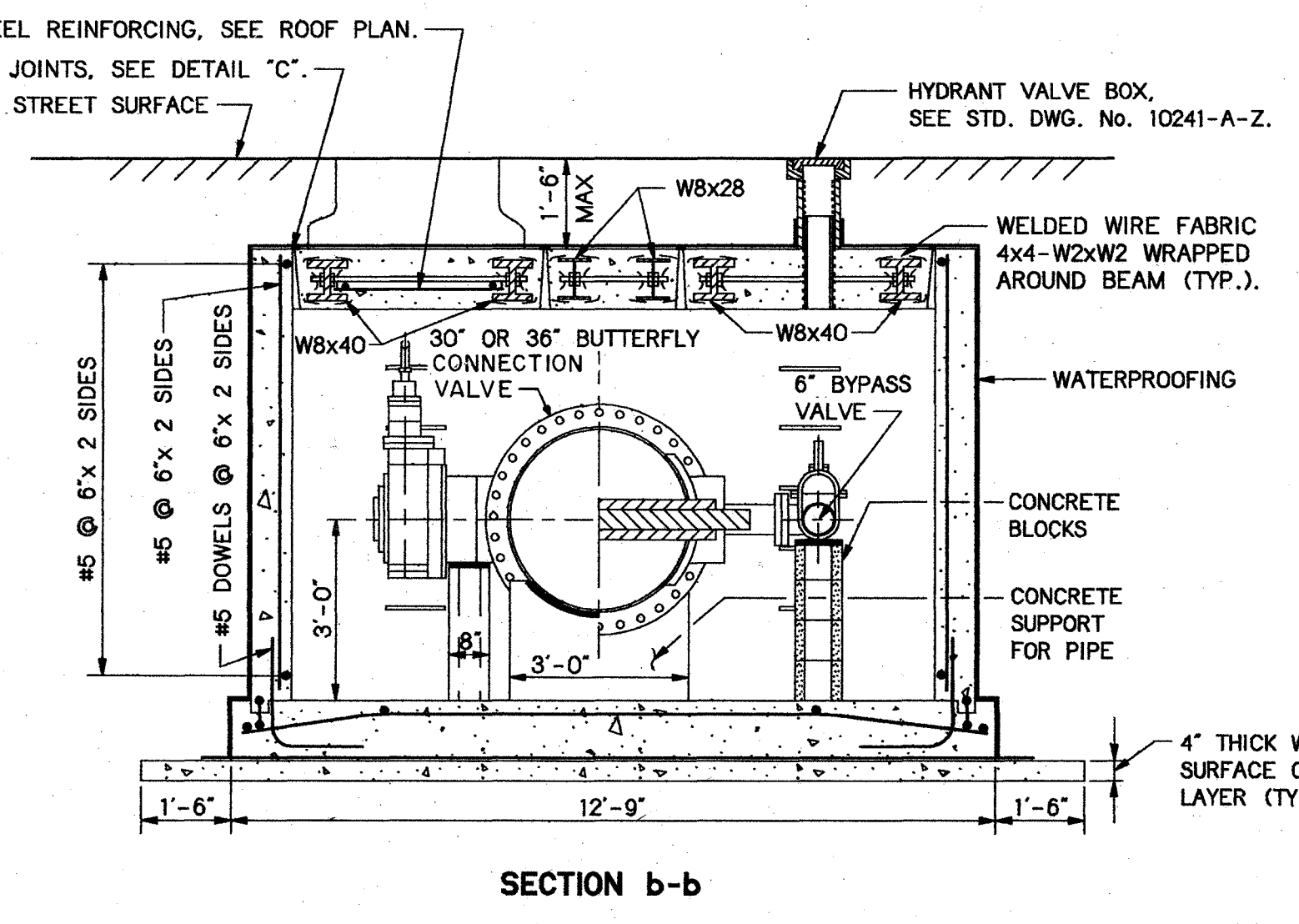
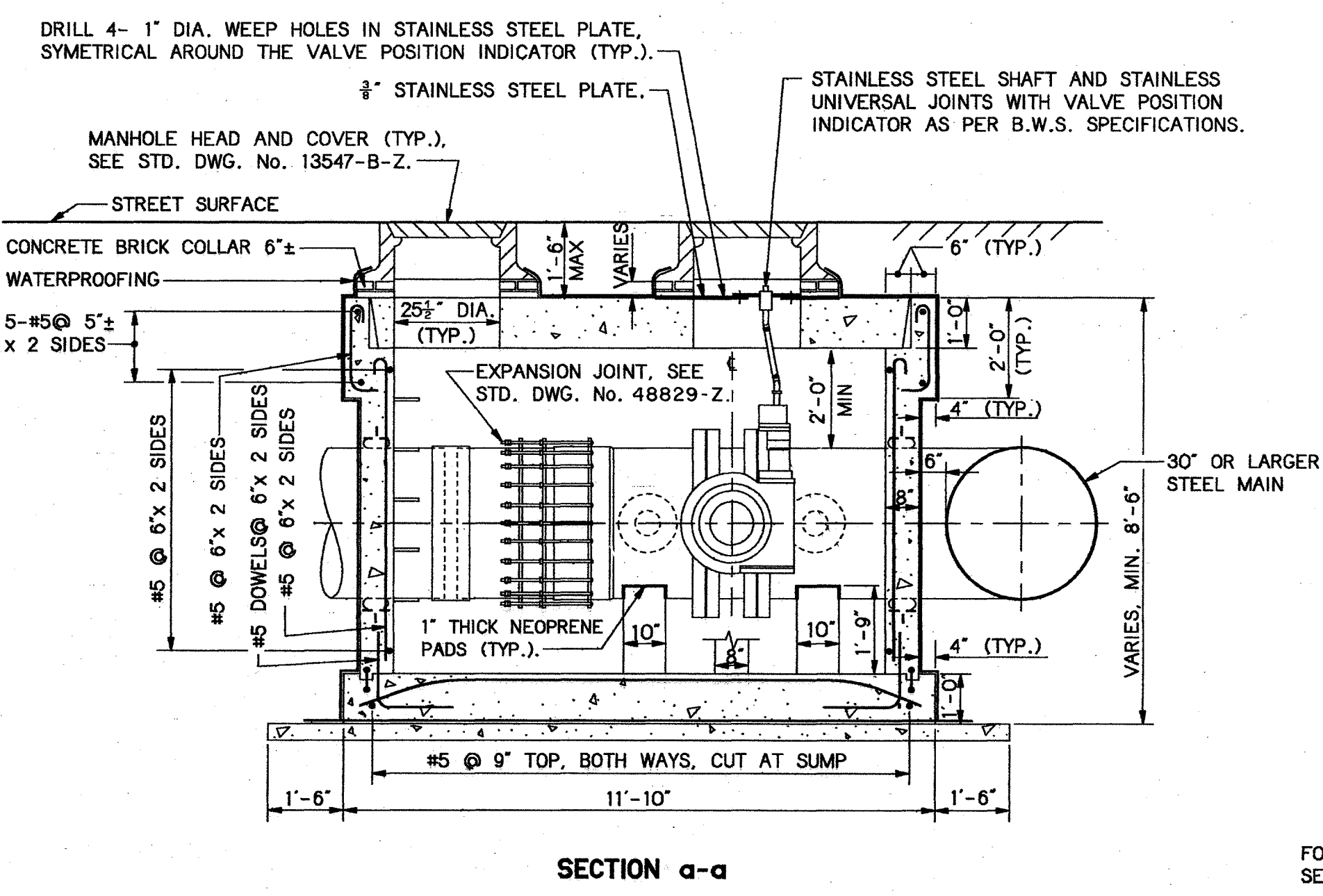


NOTE: DIMENSION IN BRACKETS IS DIMENSION FOR 30" VALVE.



ALL SEATING SURFACES SHALL BE SMOOTH AND LEVEL, AND SHALL BE PAINTED WITH 3 COATS OF ASPHALT CEMENT INDUSTRIAL COATING.

**DETAIL "D"**  
NOT TO SCALE



**QUANTITIES FOR ESTIMATING**

STANDARD VALVE CHAMBER	CAST-IN-PLACE CONCRETE	PRECAST CONCRETE	REINFORCING STEEL INC. WIRE MESH	STRUCTURAL STEEL INC. TIE RODS
TOTALS (CHAMBER OF MIN. HT. 8'-6")	18.30 Cu.Yd.	3.86 Cu.Yd.	2830 LBS.	2395 LBS.
PER LINEAR FT. OF WALL IN EXCESS OF 8'-6"	1.08 CU.YD.	—	190 LBS.	—

**STRUCTURAL NOTES**

- THE MINIMUM COMPRESSIVE STRENGTH OF CAST IN PLACE CONCRETE,  $f_c$ , SHALL BE 3,500 PSI AT 28 DAYS. THE MINIMUM COMPRESSIVE STRENGTH OF PRECAST CONCRETE,  $f_c$ , SHALL BE 4,000 PSI AT 28 DAYS.
- AIR-ENTRAINING AGENTS MAY BE USED IN THE CONCRETE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
- THE ALLOWABLE CONCRETE SLUMP SHALL BE 2 TO 4 INCHES.
- STEEL FOR REINFORCING CONCRETE AND ANCHOR BARS SHALL BE GRADE 60 AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR DEFORMED AND PLAIN BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT (ASTM A 615 INCLUDING SUPPLEMENTARY REQUIREMENTS S1).
- STEEL REINFORCEMENT MAY BE SLIGHTLY MOVED OR BENT IN THE FIELD TO CLEAR WATERSTOPS, ANCHORS, OBSTRUCTIONS AND OPENINGS AS APPROVED BY THE ENGINEER.
- THE MINIMUM CONCRETE COVER FOR STEEL REINFORCEMENT SHALL BE AS FOLLOWS:
  - CONCRETE POURED ON GROUND - 3"
  - SURFACES EXPOSED TO EARTH, WATER OR WEATHER - 2"
  - FORMED SURFACES EXPOSED TO EARTH, WATER OR WEATHER - 1 1/2"
  - SLAB NOT EXPOSED TO EARTH, WATER OR WEATHER - 1"
  - AT KEYS - 1"
- WHERE BARS ARE TO BE SPLICED OR EMBEDDED, THE LENGTH OF SPLICE OR EMBEDMENT SHALL COMPLY WITH THE LATEST EDITION OF THE MANUAL OF STANDARD PRACTICE OF THE AMERICAN CONCRETE INSTITUTE.
- CONSTRUCTION JOINTS SHALL BE PROVIDED WITH 6-INCH P.V.C. WATERSTOPS WHERE INDICATED ON THE DRAWING OR AS ORDERED BY THE ENGINEER.
- ALL EXPOSED CORNERS AND EDGES OF THE STRUCTURE SHALL BE CHAMFERED ONE INCH, EXCEPT WHERE OTHERWISE NOTED.
- THE INVERT SLAB OF THE CHAMBER SHALL BE FLOAT FINISHED.
- CHAMBER FLOOR TO BE SLOPED 1/4" PER FOOT MINIMUM, TO THE SUMP.
- THE CHAMBER SHALL BE WATERPROOFED WITH 4 LAYERS OF WOVEN FIBERGLASS FABRIC SATURATED WITH BITUMINOUS WATERPROOFING SUBSTANCE ON ALL EXTERIOR SURFACES, INCLUDING BOTTOM SLAB AS SHOWN ON THE DRAWING.

**NOTES ON BUTTERFLY VALVE**

- FIELD JOINTS, UNLESS OTHERWISE NOTED, SHALL BE LAP FILLET WELDED AS SHOWN ON DRAWING NO. 38226-Y-A.
- HYDRANT VALVE BOX MAY BE SUBSTITUTED WITH STD. MANHOLE, FRAME AND COVER (STD. DRG. NO. 13547-B-2) IF INDICATED ON THE CONTRACT DRAWING OR WHEN, DUE TO SPECIAL FIELD CONDITIONS, ORDERED BY THE ENGINEER.
- FOR UN-INSULATED JOINTS, BOLTS, NUTS AND WASHERS SHALL BE CARBON STEEL TO MEET THE REQUIREMENTS OF ASTM DESIGNATION A307, GRADE B FOR BOLTS AND GRADE A FOR HEAVY HEX NUTS AND WASHERS.
- FOR INSULATED JOINTS, BOLTS AND WASHERS SHALL BE STAINLESS STEEL TYPE 304 AND TO MEET THE REQUIREMENTS OF ASTM DESIGNATION A-193-88 GRADE B8A CLASS 1A; NUTS SHALL BE STAINLESS STEEL TYPE 303 AND COMPLY WITH THE REQUIREMENTS OF ASTM DESIGNATION A-194-88 GRADE 8FA.

NO.	DATE	REVISIONS	APP'D BY	TITLE

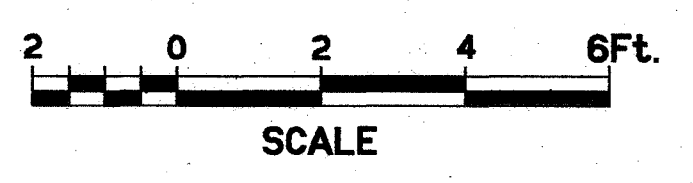
CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY AND WASTEWATER COLLECTION

**STANDARD CHAMBER FOR 30" & 36" BUTTERFLY CONNECTION VALVE ON STEEL MAIN**

SCALE: AS SHOWN      DATE: SEPTEMBER 1995      SHEET: 1 OF 1

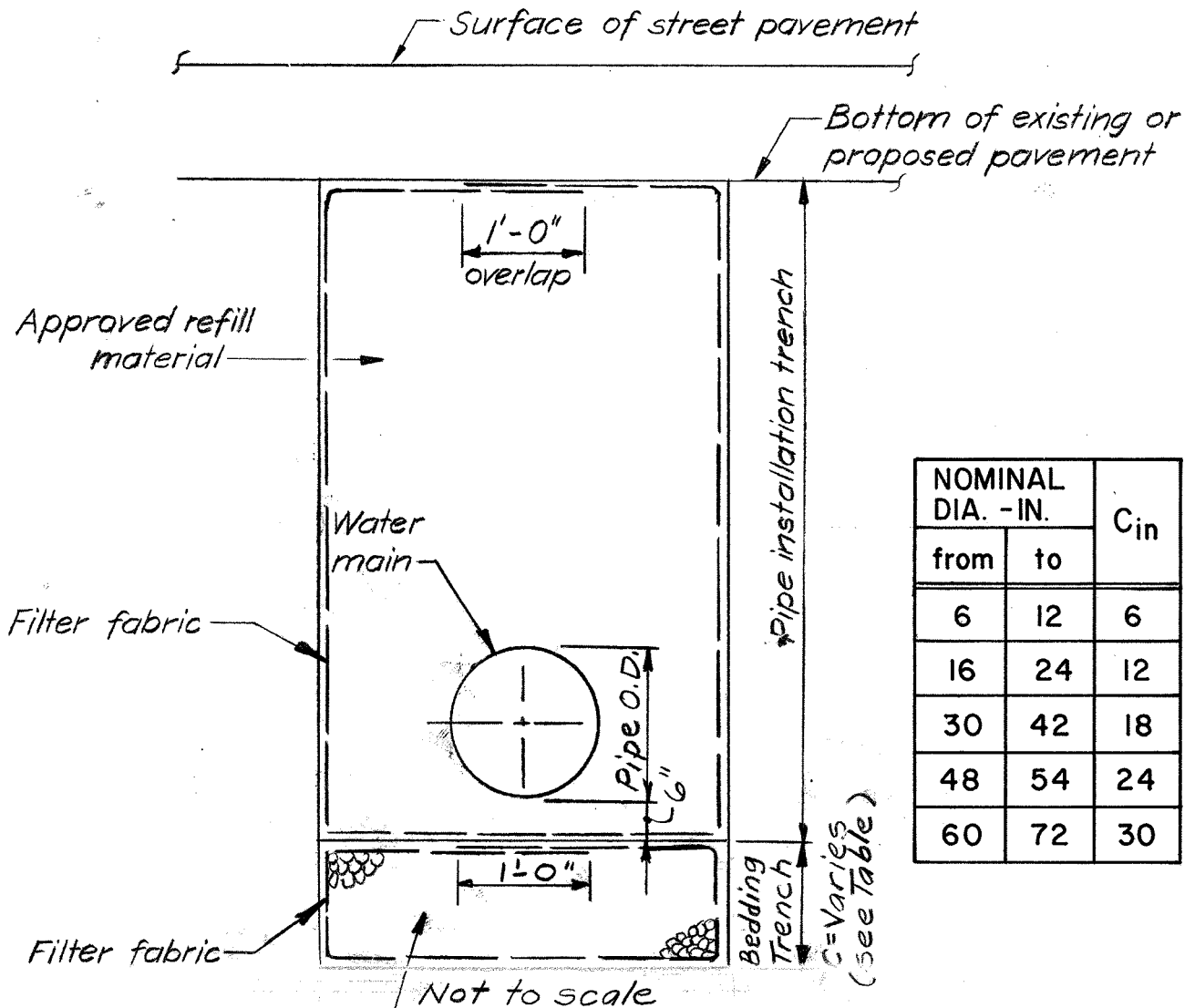
DRAWN BY: H.C.  
CHECKED BY: A.B.

NOTE: THIS DRAWING SUPERSEDES DRAWING NO. 44162-X.



*Alfonso Darsoum* P.E.  
ACTING SECTION CHIEF

*Michael P. Rose* P.E.  
DEPUTY DIRECTOR



NOMINAL DIA. - IN.		C <sub>in</sub>
from	to	
6	12	6
16	24	12
30	42	18
48	54	24
60	72	30

C = Varies (see Table)

Not to scale

Screened gravel or broken stone bedding in filter fabric wrap - if specified or ordered by the Engineer

NOTES:

1. See Std. Specifications for Pay Limits for Filter Fabric and screened gravel or broken stone bedding.
2. Depth of bedding shall be as shown in the Table above or as ordered and approved by the Engineer.

CITY OF NEW YORK  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF WATER SUPPLY  
**GRAVEL OR BROKEN STONE BEDDING  
 AND FILTER FABRIC INSTALLATION  
 FOR DUCTILE CAST IRON PIPES**

NOV. 1985  
 REVISED: FEB. 1989

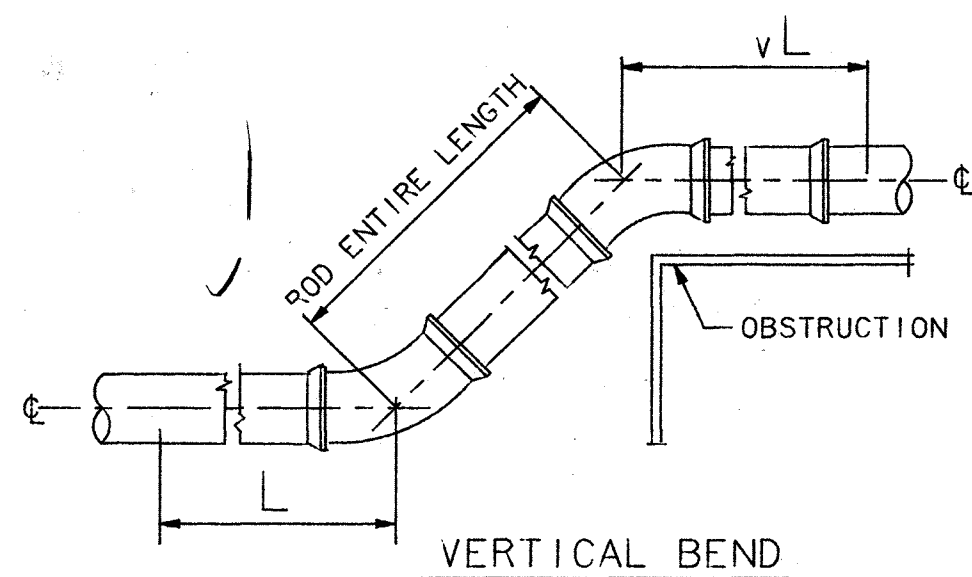
*Stephen Gyimmi* P.E.  
 DIVISION ENGINEER

*Walter C. Fitzgerald* P.E.  
 CHIEF OF DESIGN

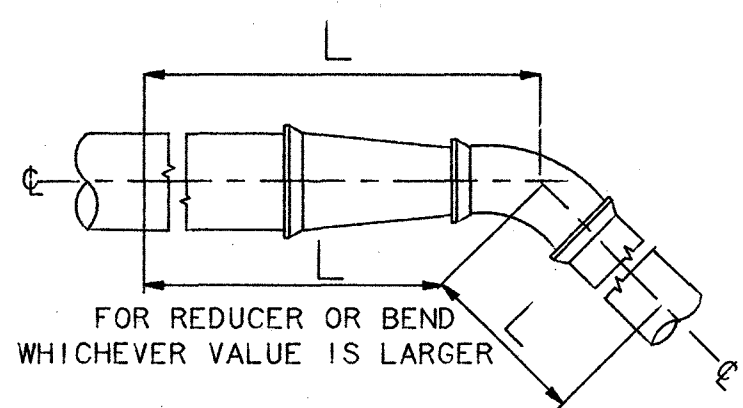
*Edward C. [Signature]* P.E.  
 DEPUTY DIRECTOR

DRAWN BY: A.S.  
 CHECKED BY: A.B.

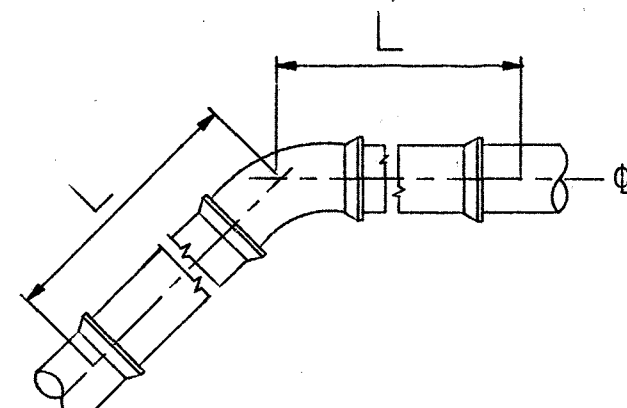
This drawing supersedes Dwg. No. 44292-A-Z **44292-B-Z**



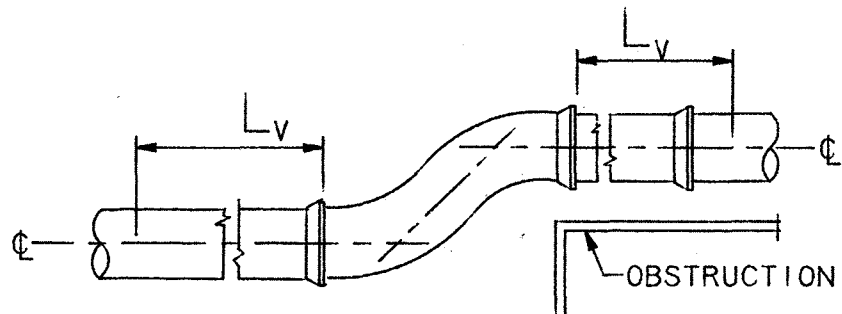
VERTICAL BEND



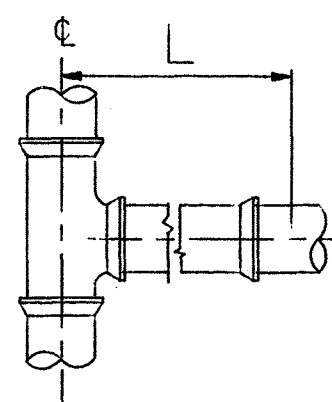
REDUCER & HORIZONTAL BEND



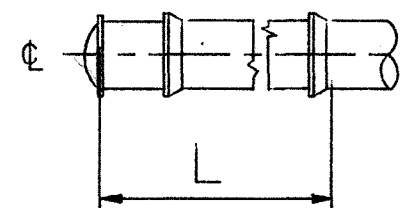
HORIZONTAL BEND



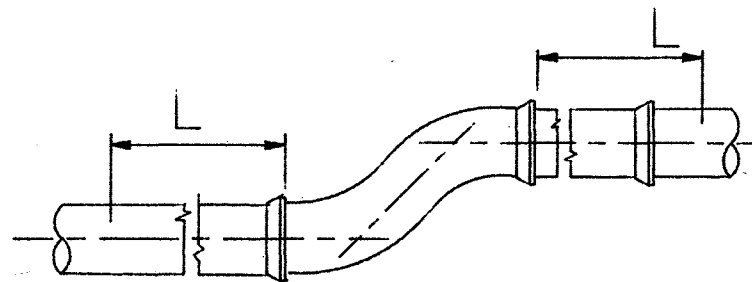
VERTICAL OFFSET



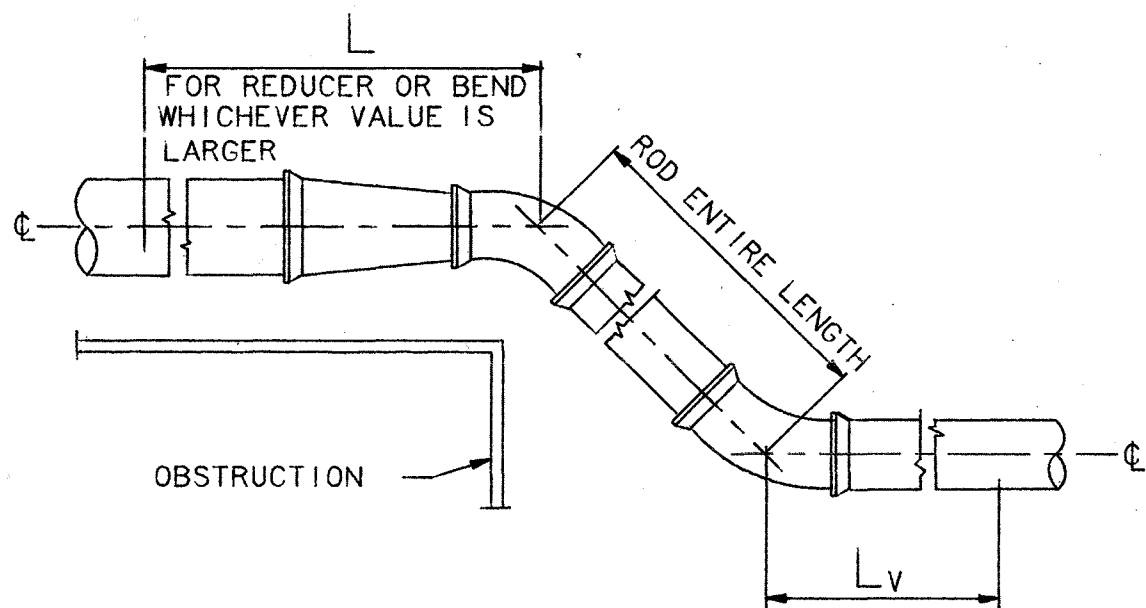
3 WAY



CAP



HORIZONTAL OFFSET



REDUCER & VERTICAL BEND

LENGTH TO BE RODDED FOR VERTICAL BENDS & OFFSETS  
(APPLIES ONLY FOR 2FT COVER BETWEEN STREET SURFACE AND WATER MAINS)

DIAM. IN INCHES	Lc CAP OR VALVE	VERTICAL OFFSET	DEGREE OF VERTICAL BEND				REDUCERS	
			90°	45°	22.5°	11.25°	SIZE	L
			PIPE LENGTH TO BE RODDED IN FEET L <sub>v</sub>					
6	35	16	24	16	10	6	-	-
8	48	21	32	21	13	8	8x6	21
12	74	32	47	32	20	11	12x8 12x6	41 55
20	125	50	77	50	30	17	20x16 20x12	45 80

LENGTH TO BE RODDED FOR HORIZONTAL BENDS & OFFSETS  
(APPLIES ONLY FOR 4FT COVER BETWEEN STREET SURFACE AND WATER MAINS)

DIAM. IN INCHES	Lc CAP OR VALVE	OUTLET & HORIZONTAL END OF 3-WAY	HORIZONTAL OFFSET	DEGREE OF HORIZONTAL BEND				REDUCERS	
				90°	45°	22.5°	11.25°	SIZE	L
				PIPE LENGTH TO BE RODDED IN FEET L					
6	18	-	6	9	6	3	2	-	-
8	24	-	7	12	7	4	2	8x6	21
12	37	-	11	19	11	6	3	12x8 12x6	14 18
20	63	10	18	30	18	10	5	20x16 20x12	23 40

NOTES

1. REQUIRED LENGTHS OF RESTRAINT FOR PIPES UP TO AND INCLUDING 48-INCHES IN DIAMETER, AT VARIOUS HEIGHTS OF COVER, ARE LISTED IN THE "SPECIFICATIONS FOR DUCTILE CAST IRON PIPE 6-INCH THROUGH 48-INCH DIAMETER".
2. ALL JOINTS WITHIN THE DISTANCE OF "L" OR "L<sub>v</sub>", AS APPLICABLE, SHALL BE RODDED
3. PIPE JOINTS SHALL BE PUSH-ON TYPE WITH RUBBER GASKET
4. BELL AND SPIGOT CASTINGS SHALL HAVE 100% LEAD JOINTS
5. TOTAL OF ALL ADJACENT ANGLES SHALL BE USED IN TABLE FOR DETERMINING "L" AND "L<sub>v</sub>"
6. LENGTH OF REDUCERS SHALL BE INCLUDED IN THE REQUIRED LENGTH OF RESTRAINT "L" OR "L<sub>v</sub>"
7. PIPE SHALL BE RODDED (RESTRAINED) ON BOTH SIDES OF A VALVE
8. FOR DETAILS OF RODS AND BANDS, SEE DWG. 10238-A-Z

THIS DRAWING SUPERSEDES DRAWING NO. 44387-Z-A

NO	DATE	REVISIONS	DIVISION ENGINEER	CHIEF OF DESIGN	DEPUTY DIRECTOR
2	APR., 1986	RESTRAINTS REVISED FOR OFFSETS AND ADDED FOR REDUCERS	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
1	MAR., 1985	CHANGED LENGTHS TO BE RODDED	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

DRAWN BY: S. T.  
CHECKED BY: S. GY

*Stephen Gyomeni*  
DIVISION ENGINEER

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

RODDING ALL SPECIAL CASTINGS, LEAD & MECHANICAL JOINTS ON LOW PRESSURE WATER MAINS, PUSH-ON JOINT PIPE

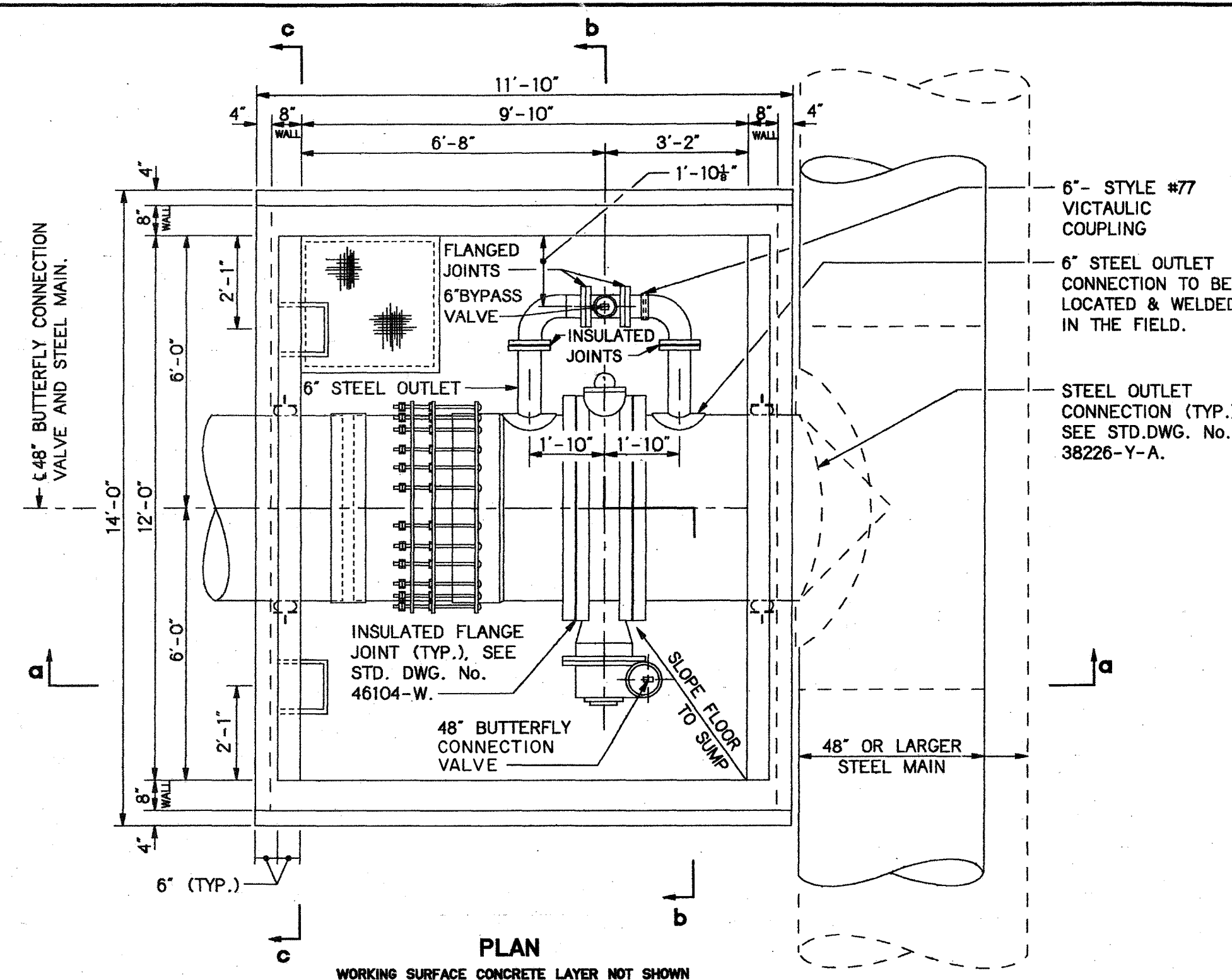
NOT TO SCALE

JULY 1986

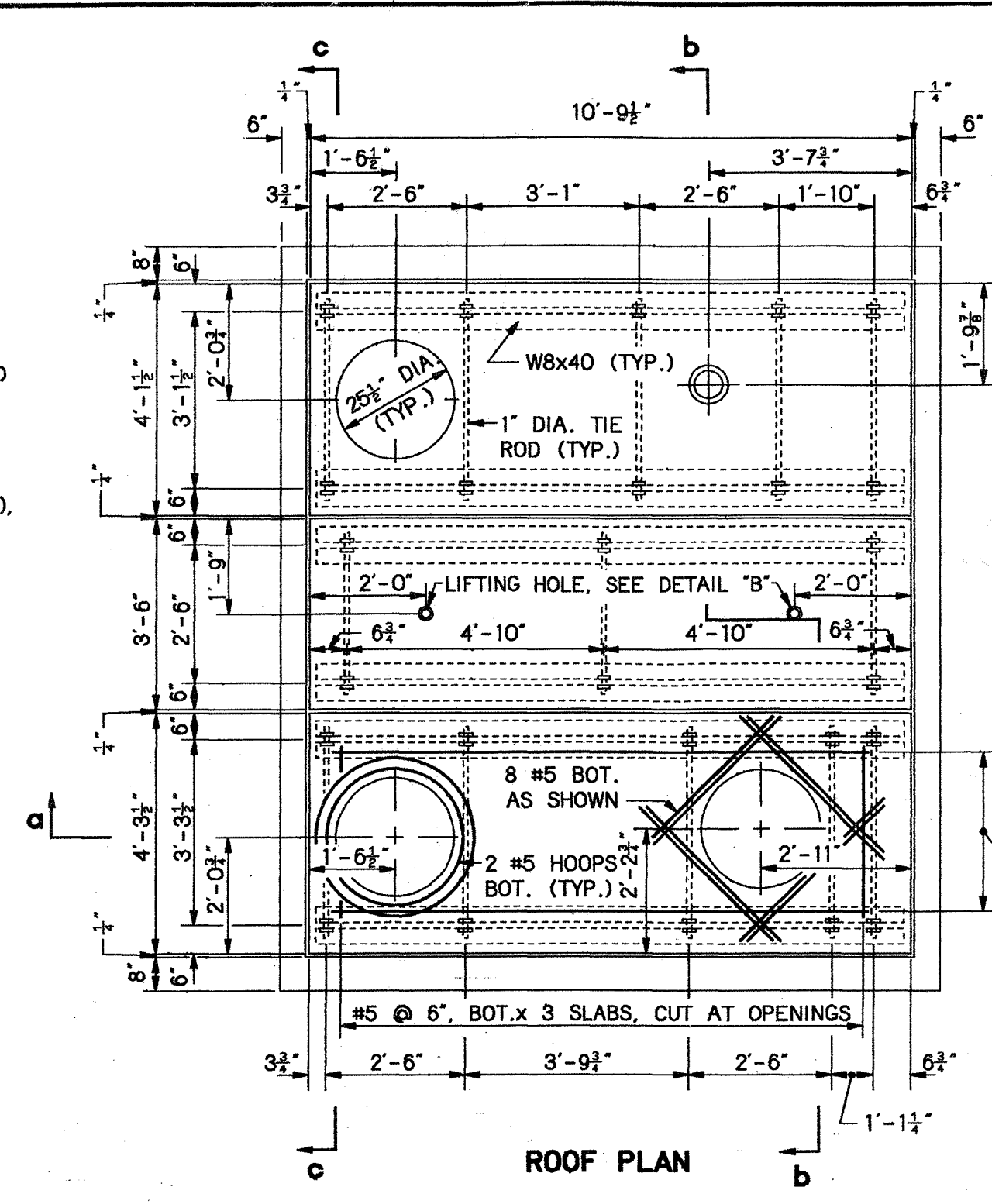
*Walter C. Fitzpatrick* *Edward C. Schneider*  
CHIEF OF DESIGN DEPUTY DIRECTOR

44387-Z-B

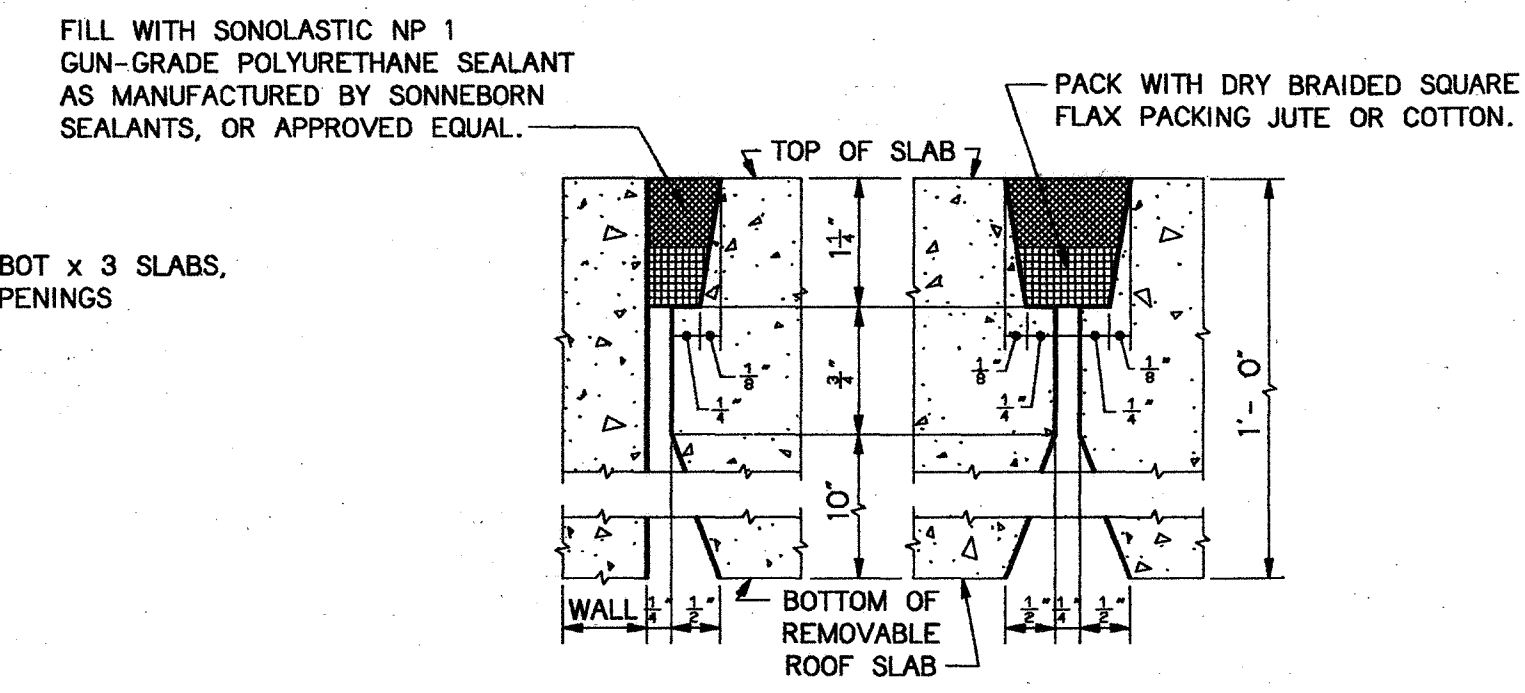
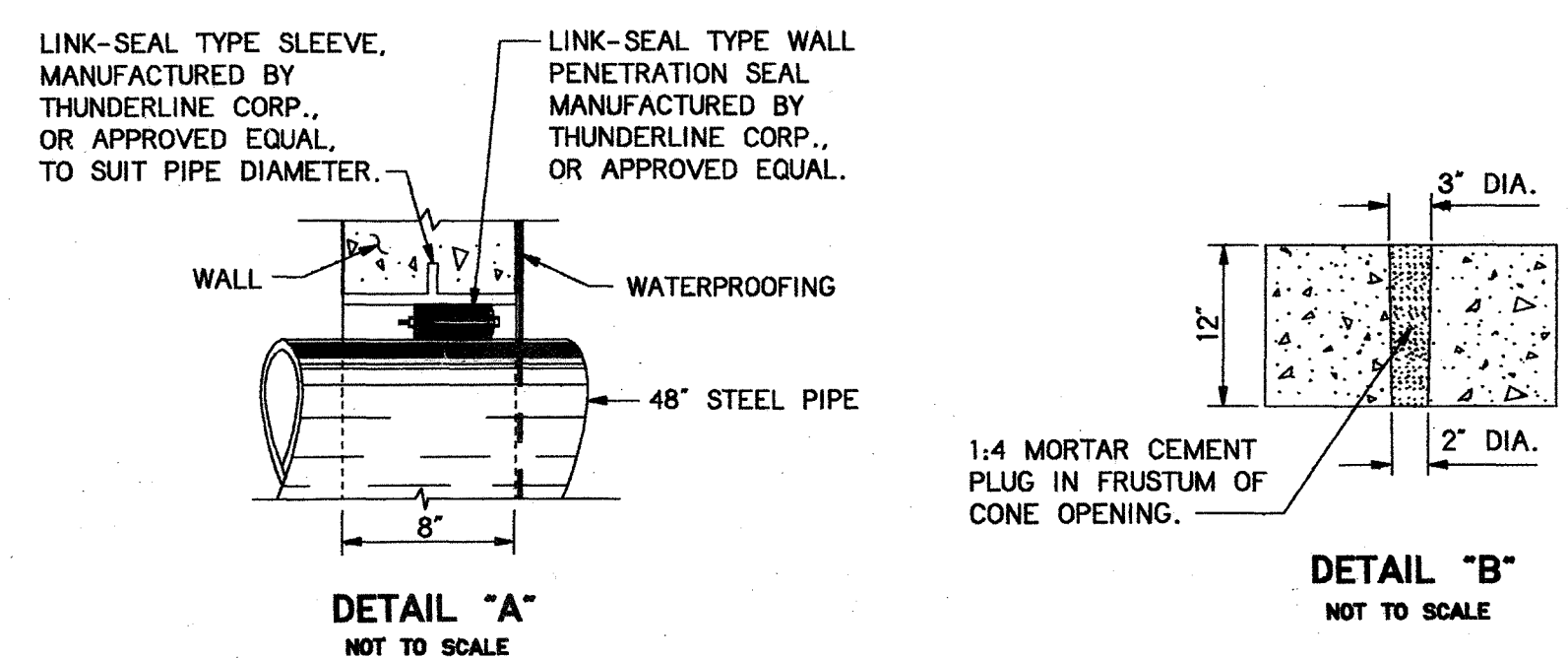




**PLAN**  
WORKING SURFACE CONCRETE LAYER NOT SHOWN

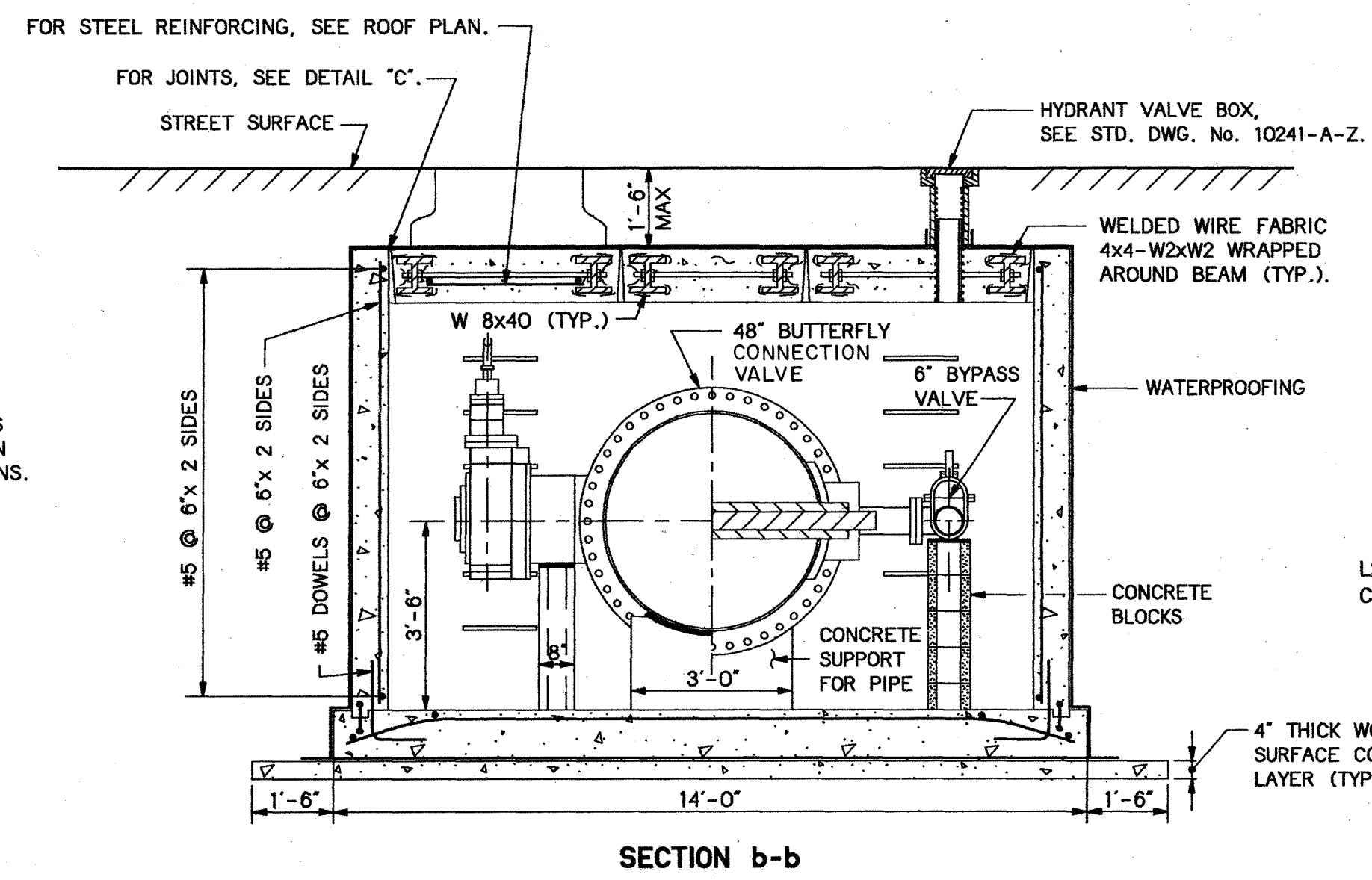


**ROOF PLAN**

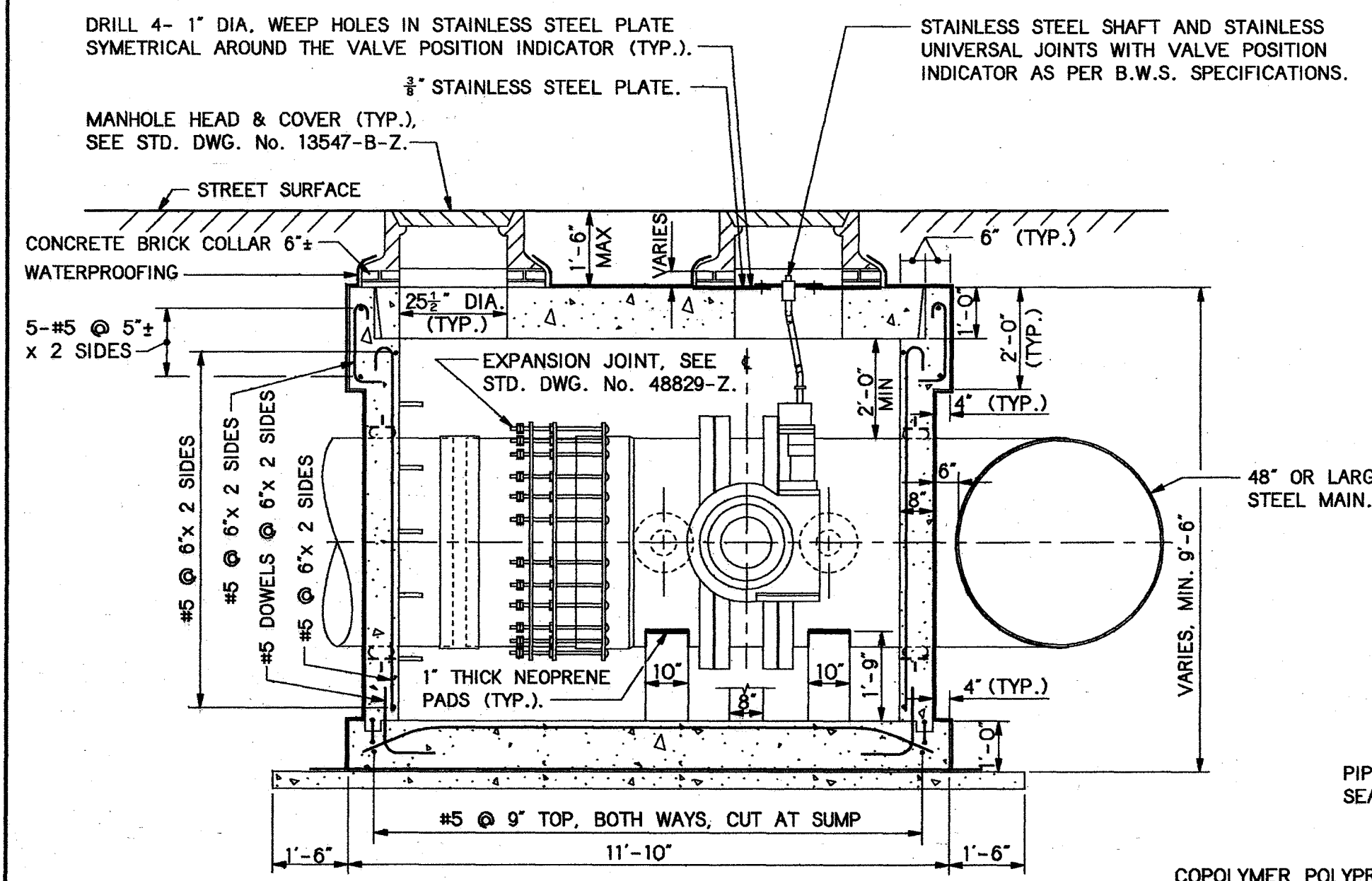


**DETAIL "C"**  
NOT TO SCALE

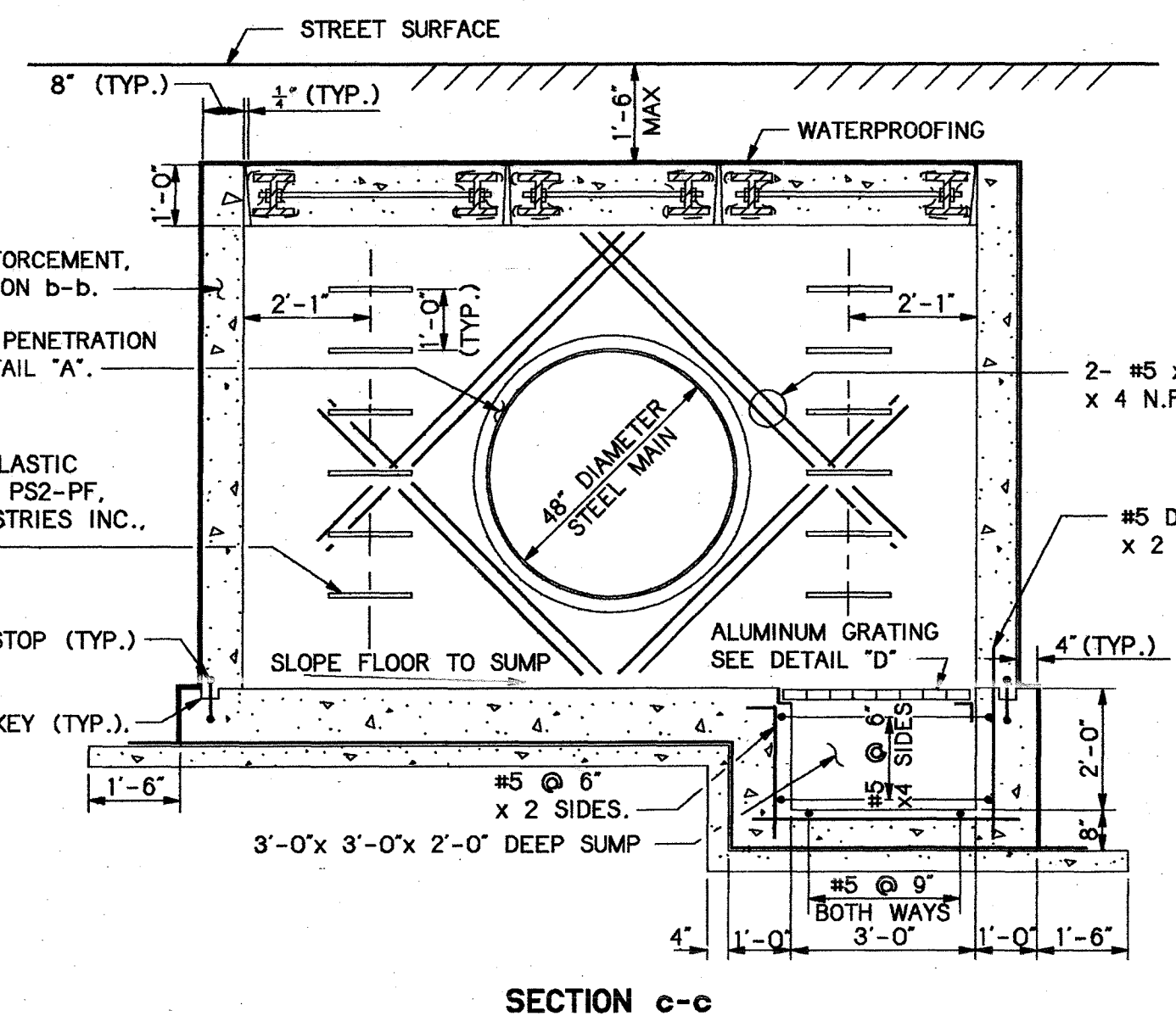
**DETAIL "D"**  
NOT TO SCALE



**SECTION b-b**



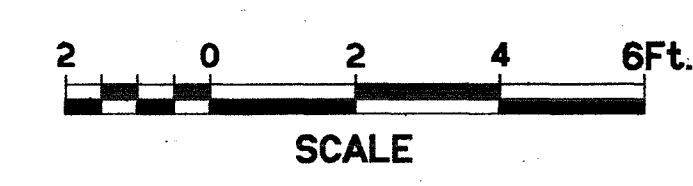
**SECTION a-a**



**SECTION c-c**

**QUANTITIES FOR ESTIMATING**

STANDARD VALVE CHAMBER	CAST-IN-PLACE CONCRETE	PRECAST CONCRETE	REINFORCING STEEL INC. WIRE MESH	STRUCTURAL STEEL INC. TIE RODS
TOTALS (CHAMBER OF MIN. HT. 9'-6")	20.40 Cu.Yd.	4.36 Cu.Yd.	3160 LBS.	2655 LBS.
PER LINEAR FT. OF WALL IN EXCESS OF 9'-6"	1.14 CU.YD.	—	200 LBS.	—



*Alfonso Parsoun* P.E.  
ACTING SECTION CHIEF

**STRUCTURAL NOTES**

- THE MINIMUM COMPRESSIVE STRENGTH OF CAST IN PLACE CONCRETE,  $f_c$ , SHALL BE 3,500 PSI AT 28 DAYS. THE MINIMUM COMPRESSIVE STRENGTH OF PRECAST CONCRETE,  $f_c$ , SHALL BE 4,000 PSI AT 28 DAYS.
- AIR-ENTRAINING AGENTS MAY BE USED IN THE CONCRETE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
- THE ALLOWABLE CONCRETE SLUMP SHALL BE 2 TO 4 INCHES.
- STEEL FOR REINFORCING CONCRETE AND ANCHOR BARS SHALL BE GRADE 60 AND SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR DEFORMED AND PLAIN BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT (ASTM A 615 INCLUDING SUPPLEMENTARY REQUIREMENTS S1).
- STEEL REINFORCEMENT MAY BE SLIGHTLY MOVED OR BENT IN THE FIELD TO CLEAR WATERSTOPS, ANCHORS, OBSTRUCTIONS AND OPENINGS AS APPROVED BY THE ENGINEER.
- THE MINIMUM CONCRETE COVER FOR STEEL REINFORCEMENT SHALL BE AS FOLLOWS:
  - CONCRETE POURED ON GROUND - 3"
  - SURFACES EXPOSED TO EARTH, WATER OR WEATHER - 2"
  - FORMED SURFACES EXPOSED TO EARTH, WATER OR WEATHER - 1 1/2"
  - SLAB NOT EXPOSED TO EARTH, WATER OR WEATHER - 1"
  - AT KEYS - 1"
- WHERE BARS ARE TO BE SPLICED OR EMBEDDED, THE LENGTH OF SPLICE OR EMBEDMENT SHALL COMPLY WITH THE LATEST EDITION OF THE MANUAL OF STANDARD PRACTICE OF THE AMERICAN CONCRETE INSTITUTE.
- CONSTRUCTION JOINTS SHALL BE PROVIDED WITH 6-INCH P.V.C. WATERSTOPS WHERE INDICATED ON THE DRAWING OR AS ORDERED BY THE ENGINEER.
- ALL EXPOSED CORNERS AND EDGES OF THE STRUCTURE SHALL BE CHAMFERED ONE INCH, EXCEPT WHERE OTHERWISE NOTED.
- THE INVERT SLAB OF THE CHAMBER SHALL BE FLOAT FINISHED.
- CHAMBER FLOOR TO BE SLOPED 1/4" PER FOOT MINIMUM, TO THE SUMP.
- THE CHAMBER SHALL BE WATERPROOFED WITH 4 LAYERS OF WOVEN FIBERGLASS FABRIC SATURATED WITH BITUMINOUS WATERPROOFING SUBSTANCE ON ALL EXTERIOR SURFACES, INCLUDING BOTTOM SLAB AS SHOWN ON THE DRAWING.

**NOTES ON BUTTERFLY VALVE**

- FIELD JOINTS, UNLESS OTHERWISE NOTED, SHALL BE LAP FILLET WELDED AS SHOWN ON DRAWING NO. 38226-Y-A.
- HYDRANT VALVE BOX MAY BE SUBSTITUTED WITH STD. MANHOLE, FRAME AND COVER (STD. DRG. NO. 13547-B-Z) IF INDICATED ON THE CONTRACT DRAWING OR WHEN, DUE TO SPECIAL FIELD CONDITIONS, ORDERED BY THE ENGINEER.
- FOR UN-INSULATED JOINTS, BOLTS, NUTS AND WASHERS SHALL BE CARBON STEEL TO MEET THE REQUIREMENTS OF ASTM DESIGNATION A307, GRADE B FOR BOLTS AND GRADE A FOR HEAVY HEX NUTS AND WASHERS.
- FOR INSULATED JOINTS, BOLTS AND WASHERS SHALL BE STAINLESS STEEL TYPE 304 AND TO MEET THE REQUIREMENTS OF ASTM DESIGNATION A-193-88 GRADE B8A CLASS 1A; NUTS SHALL BE STAINLESS STEEL TYPE 303 AND COMPLY WITH THE REQUIREMENTS OF ASTM DESIGNATION A-194-88 GRADE 8FA.

NO.	DATE	REVISIONS	APPROV'D BY	TITLE

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY AND WASTEWATER COLLECTION

**STANDARD CHAMBER FOR 48" BUTTERFLY CONNECTION VALVE ON STEEL MAIN**

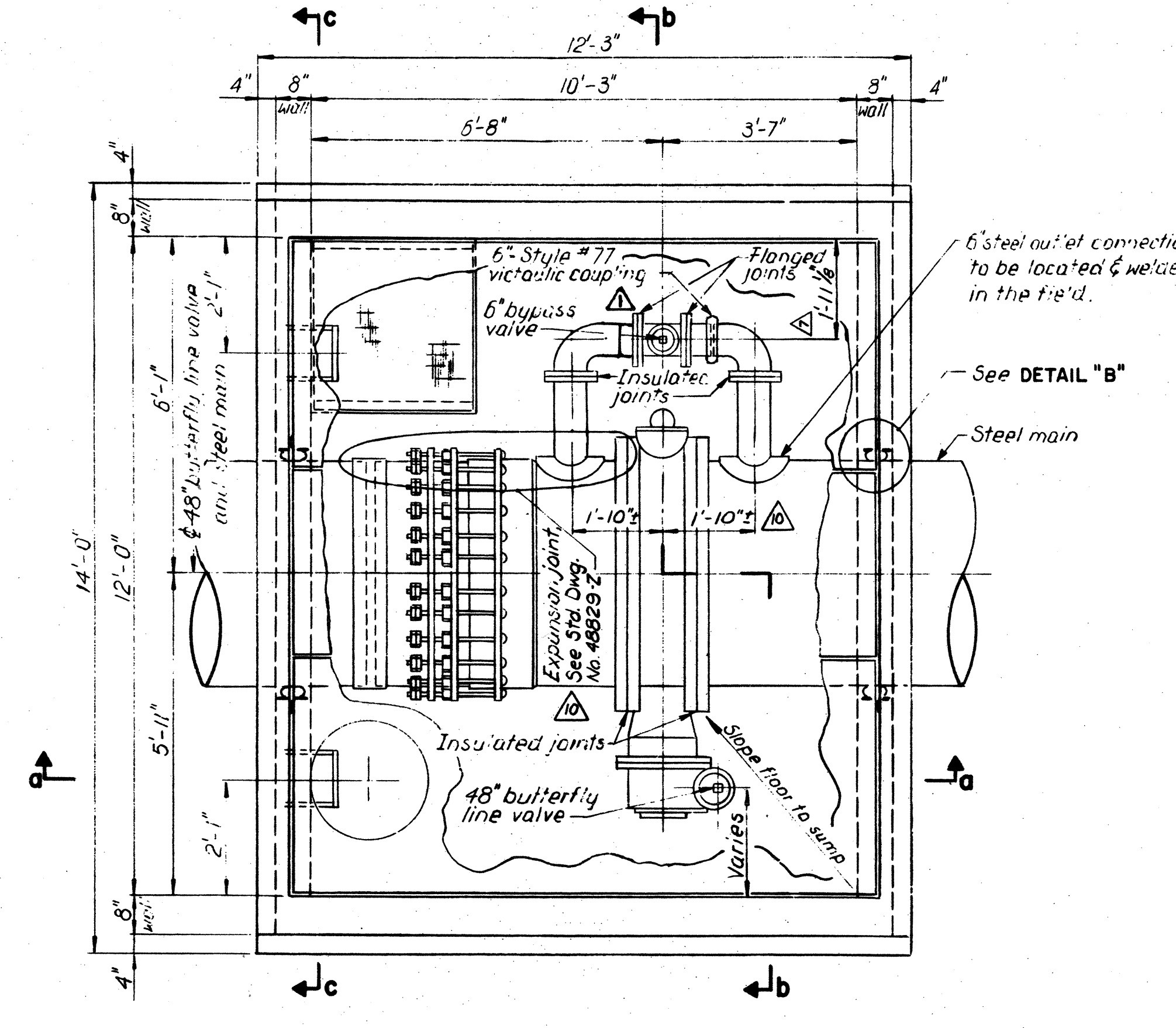
SCALE: AS SHOWN      DATE: SEPTEMBER 1995      SHEET: 1 OF 1

*Alfonso Parsoun* P.E.      *Michael P. ...* P.E.  
CHIEF OF DESIGN      DEPUTY DIRECTOR

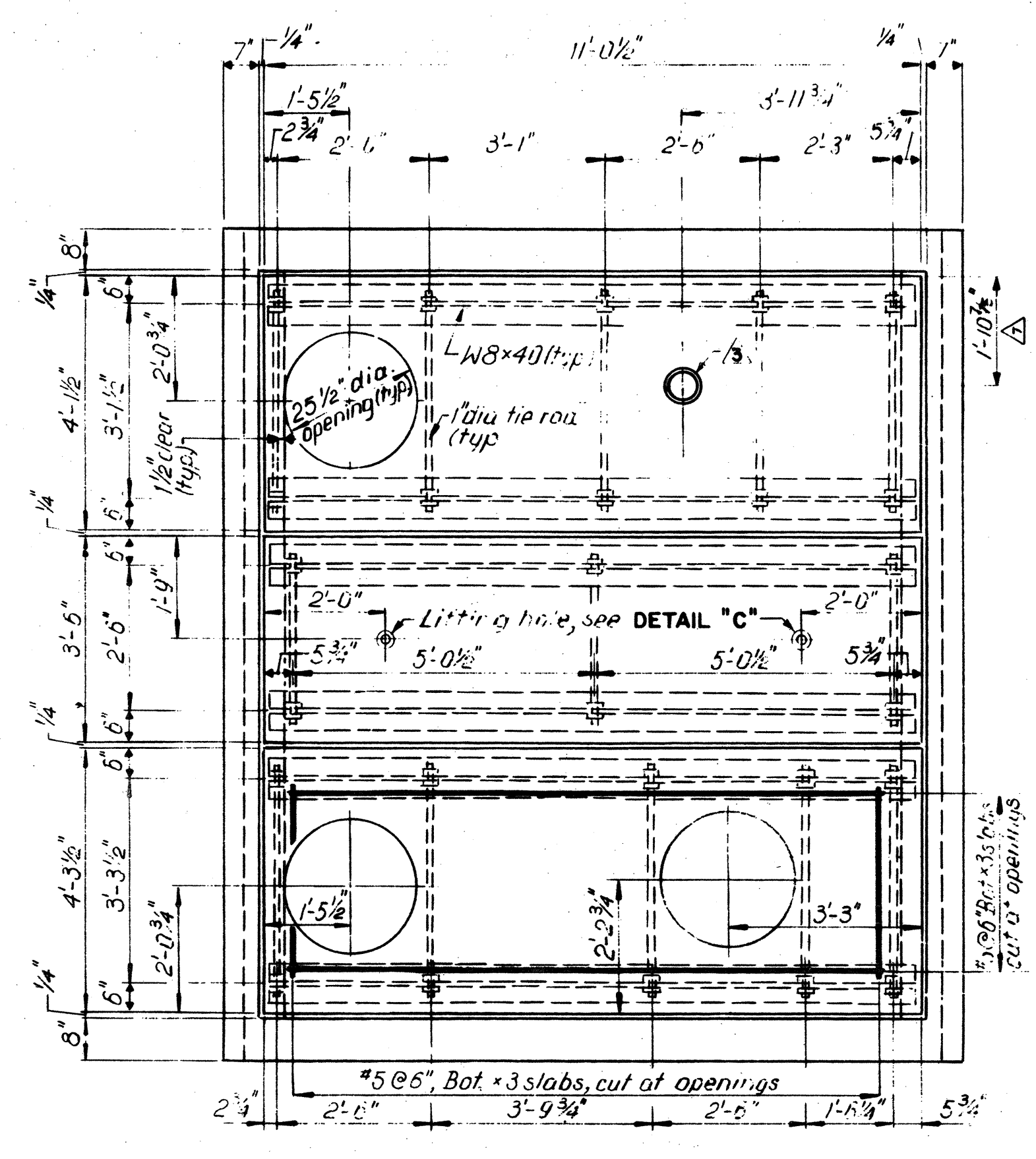
DRAWN BY: H.C.  
CHECKED BY: A.B.

NOTE: THIS DRAWING SUPERSEDES DRAWING NO. 44573-X.

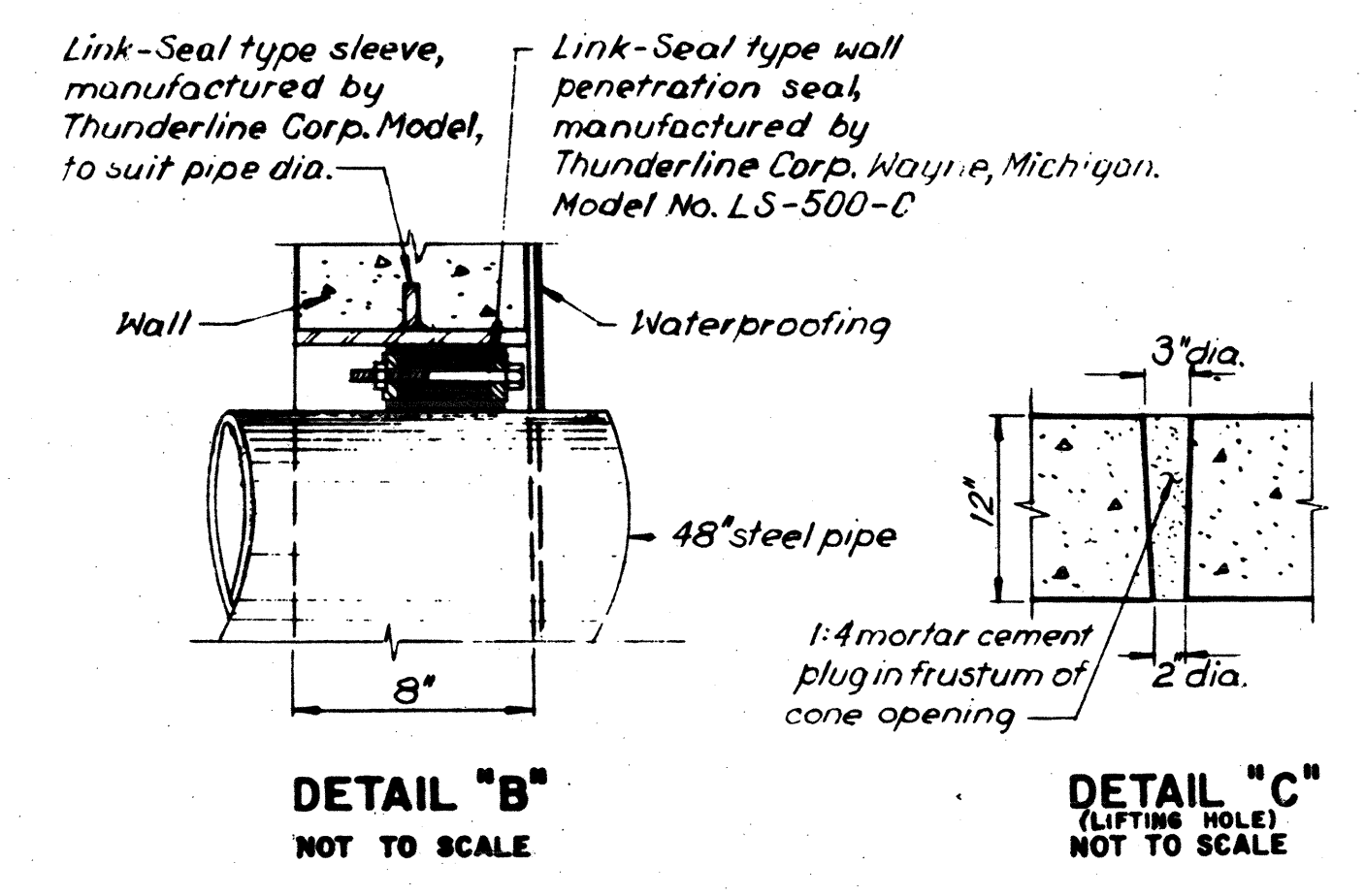




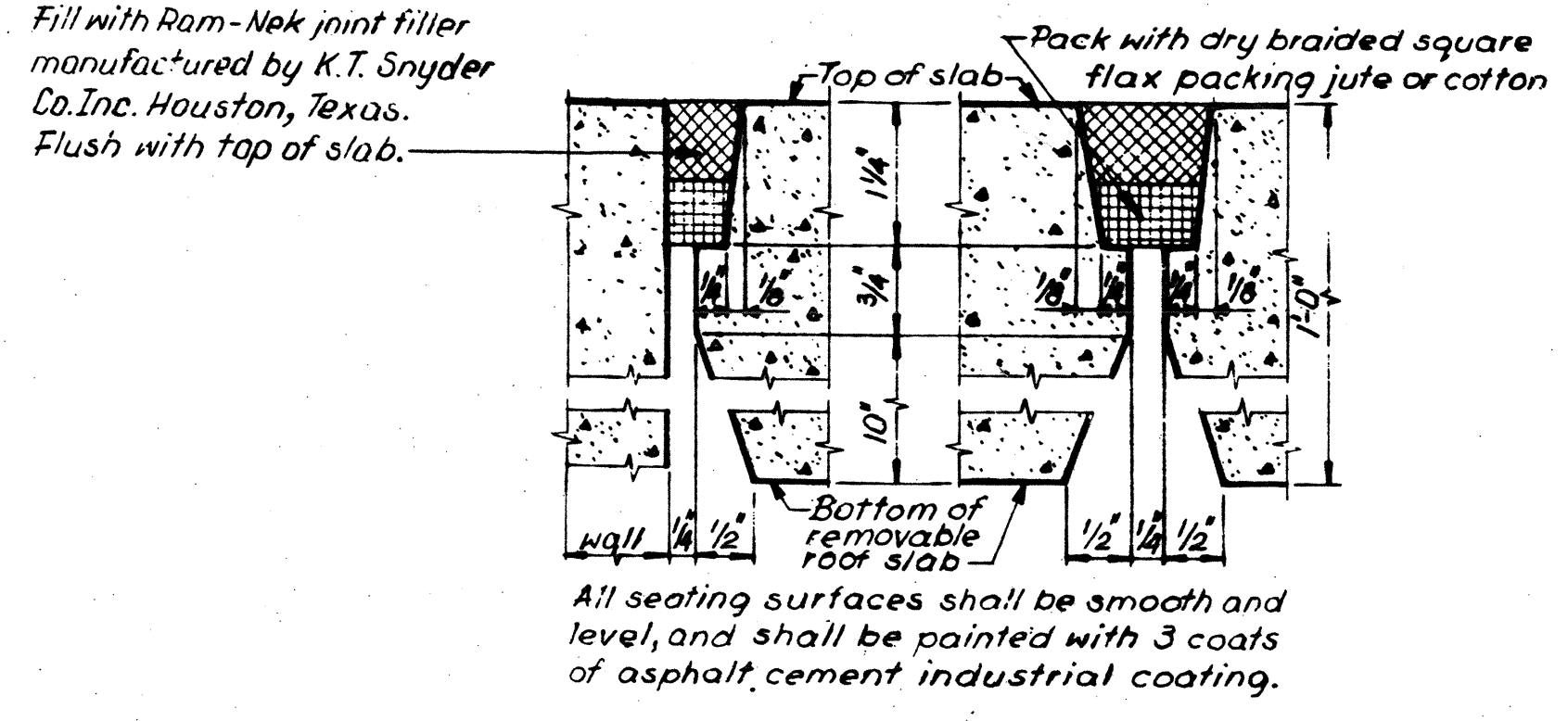
**PLAN**  
WORKING SURFACE CONCRETE LAYER NOT SHOWN



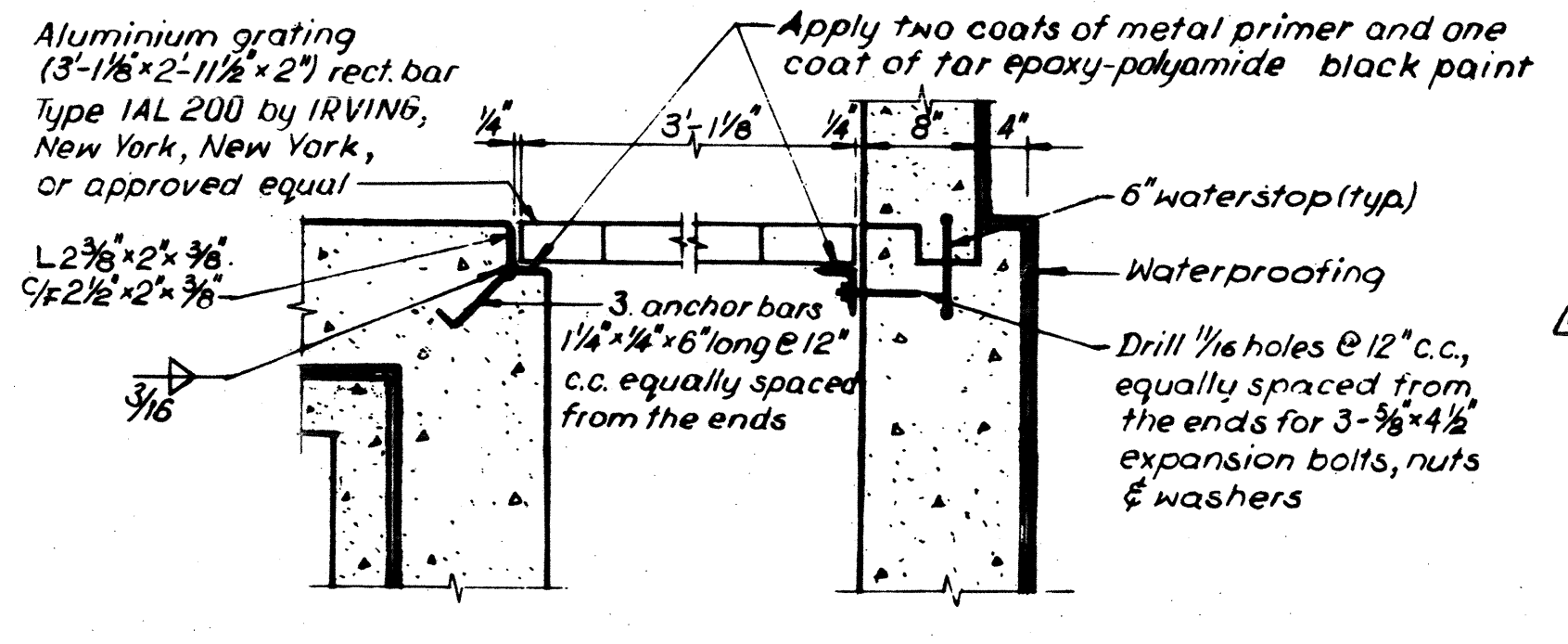
**ROOF PLAN**



**DETAIL "B"**  
NOT TO SCALE  
**DETAIL "C"**  
NOT TO SCALE



**DETAIL "D"**  
NOT TO SCALE



**DETAIL "E"**  
NOT TO SCALE

**STRUCTURAL NOTES**

- The minimum compressive strength of cast in place concrete,  $f'_c$ , shall be 3,500 p.s.i. at 28 days. The minimum compressive strength of precast concrete,  $f'_c$ , shall be 4,000 p.s.i. at 28 days.
- Air-entraining agents may be used in the concrete, subject to the approval of the Engineer.
- The allowable concrete slump shall be 2 to 4 inches.
- Steel for reinforcing concrete and anchor bars shall be grade 60 and shall conform to the requirements of the Standard Specifications for Deformed and Plain Ribbed Steel Bars for Concrete Reinforcement (ASTM A 615 including supplementary requirements S1).
- Steel reinforcement may be slightly moved or bent in the field to clear waterstops, anchors, obstructions and openings as approved by the Engineer.
- The minimum concrete cover for steel reinforcement shall be as follows:
  - Concrete poured on ground - 3"
  - Surfaces exposed to earth, water or weather - 2"
  - Formed surfaces not exposed to earth, water or weather - 1 1/2"
  - Slab not exposed to earth, water or weather - 1"
  - At keys - 1"
- Where bars are to be spliced or embedded, the length of splice or embedment shall comply with the latest edition of the Manual of Standard Practice of the American Concrete Institute.
- Construction joints shall be provided with 6-inch PVC waterstops where indicated on the drawing or as ordered by the Engineer.
- All exposed corners and edges of the structure shall be chamfered one inch, except where otherwise noted.
- The invert slab of the chamber shall be float finished.
- Chamber floor to be sloped 1/8 inch per foot minimum, to the sump.
- The chamber shall be waterproofed with 4 layers of woven fiberglass fabric saturated with bituminous waterproofing substance on all exterior surfaces, including bottom slab as shown on the drawing.

**NOTES ON BUTTERFLY VALVE**

- Field joints, unless otherwise noted, shall be lap fillet welded as shown on Drawing No. 38226-Y-A.
- Hydrant valve box may be substituted with std manhole, frame and cover (Std Dwg No. 13647-B-Z) if indicated on the Contract drawing or when, due to special field conditions, ordered by the Engineer.
- For un-insulated joints, bolts, nuts & washers shall be carbon steel to meet the requirements of ASTM Designation A 307, Grade B for bolts & Grade A for heavy hex nuts and washers.
- For insulated joints, bolts, nuts & washers shall be stainless steel type 304 and to meet the requirements of ASTM Designation A-193-BB Grade B8A Class 1A; nuts shall be stainless steel type 303 and comply with the requirements of ASTM Designation A-194-BB Grade BFA.

**REFERENCE DRAWINGS**

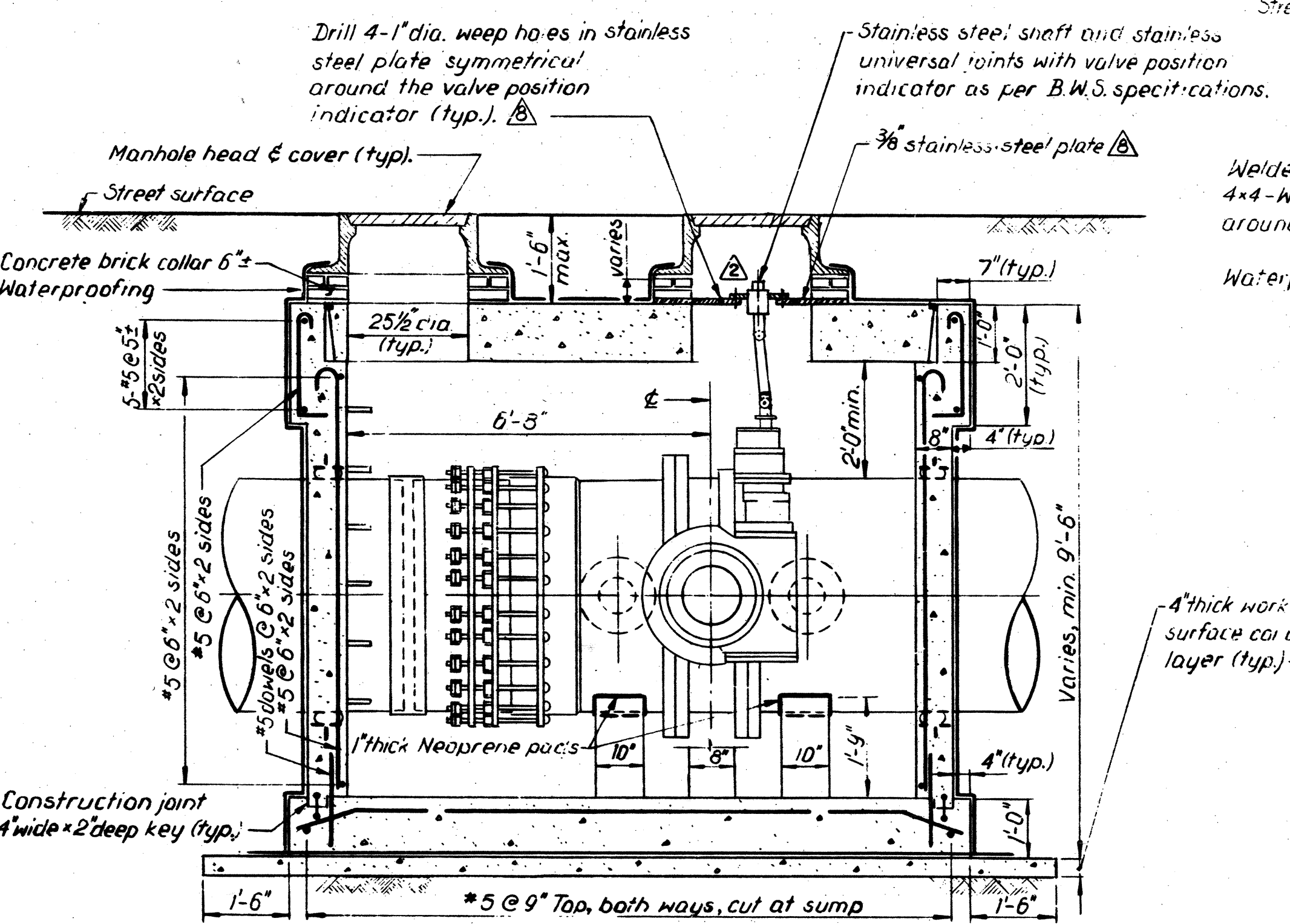
- For insulated joints, see Drawing No. 46104-W.
- For 6" steel outlet connection, see Drawing No. 38226-Y-A.
- For flange thicknesses of standard fabricated connections for steel mains, see Drawing No. 38226-Y-A.
- For flange thicknesses of insulated flange joints, see Drawing No. 46104-W.
- For details of Expansion Joint, see Std. Drawing No. 48829-Z.

**GENERAL NOTE**

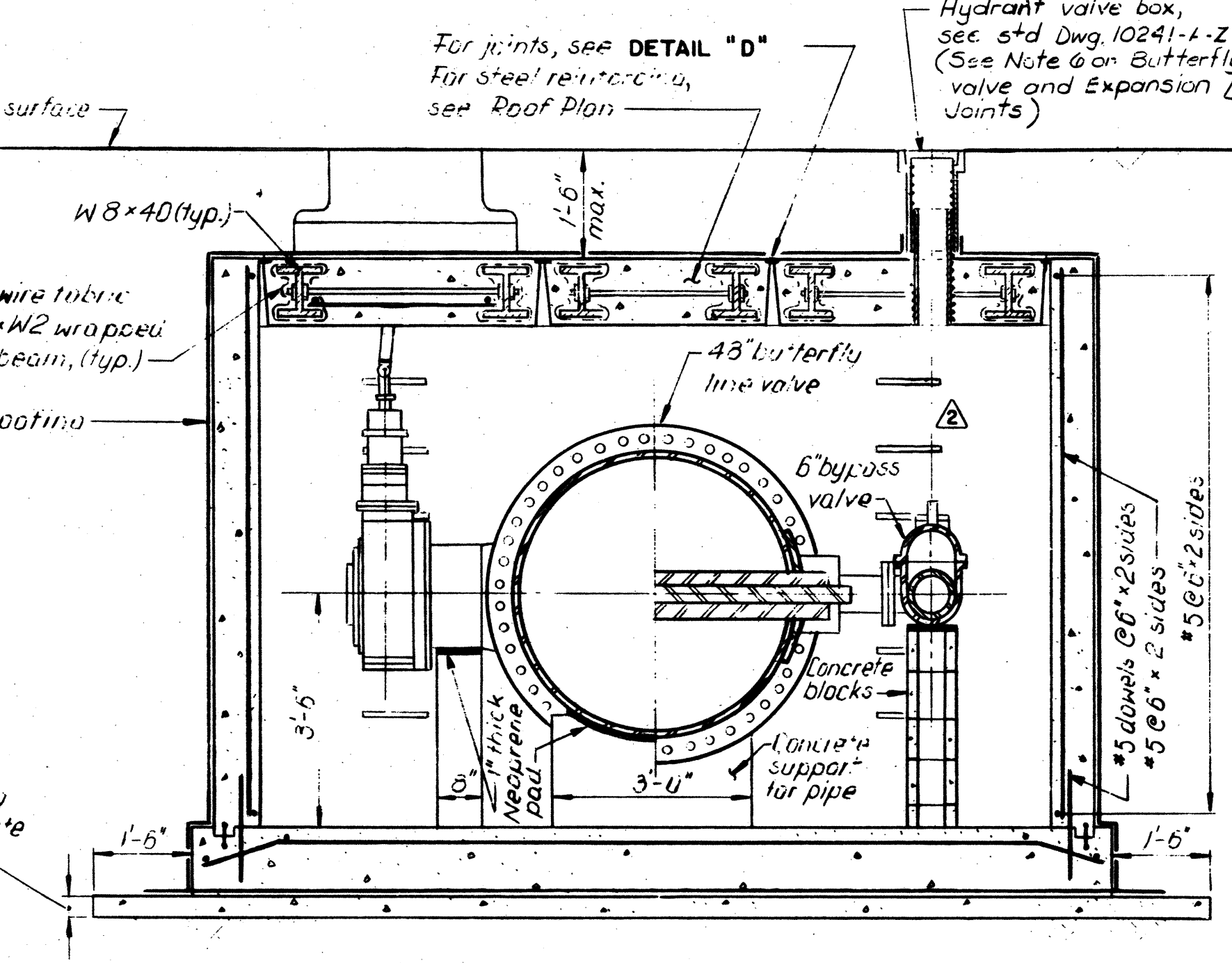
This drawing shall not be scaled for the purpose of determining dimensions, but the dimensions marked on this drawing shall be followed.

**QUANTITIES FOR ESTIMATING**

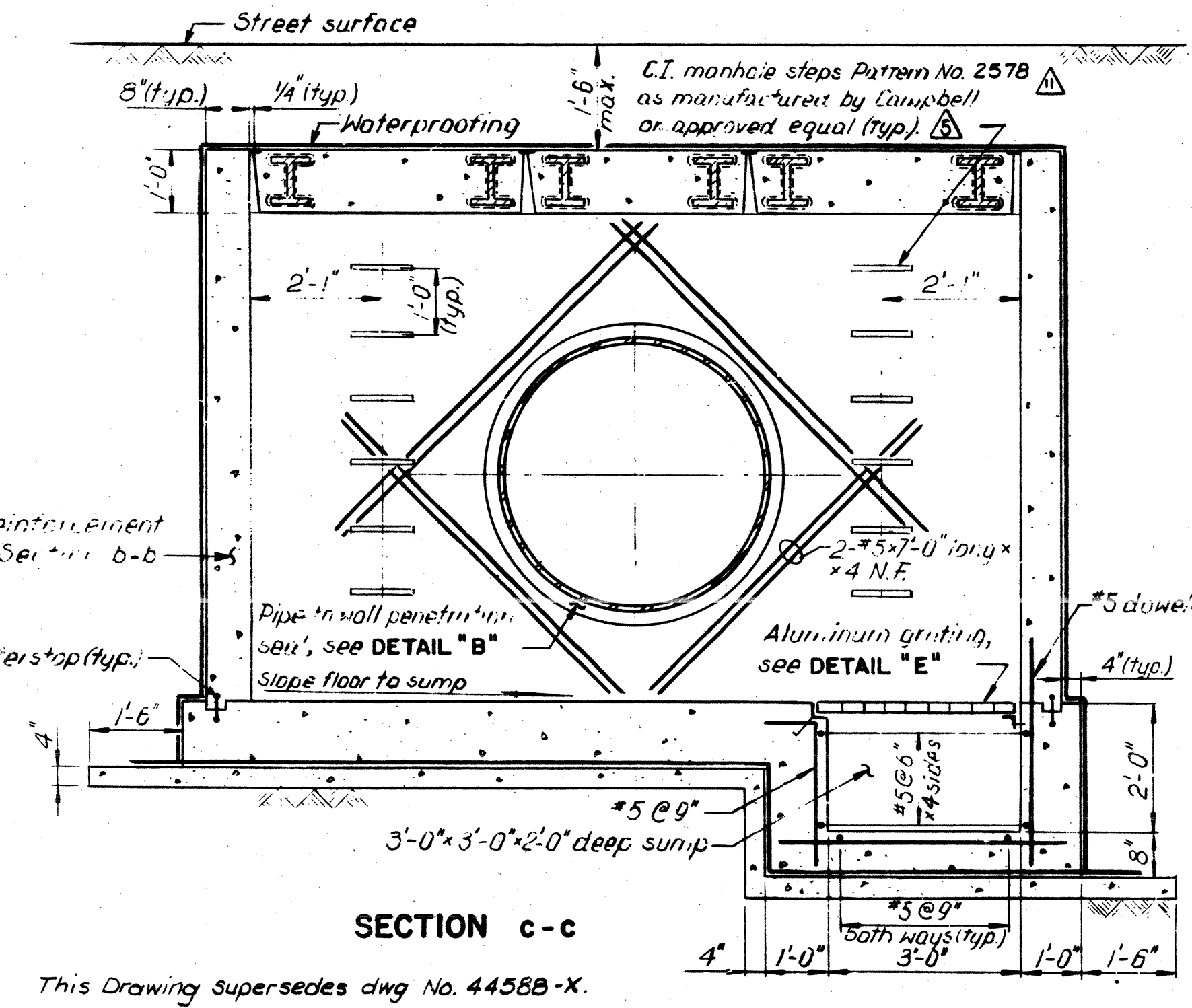
Standard valve chamber	Concrete (cu. yd.)		Reinforcing steel (lbs.)
	cnstr.	working surface	
Totals	25.51	3.48	3550
Per linear foot of wall section.	1.16	-	210



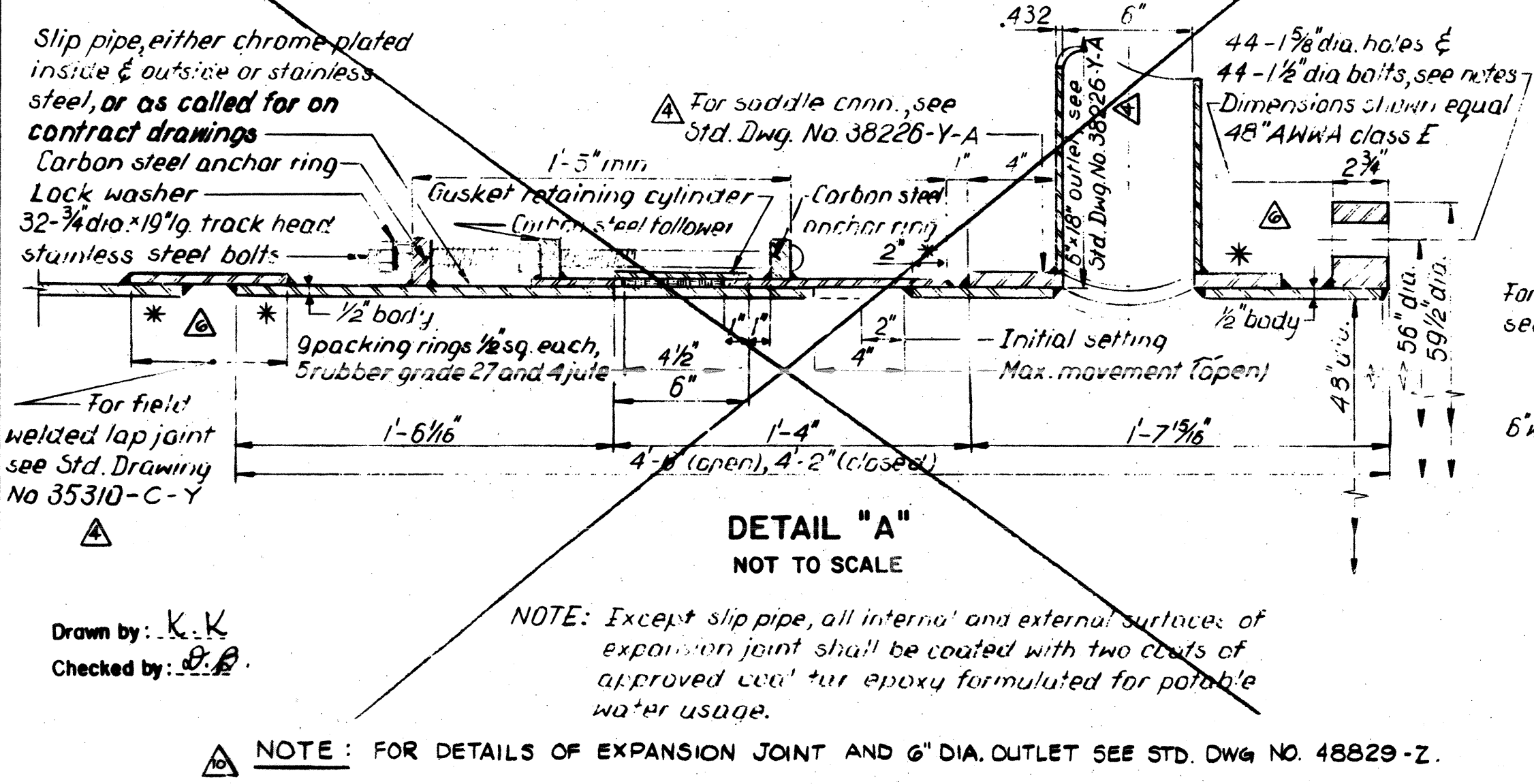
**SECTION a-a**



**SECTION b-b**



**SECTION c-c**



**DETAIL "A"**  
NOT TO SCALE

NO.	DATE	REVISIONS	APP'D BY	TITLE
3-9-94		Changed steps Pattern No.		
5-13-93		Referred to Std Dwg No. 48829-Z for Expansion Joint and revised notes and reference drawings.		
3-20-90		Revised notes for bolts		
2-28-90		Changed to stainless steel plate		
4-10-89		Revised dimensions for location of hydrant valve box		
2-4-88		Added air test for welded lap joint		
2-4-88		Changed steps manufacturer		
10-20-86		Changed Std. Dwg. No. 38226-Y to 38226-Y-A, 29818-X-A to 46104-W and 35310-Z to 35310-Z-1		
MAY, 1986		Changed manhole to std. Hydrant Valve Box		
JUNE, 1985		Section a-a: lowered valve position indicator. Section b-b: deleted valve position indicator and operator stem for 6" by-pass valve.		
APR, 1985		Omitted one Victaulic Coupling		

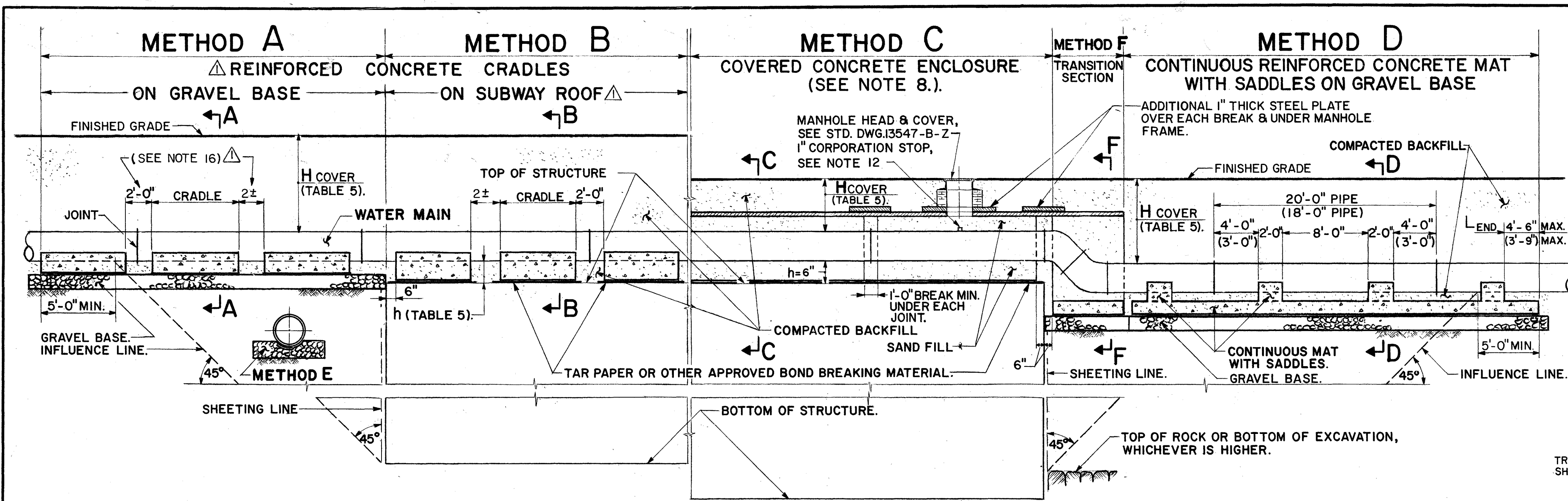
CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

**STANDARD CHAMBER FOR 48" BUTTERFLY LINE VALVE ON STEEL MAIN**

SCALE: 1/2" = 1'-0" DATE: DECEMBER, 1984 SHEET: 1 OF 1

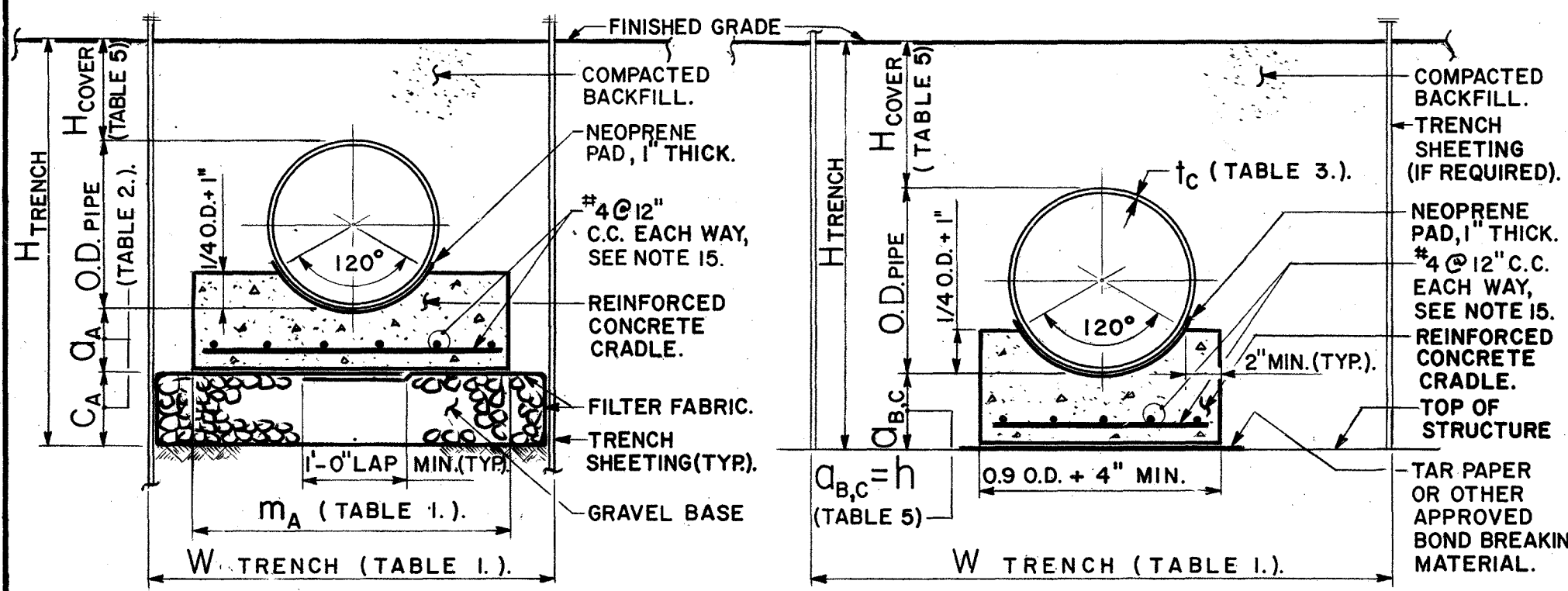
Stephen Brimmi DIVISION ENGINEER  
Edward C. Alaska DEPUTY DIRECTOR





**STANDARD METHODS OF PIPE SUPPORTS**

NOTE: SUBSCRIPTS A, B, C, D & F TO DIMENSIONS SHOWN ON DETAILS AND IN TABLES REFER TO THEIR CORRESPONDING METHOD SHOWN ABOVE.

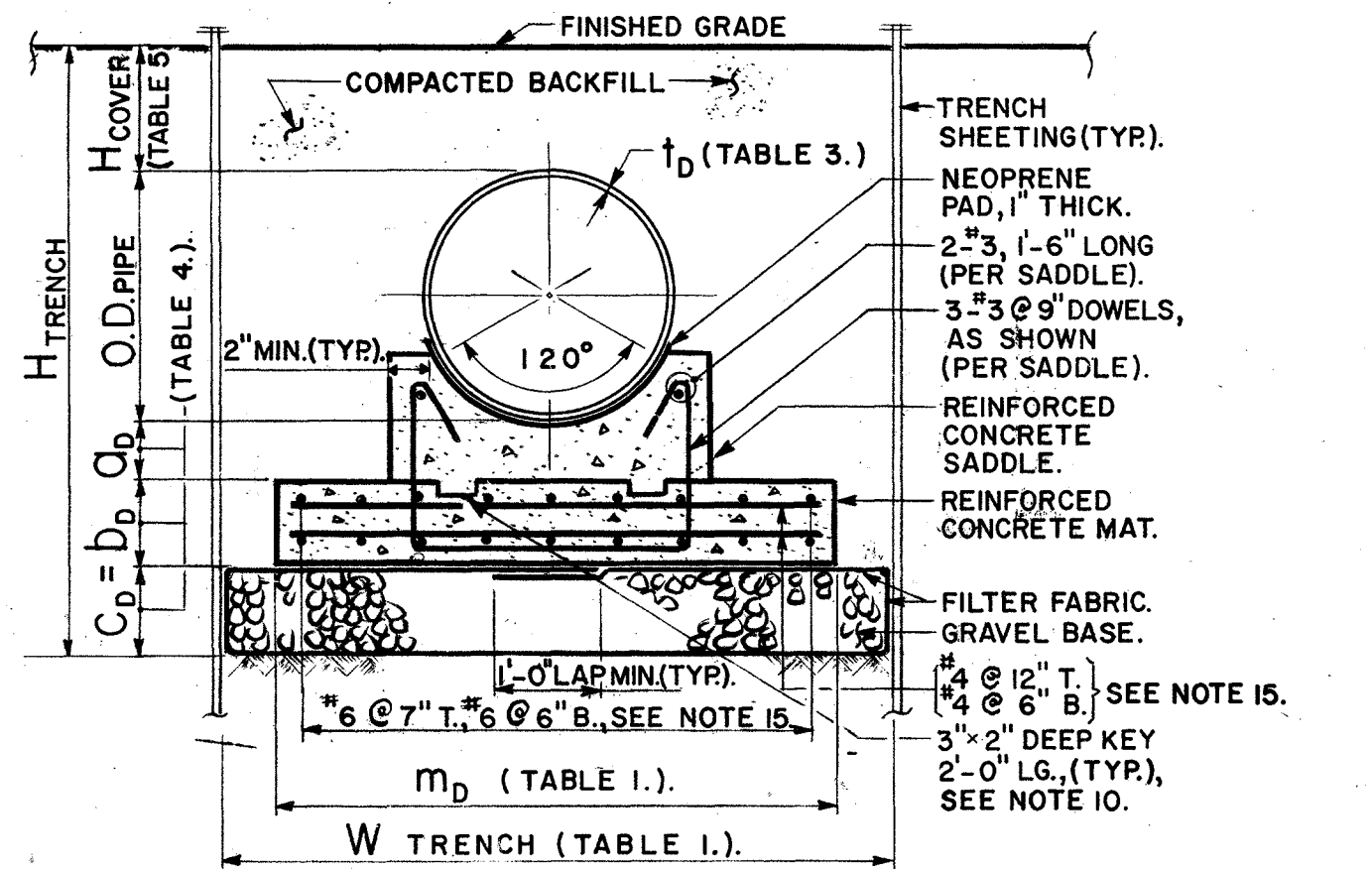


**TABLE 1**

H <sub>TRENCH</sub>	W <sub>TRENCH</sub>	m <sub>A,D</sub>
UP TO 6'	O.D.+2'-4"	O.D.+1'
UP TO 8'	O.D.+3'-4"	O.D.+2'
UP TO 12'	O.D.+4'-4"	O.D.+3'

**TABLE 2**

NOMINAL DIAMETER IN.	a <sub>A</sub>	C <sub>A</sub>	H <sub>A</sub> COVER MAX.
6	16	6"	8"
18	24	8"	10"
30	48	10"	12"



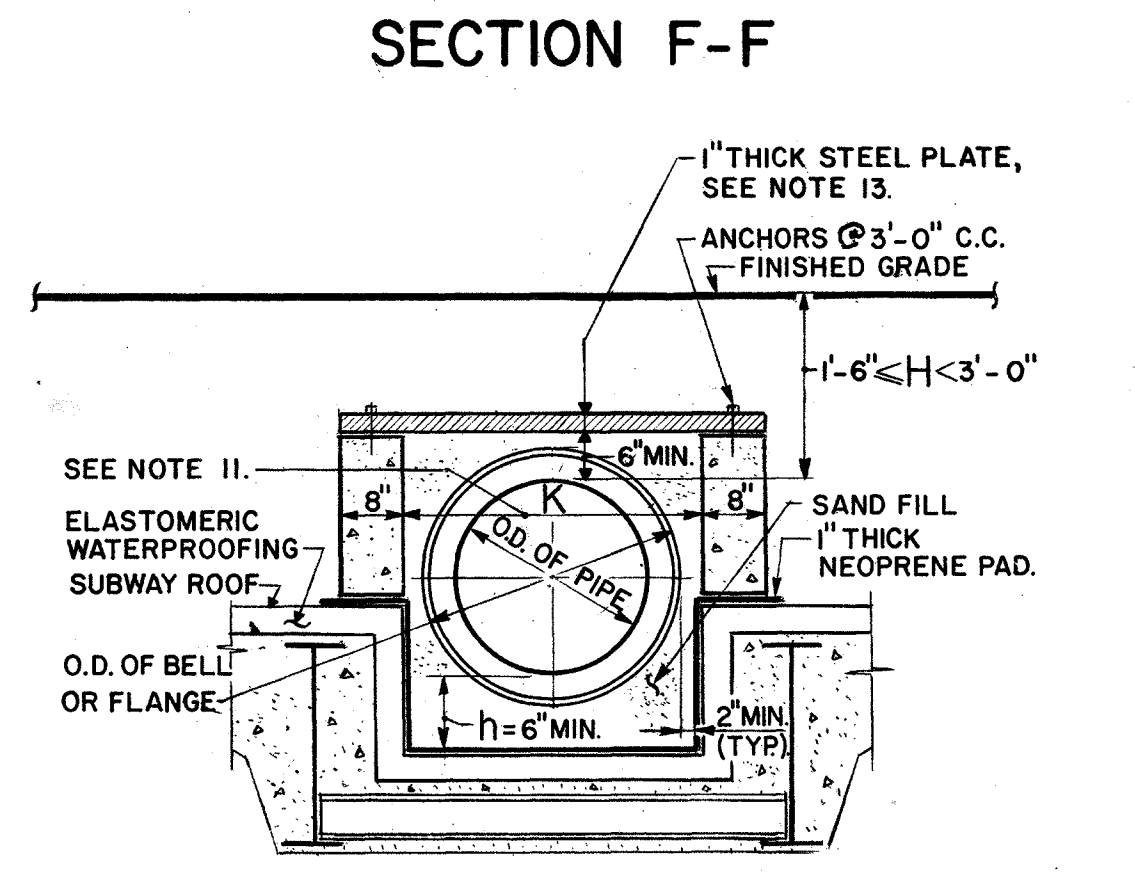
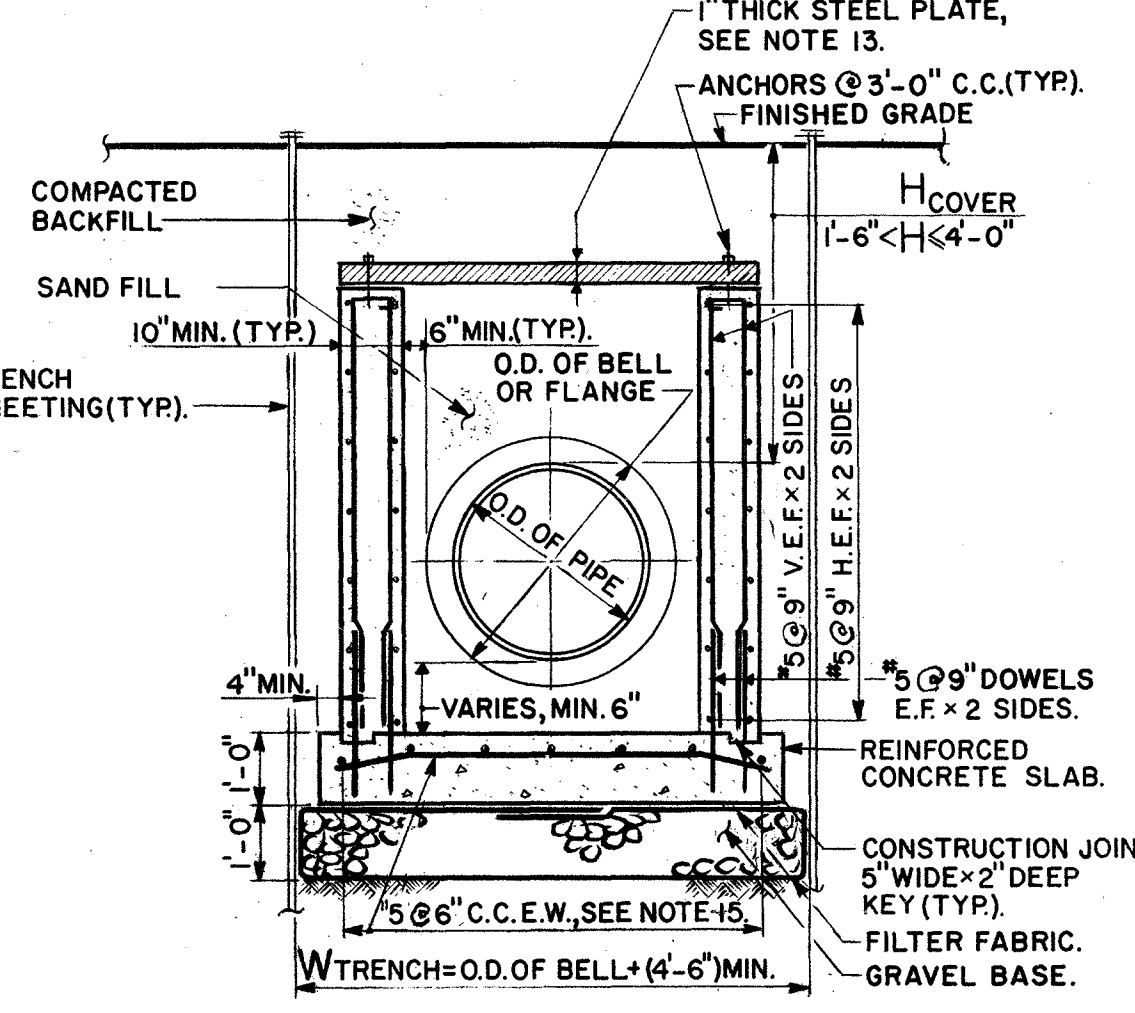
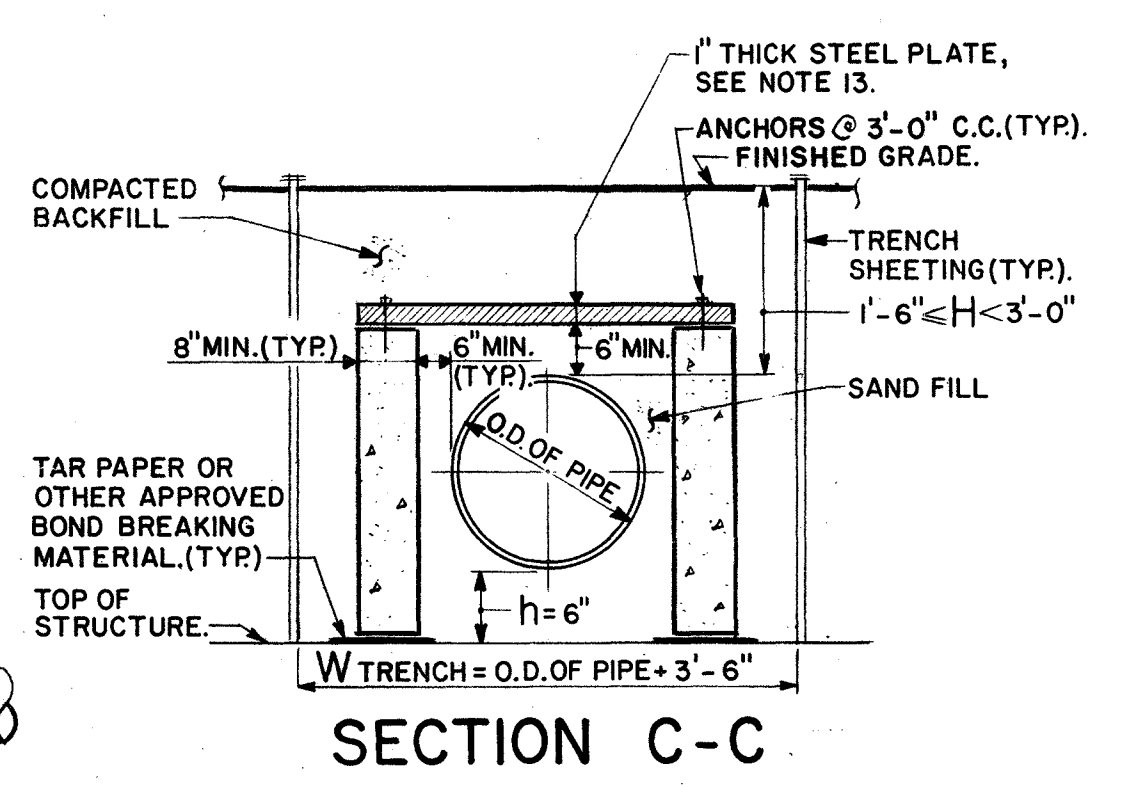
**TABLE 4. MINIMUM THICKNESSES a<sub>D</sub>, b<sub>D</sub> AND c<sub>D</sub>**

STEEL & DUCTILE IRON PIPES	NOMINAL DIAMETERS, IN.												
	12	16	18	20	24	30	36	42	48	54	60	72	
CONCRETE PIPES	24 30 36 42 48 54 60 72												
C <sub>D</sub> = b <sub>D</sub>	H <sub>COVER</sub> , ft.	3											
		4											
		5											
		6											
		7											
		8											
				6"	8"		10"		12"				
				6" 8" 10" 12"									

**TABLE 3. MINIMUM WALL THICKNESS t<sub>D</sub> FOR STEEL PIPES SUPPORTED BY METHOD D**

YIELD STRENGTH	30,000 psi.												45,000 psi.												60,000 psi.													
	12	16	18	20	24	30	36	42	48	54	60	72	12	16	18	20	24	30	36	42	48	54	60	72	12	16	18	20	24	30	36	42	48	54	60	72		
H <sub>COVER</sub> , ft.	3	7/16"												3/8"																								
	4																																					
	5																																					
	6	1/2"																																				
	7	N.A.												9/16"												7/16"												
	8	N.A.												5/8"												3/4"												
			N.A.												13/16"												1/2"											
			N.A.												1/2"												9/16"											

- NOTES:**
- FOR SELECTING THE APPLICABLE METHOD FOR SUPPORTING WATER MAINS, SEE TABLE 5.
  - ALL PIPES SUPPORTED BY METHODS A, B, C, D, AND F SHALL HAVE RESTRAINED JOINTS.
  - WHEN METHOD D IS USED TO SUPPORT STEEL PIPES, THE MINIMUM WALL THICKNESS OF THE PIPE SHALL BE AS GIVEN IN TABLE 3.
  - ALL PIPES AND MATERIALS FOR THEIR SUPPORT (CONCRETE, REINFORCEMENT, SCREENED GRAVEL, FILTER FABRIC, BACKFILL, ETC.) SHALL CONFORM TO THE REQUIREMENTS OF THE BWS SPECIFICATIONS.
  - MINIMUM 2-INCH CLEARANCE SHALL BE PROVIDED FOR REINFORCING BARS FACING FORMS, AND A MINIMUM OF 3-INCHES FOR BARS AT FACES BEING IN CONTACT WITH SOIL.
  - DISTANCES BETWEEN SADDLES, SHOWN ON THIS DRAWING (METHOD D) INDICATE MAXIMUM ALLOWABLE SPACING. A MINIMUM OF TWO (2) SADDLES PER PIPE LENGTH IS REQUIRED.
  - FREE END (L<sub>END</sub>) OF THE MAT SHALL NOT EXCEED L<sub>END</sub> MAX., SHOWN FOR METHOD D ABOVE. IF L<sub>END</sub> EXCEEDS L<sub>END</sub> MAX., ADDITIONAL SADDLE IS REQUIRED.
  - FOR ADDITIONAL DETAILS COVERING WATER MAINS UP TO 36-INCHES IN DIAMETER, CROSSING SUBWAYS AND OTHER STRUCTURES WITH SHALLOW COVER, SEE STD. DRAWING NO. 46464-Z. FOR SUBWAY CROSSING BY MAINS OVER 36-INCHES IN DIAMETER, SPECIAL DESIGN IS REQUIRED.
  - DETAILS OF GRAVEL BEDDING (FOR METHOD E) ARE SHOWN ON STD. DRAWING NO. 44292-A-Z.
  - TWO KEYS PER CRADLE SHALL BE PROVIDED FOR PIPES OVER 30" DIA. FOR PIPES UP TO 30" DIA. ONE KEY PER CRADLE IS REQUIRED.
  - DIMENSIONS SHOWN FOR DETAIL OF WATER MAIN IN DEPRESSED BAY ARE APPLICABLE FOR K UP TO 3' ONLY.
  - 1" CORPORATION STOP SHALL BE INSTALLED AT THE HIGHEST POINT OF THE PIPE. MANHOLE HEAD & COVER SHALL BE CENTERED DIRECTLY OVER CORPORATION STOP.
  - STEEL PLATES, USED TO PROTECT PIPES WITH SHALLOW COVER, MAY BE SUBSTITUTED WITH CLEARANCE PERMITTING, REMOVABLE CONCRETE SLABS OF APPROVED DESIGN.



**TABLE 5 APPLICABLE METHODS FOR SUPPORTING WATER MAINS**

CONDITION OF INSTALLATION	NOMINAL DIA., IN.		h	H <sub>COVER</sub>		APPLICABLE METHOD
	FROM	TO		FROM	TO	
CROSSING OVER SUBWAY STRUCTURE, OR PARALLEL WITH AND OVER SUBWAY STRUCTURE.	6	36	6"	N.A.	1,5'	C
	6	10	6"	3'	3' 8"	B
			OVER 3'	3'	7'	A
	12	16	6"	3'	3' 8"	B
			OVER 3'	3'	7'	A
	18	24	6"	3'	3' 8"	B
			OVER 3'	3'	6'	A
	30	48	6"	3,5'	3' 8"	B
			OVER 3,5'	3'	5'	A
	54	72	6"	4,5'	3' 8"	B
OVER 4,5'			3'	8'	D	
WITHIN INFLUENCE LINE OF SUBWAY STRUCTURE AND IN EXTREMELY YIELDING SOIL.	6	36		1,5'	4,5'	F
	6	10		3'	7'	A
	12	16		3'	7'	A
	18	24		3'	8'	D
				3'	6'	A
30	48		6'	8'	D	
			3'	5'	A	
54	72		3'	8'	D	
WITHIN INFLUENCE LINE OF OLD SUBWAY STRUCTURE (25 YEARS OLD AND OLDER).	6	72		3'	8'	E

THIS DRAWING SUPERSEDES DWG'S NO. 43587-Y & 43692-Y.

DRAWN: *[Signature]*  
CHECKED: *[Signature]*

*[Signature]* RE.  
DIVISION ENGINEER

*[Signature]* RE.  
CHIEF DESIGN

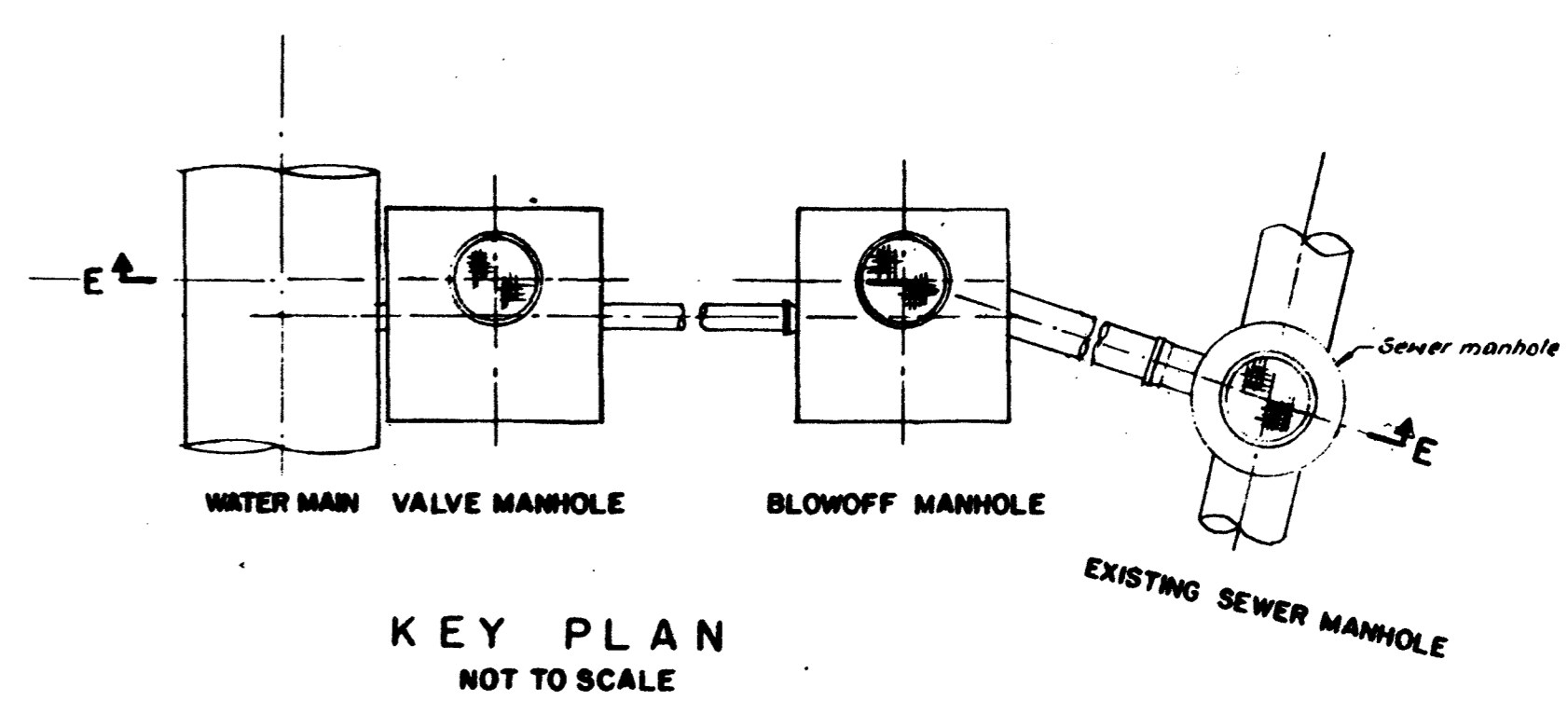
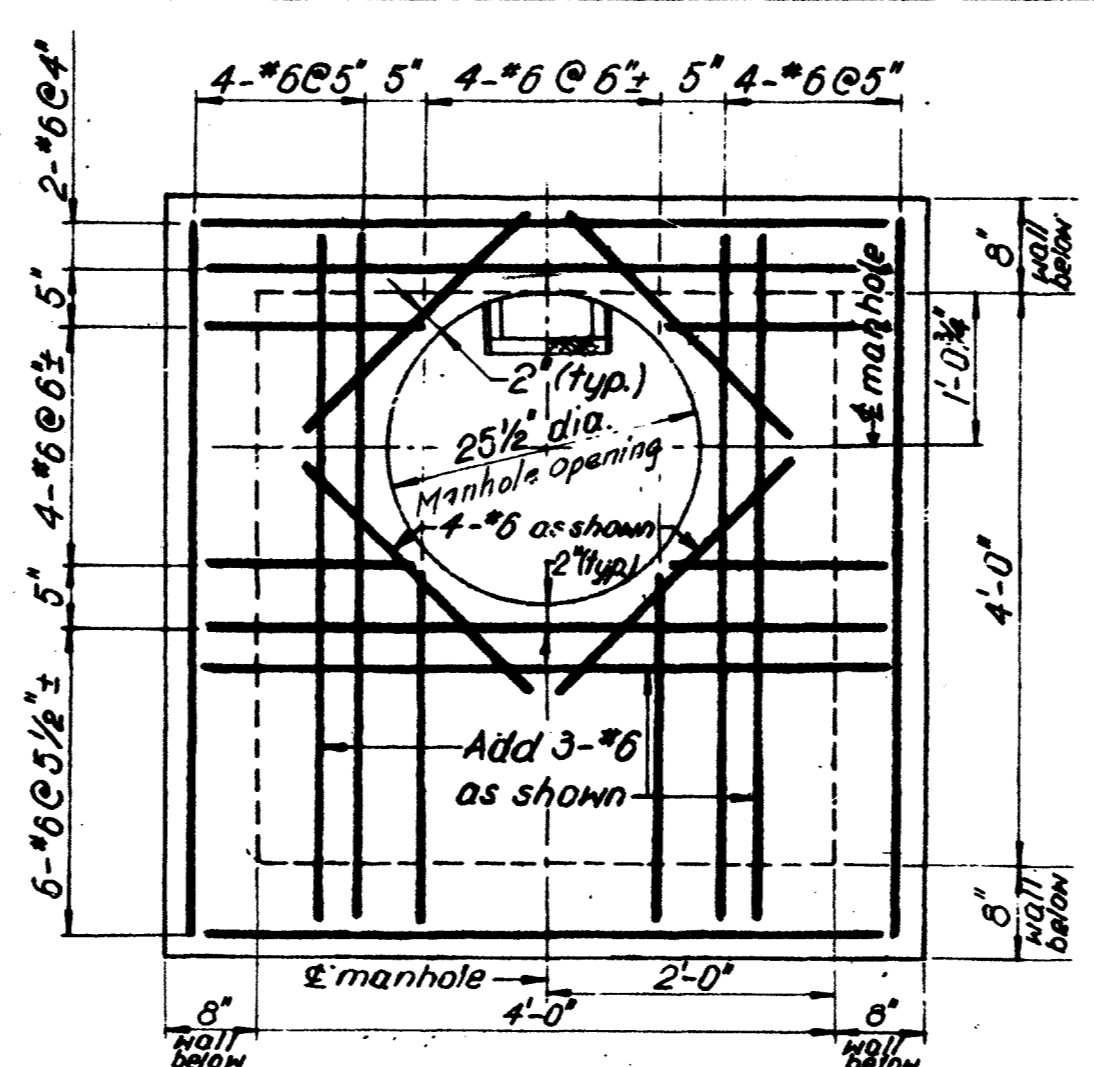
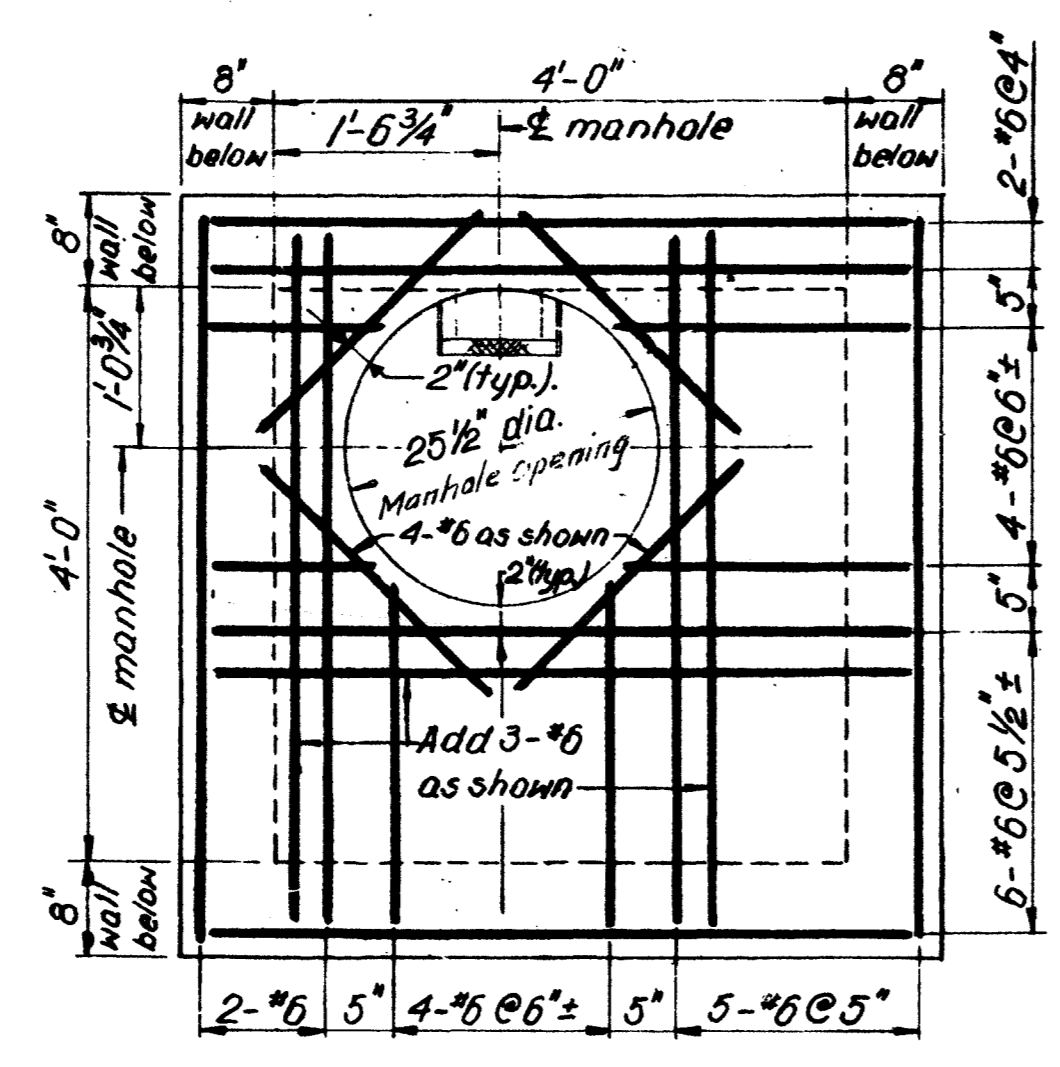
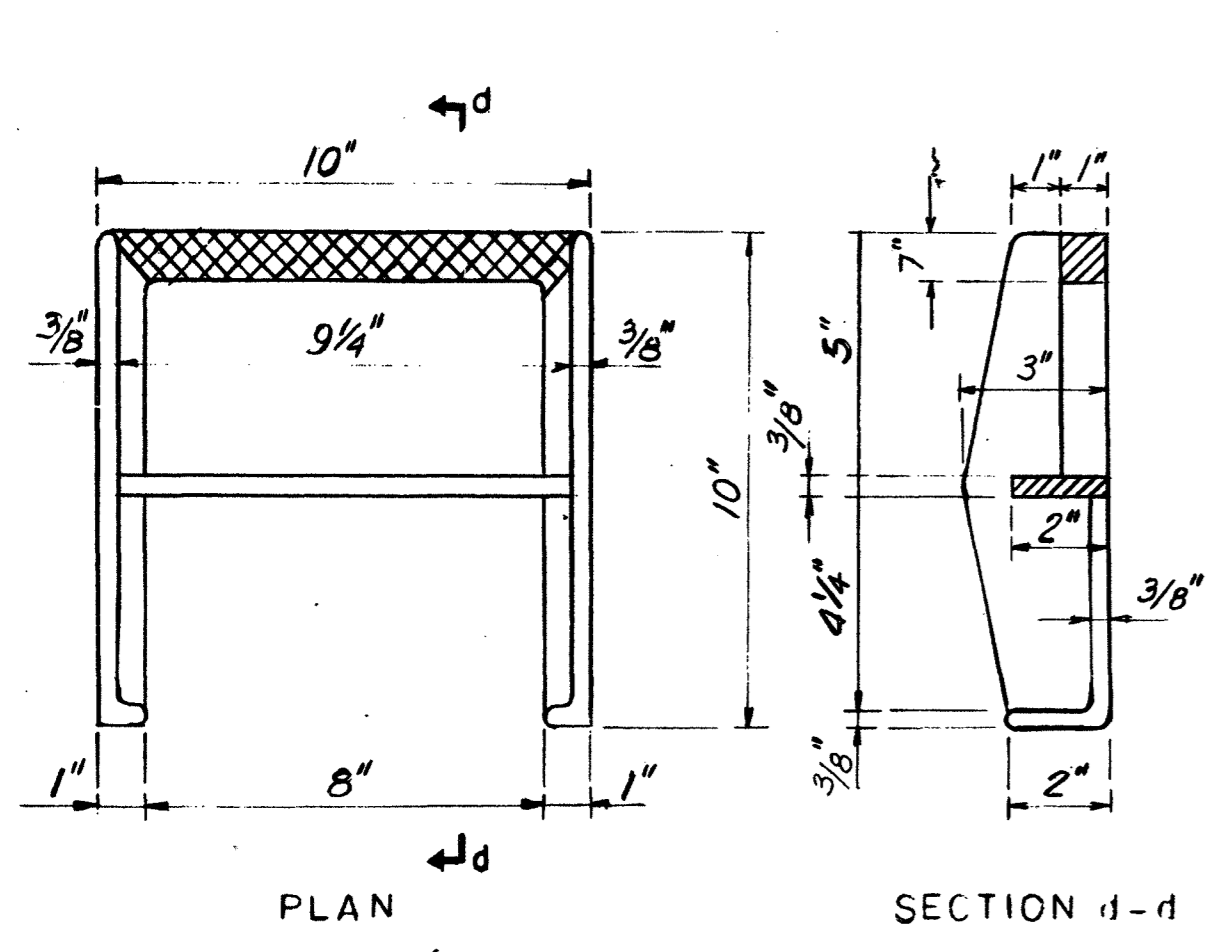
*[Signature]* RE.  
DEPUTY DIRECTOR

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

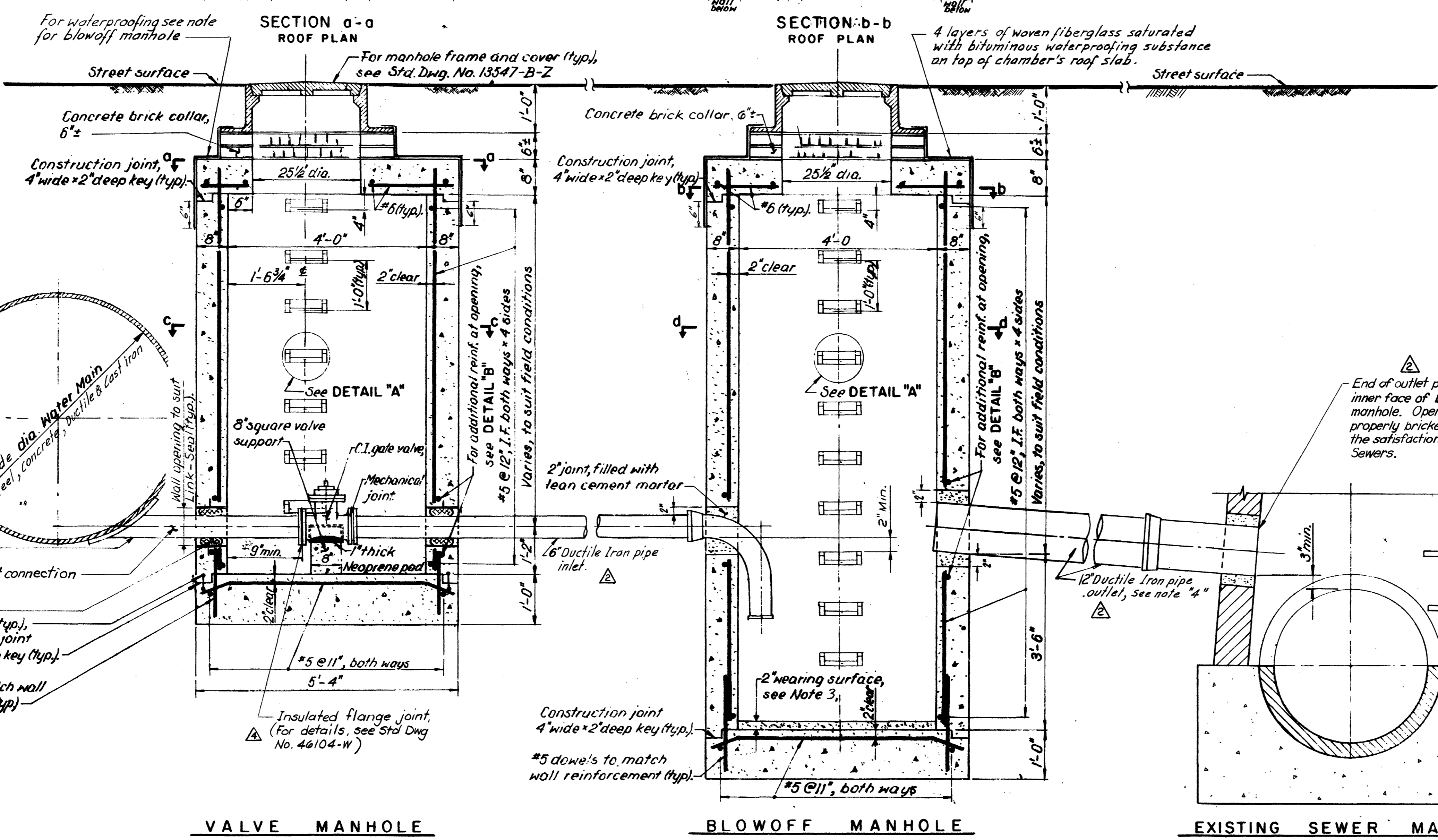
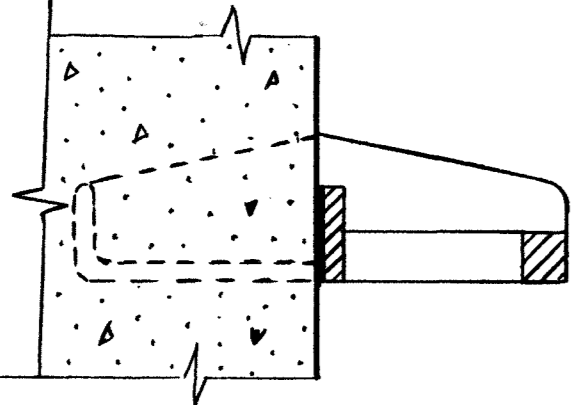
**STANDARD SUPPORTS FOR WATER MAINS  
INSTALLED AT SUBWAYS  
AND  
IN EXTREMELY YIELDING SOIL**

SCALE: NOT TO SCALE    DATE: JULY, 1986    SHEET: 1 OF 1





**DETAIL "A"**  
 CAST IRON MANHOLE RING  
 (MANUFACTURED BY CAMPBELL FOUNDRY CO.)  
 PATTERN NO. 2578 OR EQUAL.  
 NOT TO SCALE



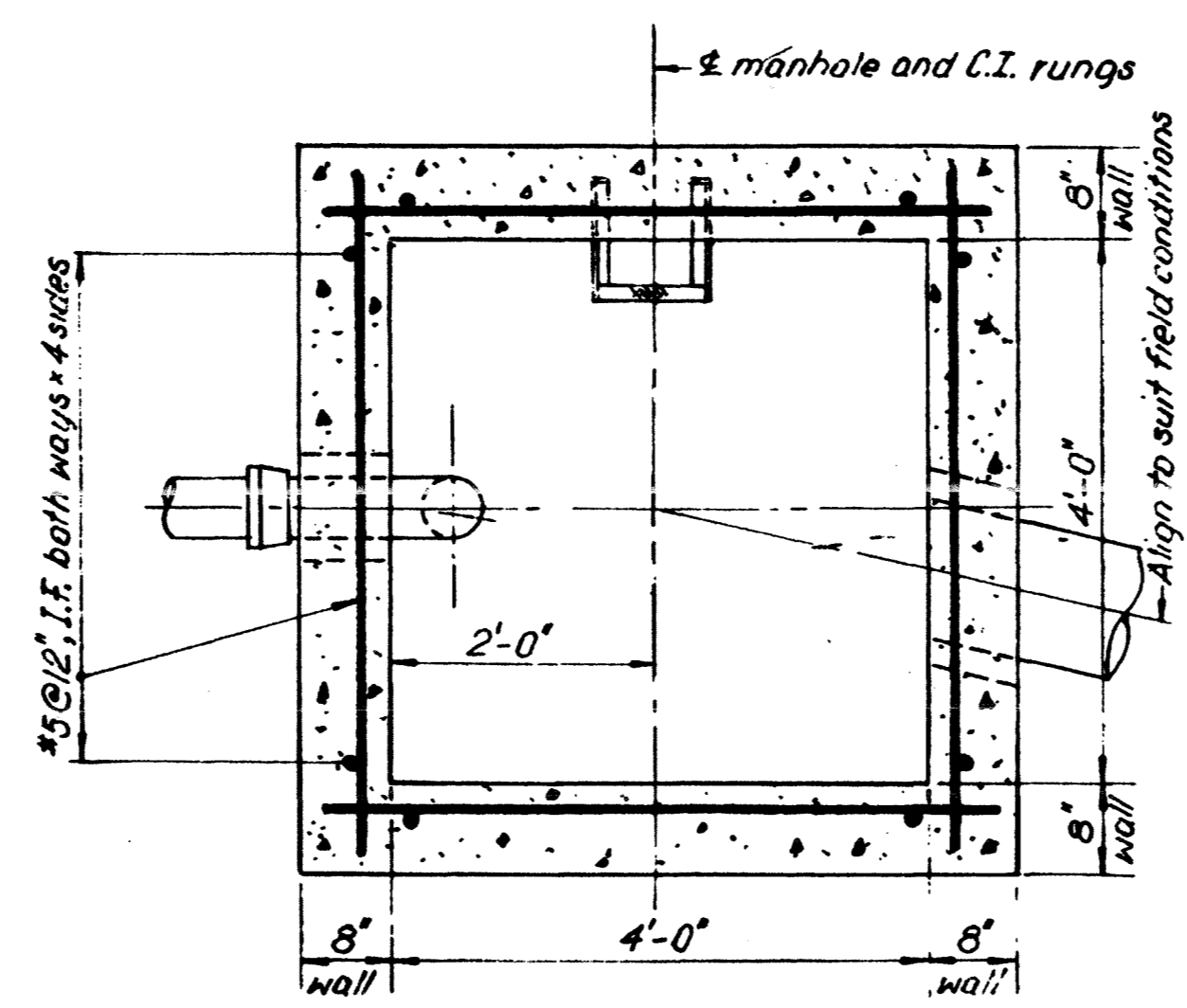
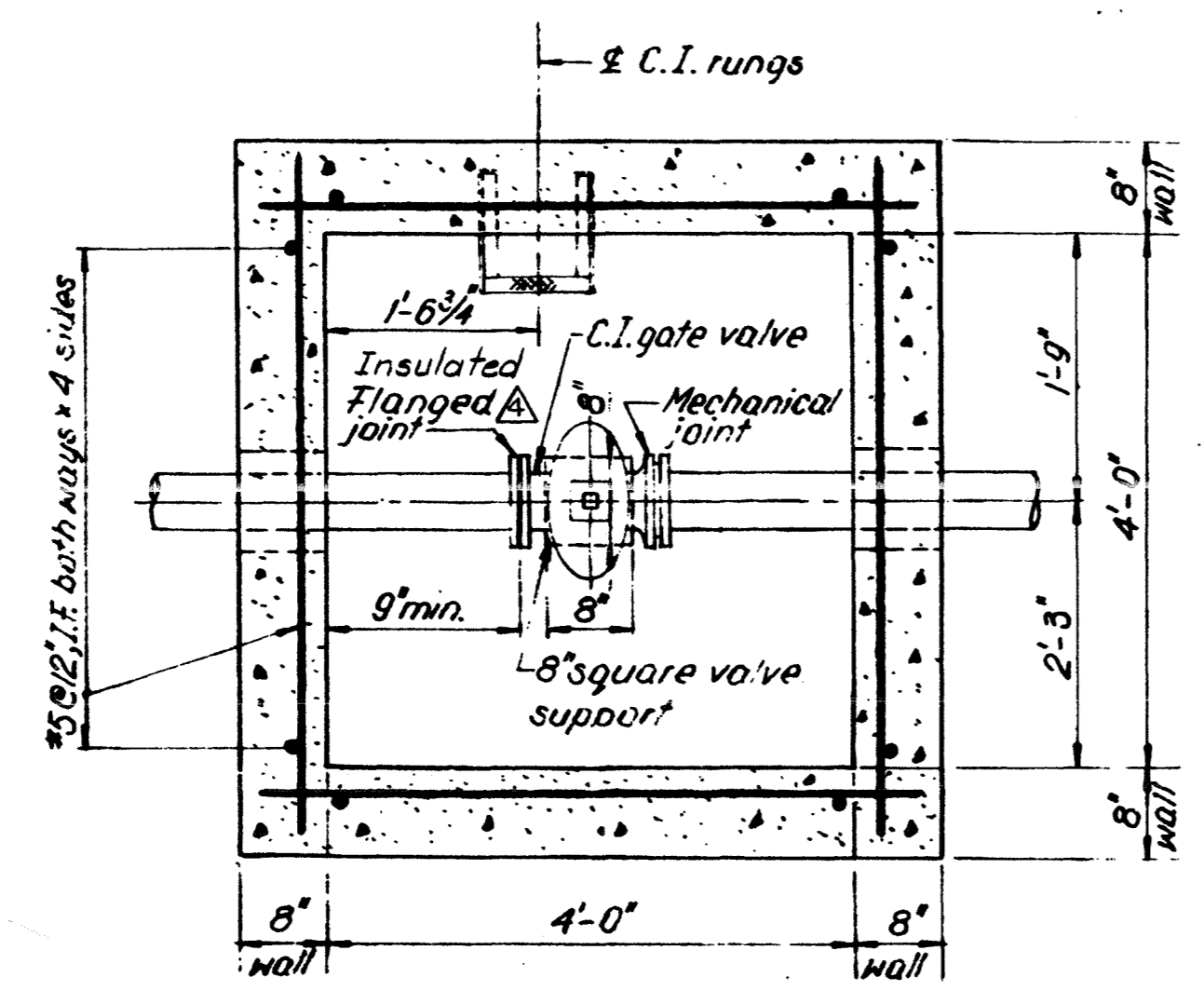
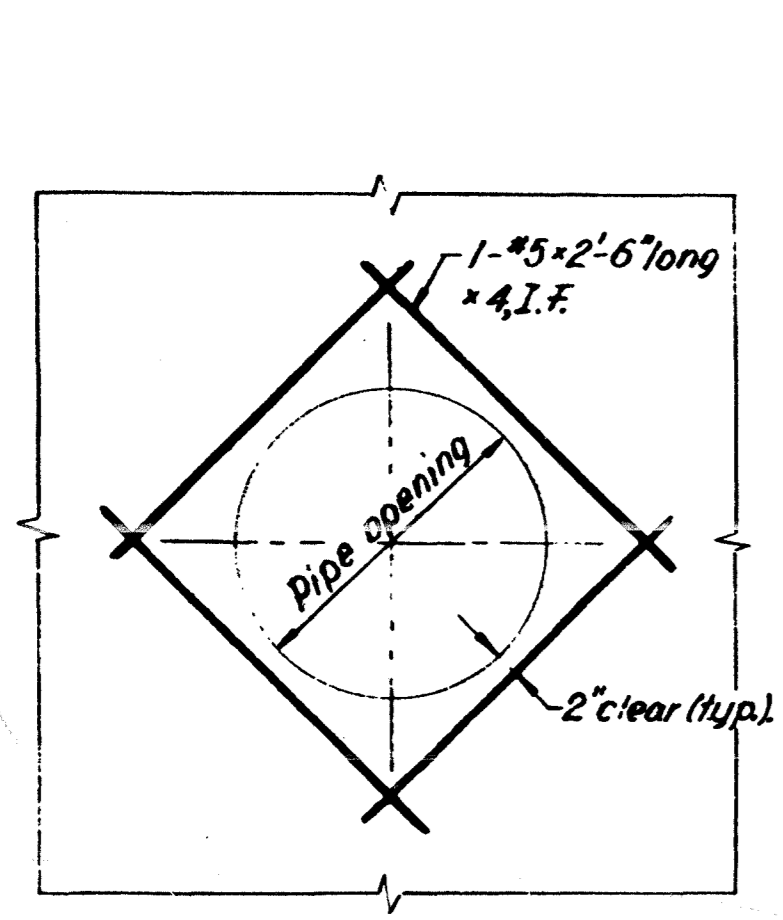
For blowoff connection details, see the applicable standard drawings:  
 Steel pipe: Dwg. No. 38226-Y-A  
 Concrete pipe: Dwg. No. 42414-Y  
 Cast iron pipe: Dwg. No. 10234-Z  
 Link-Seal type wall penetration seals and sleeves, manufactured by Thunderbolt Corp., Wayne, Michigan, or approved equal (typ.).

6" Blow-off outlet connection  
 6" waterstop (typ.)  
 Construction joint 4" wide x 2" deep key (typ.)  
 #5 dowels to match wall reinforcement (typ.)

- Notes**
- For locations of blowoff connections, see contract plans.
  - The key plan on this drawing shows only the intended arrangement; the Contractor shall make necessary adjustments to suit the field conditions.
  - Wearing surface in blowoff manhole shall consist of vitrified brick or other approved suitable material laid in cement mortar.
  - 12" dia. outlet connection to the existing sewer manhole shall be omitted where the crown of the existing sewer is higher than the invert of water main.
  - When no sewer is available omit the outlet pipe and use blowoff manhole as a blowoff "pot" manhole.
  - Air entraining agent may be used in the concrete, subject to the approval of the engineer.
  - Steel reinforcement may be slightly moved or bent in the field to clear waterstops, anchors, obstructions and openings as approved by the Engineer.
  - The concrete cover for steel reinforcement shall be as follows:  
 a. Surfaces exposed to earth, water or weather: 2"  
 b. Formed surfaces, not exposed to earth, water or weather: 1 1/2"  
 c. Slab not exposed to earth, water or weather: 1"  
 9. All exposed corners and edges of the structure shall be chamfered one inch, except where otherwise noted.  
 10. At locations where there are blow-off connections, a minimum clearance of 1'-6" shall be maintained between the bottom of the trunk main and the top of the connected sewer.

**QUANTITIES FOR ESTIMATING**

DESCRIPTION	CONCRETE / CU. YD.			REINF. STEEL / LBS.			CONCRETE BRICK / CU. YD.
	ROOF SLAB	BOTTOM SLAB	PER LIN. FT. OF WALLS	ROOF SLAB	BOTTOM SLAB	PER LIN. FT. OF WALLS	
VALVE MANHOLE	0.62	1.05	0.46	182	122	42	0.11
BLOWOFF MANHOLE	0.62	1.05	0.46	192	122	42	0.11



DRAWN BY: K.J.K.  
 CHECKED BY: S.H.L.  
**DETAIL "B"**  
 ADDITIONAL REINFORCEMENT OPENINGS  
 NOT TO SCALE

This drawing supersedes drawings A-10653-Z & B-18580-Z.

NO.	DATE	REVISIONS	DESIGNER	CHECKER	APPROVER
3-9-94		Changed steps Pattern No.			
4-13-93		Added Insulated Flange joint.			
10-20-88		St. Dwg. No. 38226-Y changed to No. 38226-YA			
3-20-86		Delete reference to 12" blow-off and added note at blow-off connection to existing sewer.			
JULY 1985		Section E-E, Valve manhole - 2" cement mortar replaced by Link-Seal.			

CITY OF NEW YORK  
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 BUREAU OF WATER SUPPLY

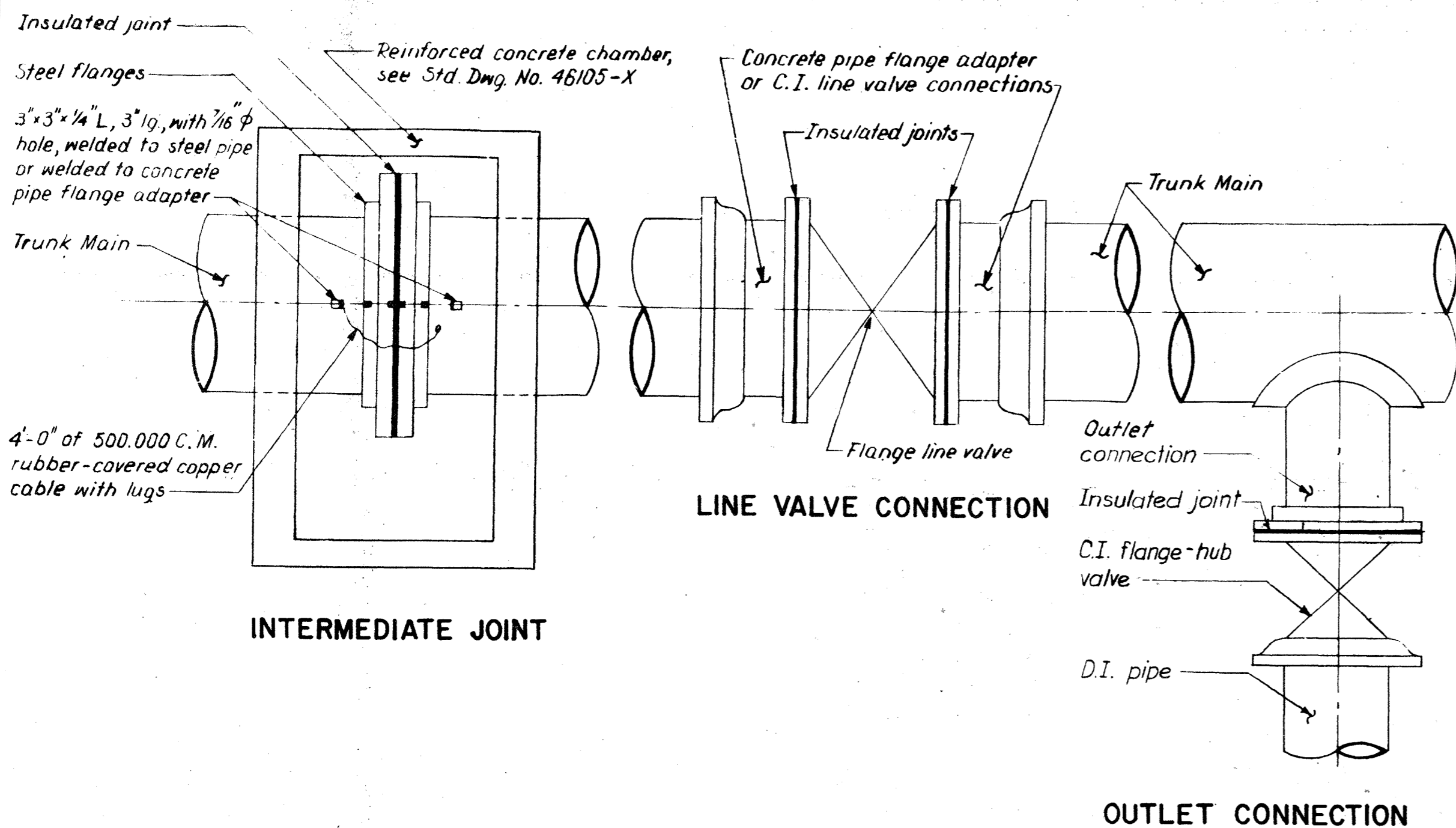
**STANDARD BLOWOFFS**  
 DETAILS OF  
 VALVE AND BLOWOFF MANHOLES

SCALE: 3/4" = 1'-0"    DATE: MARCH 1985    SHEET: 1 OF 1

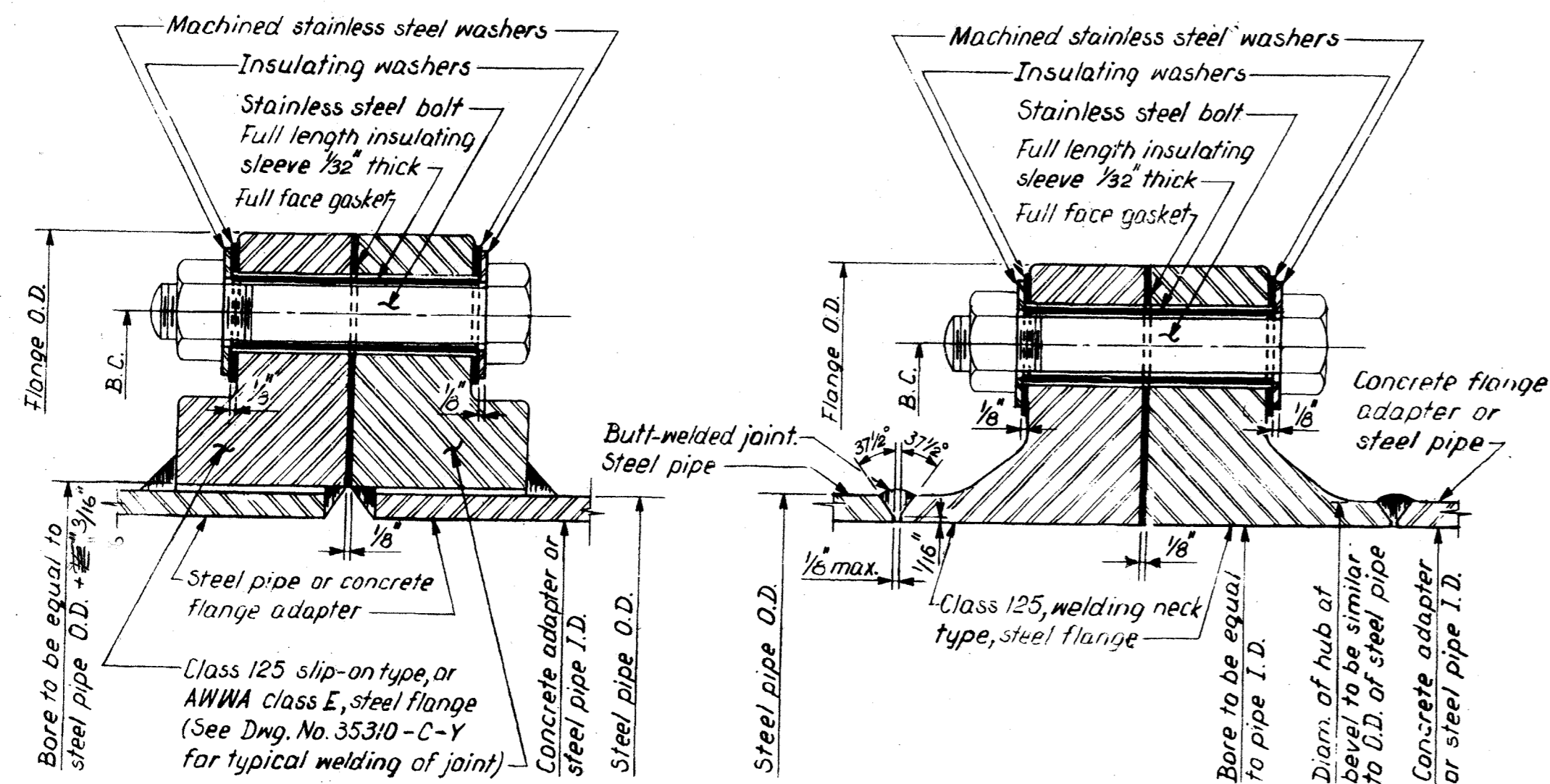
Stephen C. Fitzpatrick    RE.    Chief of Design  
 Charles C. Schuler    RE.    Deputy Director







**TYPICAL LOCATIONS FOR INSULATED JOINTS**



**AT INTERMEDIATE JOINT  
SIZES 30" THRU 72" NOM. DIA.\***

**ALTERNATE METHOD  
AT INTERMEDIATE JOINT  
SIZES 30" THRU 72" NOM. DIA.\***

**AT LINE VALVE CONNECTION  
SIZES 20" THRU 48" NOM. DIA.\***

**AT OUTLET CONNECTION  
SIZES 6" THRU 48" NOM. DIA.\***

**NOTE :**  
For trunk mains 30-inches in diameter and larger, the inside diameter of the pipe is equal to the nominal diameter.

**INSULATED JOINT DETAILS**

BOLT TABLE**												STUD TABLE**			
FOR INTERMEDIATE JOINTS, LINE VALVES AND OUTLET CONNECTIONS 150 LBS. OR CLASS 125 FLANGES.												FOR FLANGED BUTTERFLY VALVES FACED AND DRILLED IN ACCORDANCE WITH ANSI B16.1 CLASS 125, SEE NOTE II			
NOM. DIA.	FLANGE O.D.	FLANGE THICKNESS	B.C.	BOLT HOLE DIA.	BOLT DIA.	LENGTH OF BOLTS	THREAD LENGTH	NUMBER OF BOLTS FOR		MIN. SPOT FACE DIA.	S.S. WASHER DIA.	STUD DIA.	NUMBER OF STUDS	LENGTH OF STUD	STUD THREAD GAUGE
								(A)	(B)						
6	11	1	9/2	15/16	3/4	4	1 3/4	8	8	1 1/16	1 1/2	-	-	-	-
8	13 1/2	1 1/8	11 3/4	15/16	3/4	4	1 3/4	8	8	1 1/16	1 1/2	-	-	-	-
12	19	1 1/4	17	1 1/16	7/8	4 1/2	2	12	12	1 13/16	1 3/4	-	-	-	-
16	23 1/2	1 7/16	21 1/4	1 3/16	1	5	2 1/4	16	12	2 1/16	2	1	4	5	8NC
20	27 1/2	1 11/16	25	1 3/8	1 1/8	5 1/2	2 1/2	20	16	2 1/4	2 3/8	1 1/8	4	5 3/4	7NC
24	32	1 1/8	29 1/2	1 1/2	1 1/4	6	2 3/4	20	16	2 7/16	2 3/8	1 1/4	4	6 1/4	7NC
30	38 3/4	2 1/8	36	1 1/2	1 1/4	6 1/2	3	28	24	2 7/16	2 3/8	1 1/4	4	5 3/4	7NC
36	46	2 3/8	42 3/4	1 3/4	1 1/2	7 1/2	3 1/2	32	28	2 7/8	2 3/4	1 1/2	4	6 1/4	6NC
48	59 1/2	2 3/4	56	1 3/4	1 1/2	8	3 1/2	44	36	2 7/8	2 3/4	1 1/2	8	6 5/8	6NC
60	73	3 1/8	69 1/4	2	1 3/4	9	4	52	44	3 3/8	3 1/4	1 3/4	8	7 1/2	5NC
66	80	3 3/8	76	2	1 3/4	9 1/2	4	52	44			1 3/4	8	7 3/4	5NC
72	86 1/2	3 1/2	82 1/2	2	1 3/4	10	4	60	52			1 3/4	8	7 7/8	5NC

**\*\* NOTES:**  
 1. The bolt and stud tables are based on flanges with dimensions conforming to AWWA Standard C207, class E, for steel hub (slip on) flanges, except for bolt hole diameters. Both tables are also applicable for welding neck flanges with flange thickness and drilling conforming to those of class E hub flanges.  
 2. Number of studs and their lengths shall be verified with butterfly valve manufacturer for each particular installation.

**NOTES:**  
 1. Gaskets for insulated flanged joints shall be 1/8-inch thick, full face type, with bolt holes and bolt circle to match standard 150 lb. drilling of flanges 6 inches through 24 inches in diameter, and AWWA Standard Class E type for flanges 30 inches and larger in diameter. Material for gaskets shall be cloth-reinforced SBR rubber, Style 159, as manufactured by Garlock Mechanical Packing Division, Palmyra, N.Y. 14522, or approved equal.  
 2. Each bolt and/or stud for the insulated flanged joints shall be provided with:  
 a) one full length Mylar insulating sleeve with a wall thickness of 1/32 inch;  
 b) two 1/8-inch thick Phenolic insulating washers. The outside diameter of the insulating washers shall be 1/32-inch larger than that of the following stainless steel washers: NOTE: The items specified in para a) and b) shall be as manufactured by Central Plastics Co., Shawnee, Oklahoma 74801, or approved equal.  
 c) two 1/8-inch thick stainless steel washers, solution annealed, Type 304. The outside diameter of the washers shall be as listed in the table shown on this drawing.  
 3. All surfaces receiving gaskets shall be machine-finished; back of flanges shall be machined or spot-faced.  
 4. Where spot facing is more than 1/16-inch deep, additional insulating washers shall be used to provide 1/8-inch minimum clearance between the steel washer and the casting.  
 5. Insulated flange connections shall be tested by an approved qualified licensed electrician. A certificate attesting to the adequacy of the insulation shall be submitted to the Resident Engineer.  
 6. Insulated joints shall, immediately after acceptance, be coated as follows:  
 a. if the adjoining pipe is coated on the exterior and interior surfaces with coal tar enamel, the joint shall be coated with Thick-n-Quick Mastic as manufactured by the Utility Products Co., King of Prussia, Pennsylvania;  
 b. if the adjoining pipe, valve or other component is coated with coal tar epoxy, the joint shall be coated with Tremec 46-272 Tcpx coal tar epoxy as manufactured by the Tremec Co., Kansas City, Missouri, or approved equal, to a dry film thickness of 16 mils minimum. The coating shall be applied to fill all voids and covering all bolts, nuts and washers on the outside and one inch minimum at both sides of the gasketed joint on the inside, all in strict conformance with the manufacturer's recommended procedure. All coatings shall be checked for discontinuities and those found shall be repaired to the satisfaction of the Engineer.  
 c. if the adjoining pipe is coated with a tape coating system such as the Polyken YCIII System, manufactured by the Kendall Co., Murrysville, Pennsylvania, or approved equal, the following shall be completed prior to shipment to the jobsite:  
 a) pipe or fitting surface shall be prepared by sandblasting to an SSFC-SP6 commercial blast finish;  
 b) coal tar enamel shall be applied to the interior of the pipe;  
 c) flanged ends, including the flange and the adjacent length of pipe up to a distance not less than 12 inches from the base of the flange shall be coated with coal tar epoxy;  
 d) tape coating is then applied to the pipe exterior up to the flange attachment weld.  
 At the jobsite, insulated joints shall be assembled and tested. If continuity is found, each bolt shall be tested individually. After repair of all shorted bolts, the flange shall be retested. When complete insulation is achieved, bolts, nuts and washers shall be coated with coal tar epoxy and all coating damage on the flange shall be repaired according to the manufacturer's recommendations. Care shall be taken not to damage or contaminate the tape coating while coating bolt assemblies or during touch-up procedures.  
 7. Bolts, studs and washers shall be austenitic stainless steel, Type 304, and meet the requirements of ASTM 193, latest edition, Grade B8A, Class 1A. Nuts shall be stainless steel, Type 303, Grade 8FA and meet the requirements of ASTM 194, latest edition. Bolts heads and nuts shall have bright finish, and meet the dimensional requirements of the heavy series of ANSI B18.2.1-1981. Threads shall be in accordance with ANSI B1.1-1972 specifications for Unified Screw Threads. Coarse Thread Series shall be used for sizes 1 inch and smaller, and 8 Thread Series for sizes 1-1/8 inch and larger, Classes 2A and 2b, carefully threaded so as to produce smooth and clean threads.

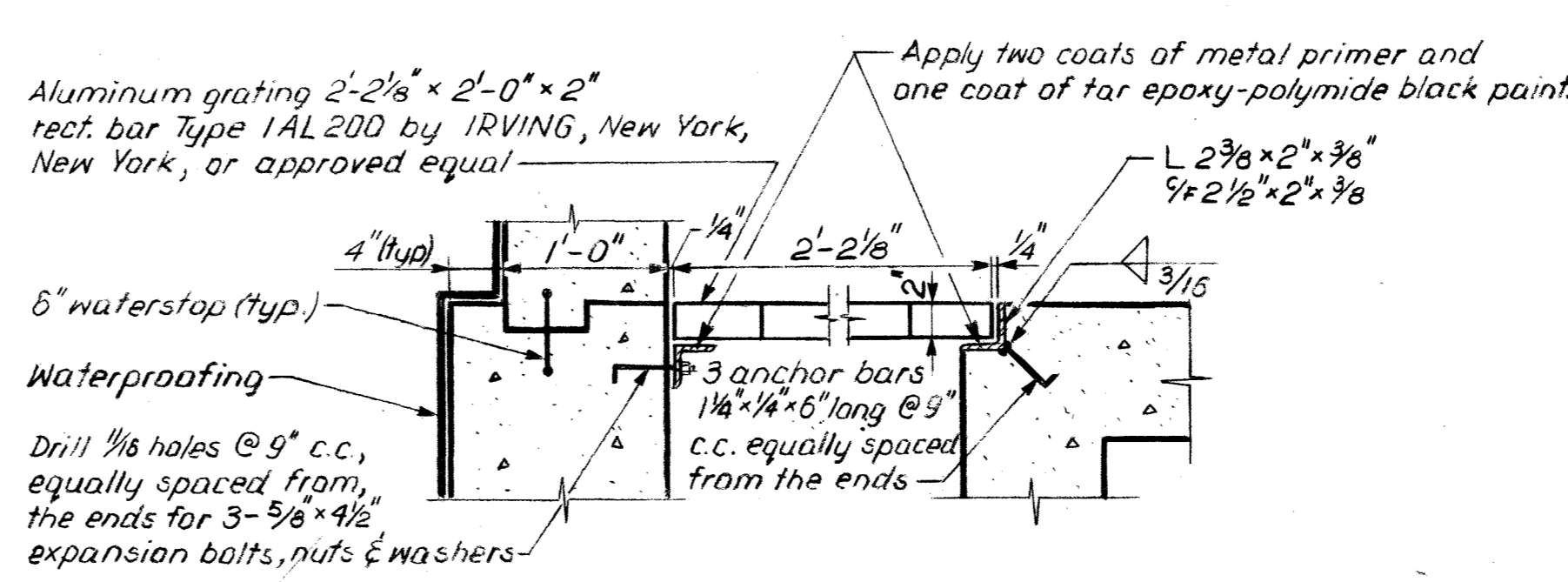
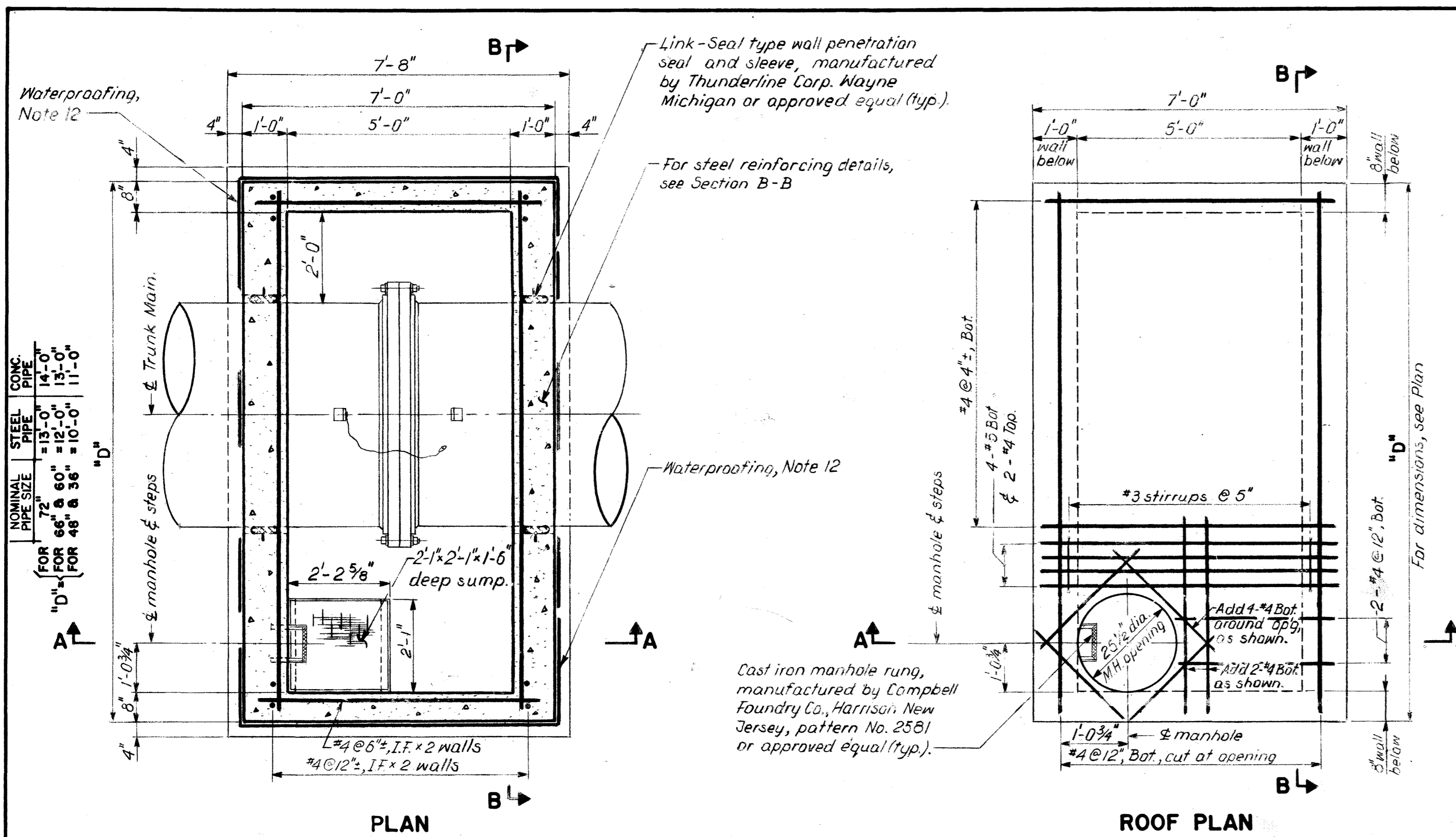
No	Date	Revisions	APPR'D BY	TITLE
△	April, 1993	Revised Note 7 for Bolts, washers and nuts.		
△	March 1992	Revised Bolt diameters, min. spot face diameters and Note 1 under Bolt and Stud Table.		
△	Apr. 1988	Revised insulating sleeve, gaskets, bolts, studs and washers. Added and revised notes.		

Feb., 1986	Updated coating specifications.	S.G.	9/89
No.	Date	Revisions	DIVISION CHIEF OF DESIGN
CITY OF NEW YORK DEPARTMENT OF ENVIRONMENTAL PROTECTION BUREAU OF WATER SUPPLY			
INSULATED FLANGE JOINTS FOR REDUCTION OF ELECTROLYSIS IN TRUNK MAINS			
SCALE: NOT TO SCALE	DATE: SEPTEMBER, 1985	SHEET: 1 OF 2	
Halter C. Fitzpatrick P.E. CHIEF OF DESIGN		Edward C. Schaefer P.E. DEPUTY DIRECTOR	

Drawn K K  
 Traced  
 Checked DB  
 Stephen Guzman P.E.  
 DIVISION ENGINEER

This drawing with Drawing No. 46105-W  
 superseded Drawing Nos 29818-X-A  
 46104-X and 46105-X.





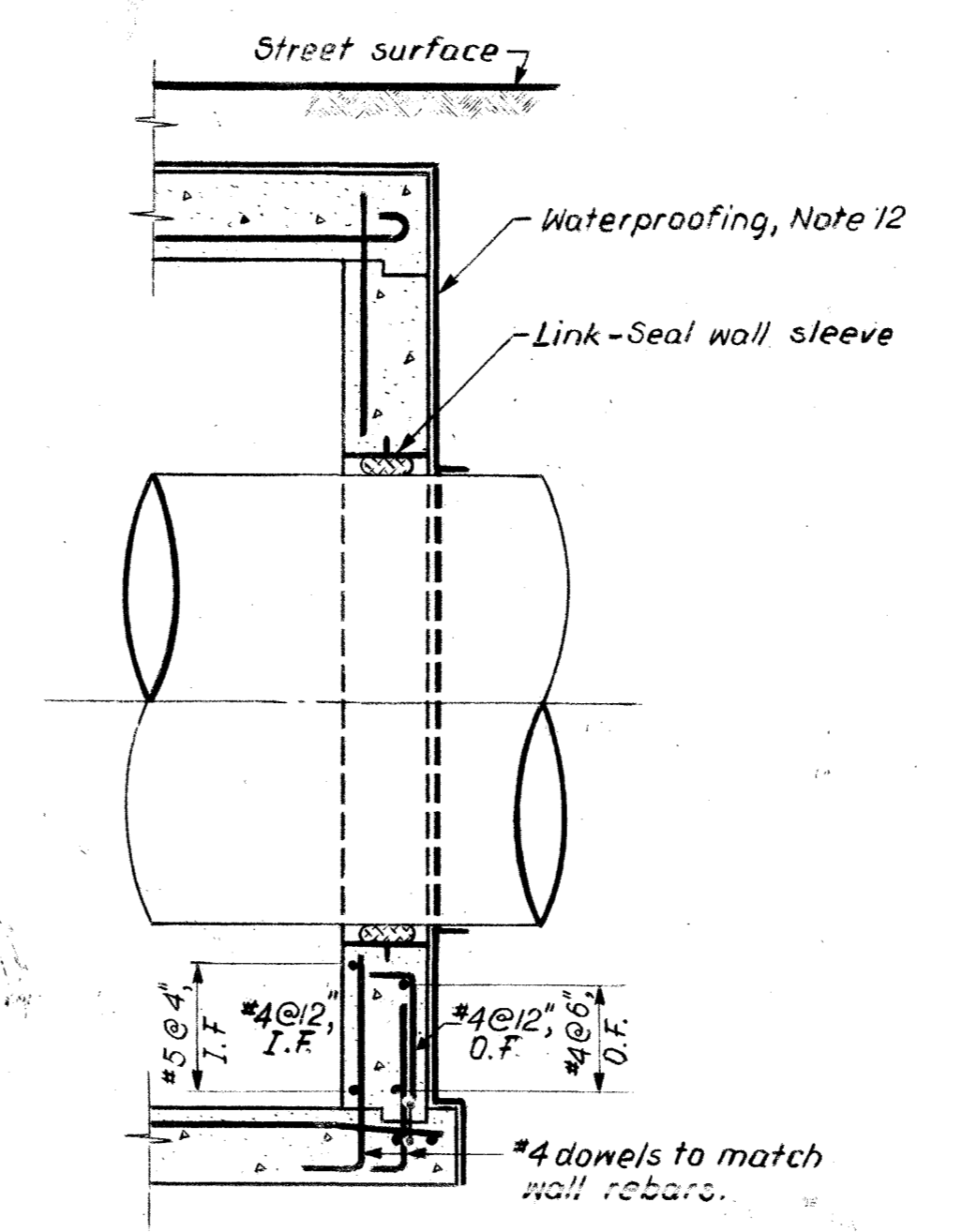
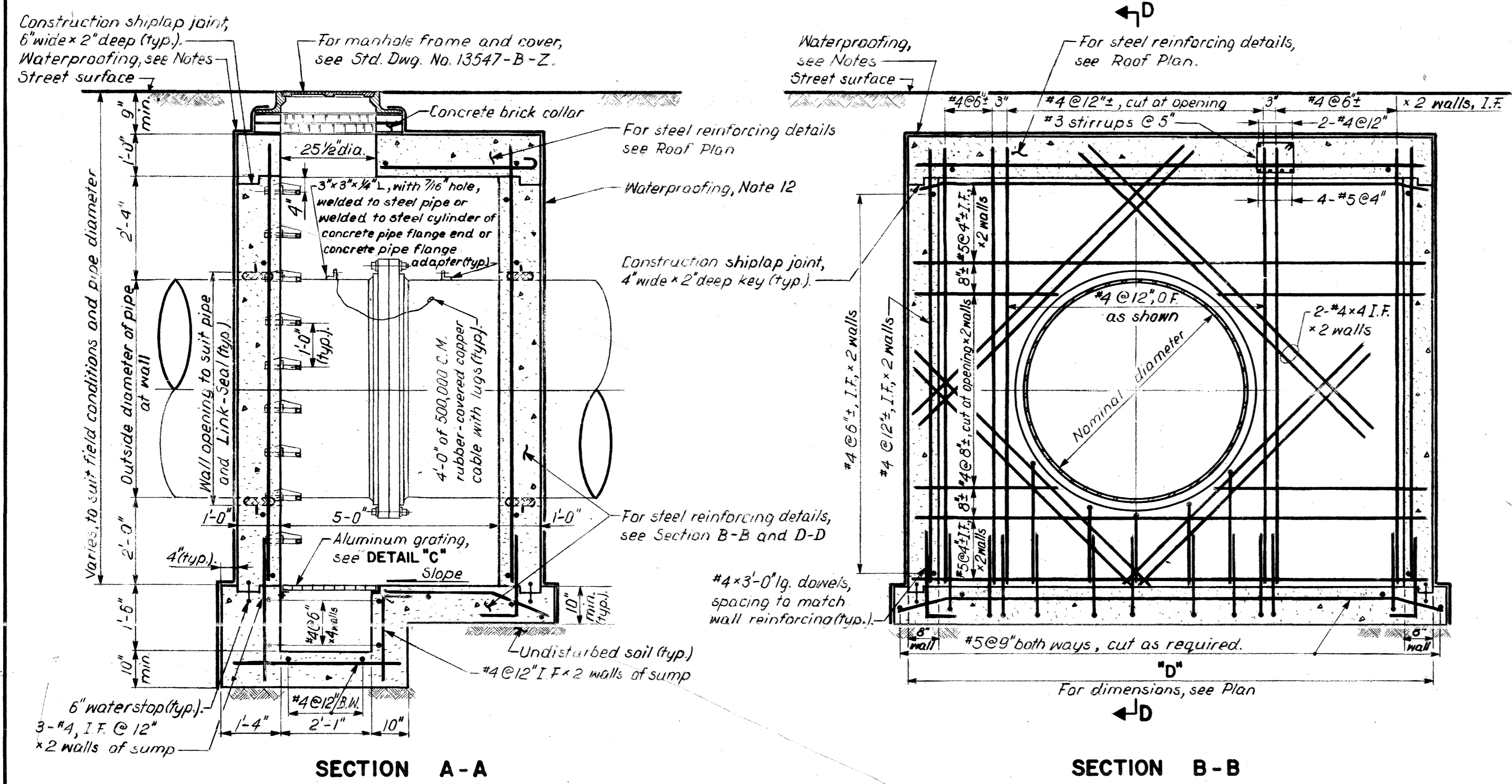
DETAIL "C"  
NOT TO SCALE

APPROXIMATE QUANTITIES FOR ONE CHAMBER

SIZE OF MAIN / INCHES /	FOR STEEL MAIN		FOR CONCRETE MAIN	
	CONCRETE / CU. YDS. /	STEEL / LBS. /	CONCRETE / CU. YDS. /	STEEL / LBS. /
36	12.3	1420	13.9	1590
48	13.0	1480	14.4	1640
60	15.7	1760	17.4	1940
66	15.9	1790	17.7	1960
72	17.5	1940	19.3	2120

NOTE: STEEL QUANTITIES ARE FOR REBAR STEEL ONLY.

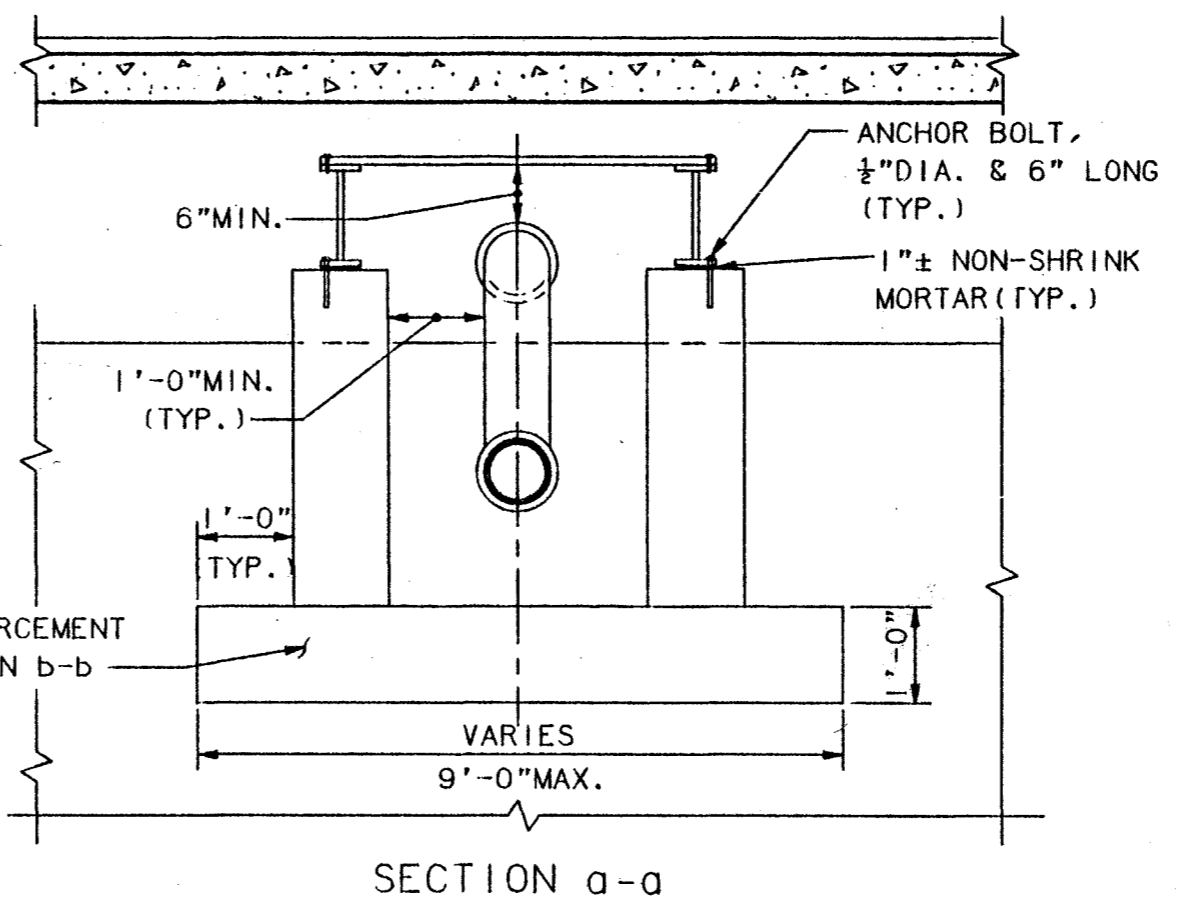
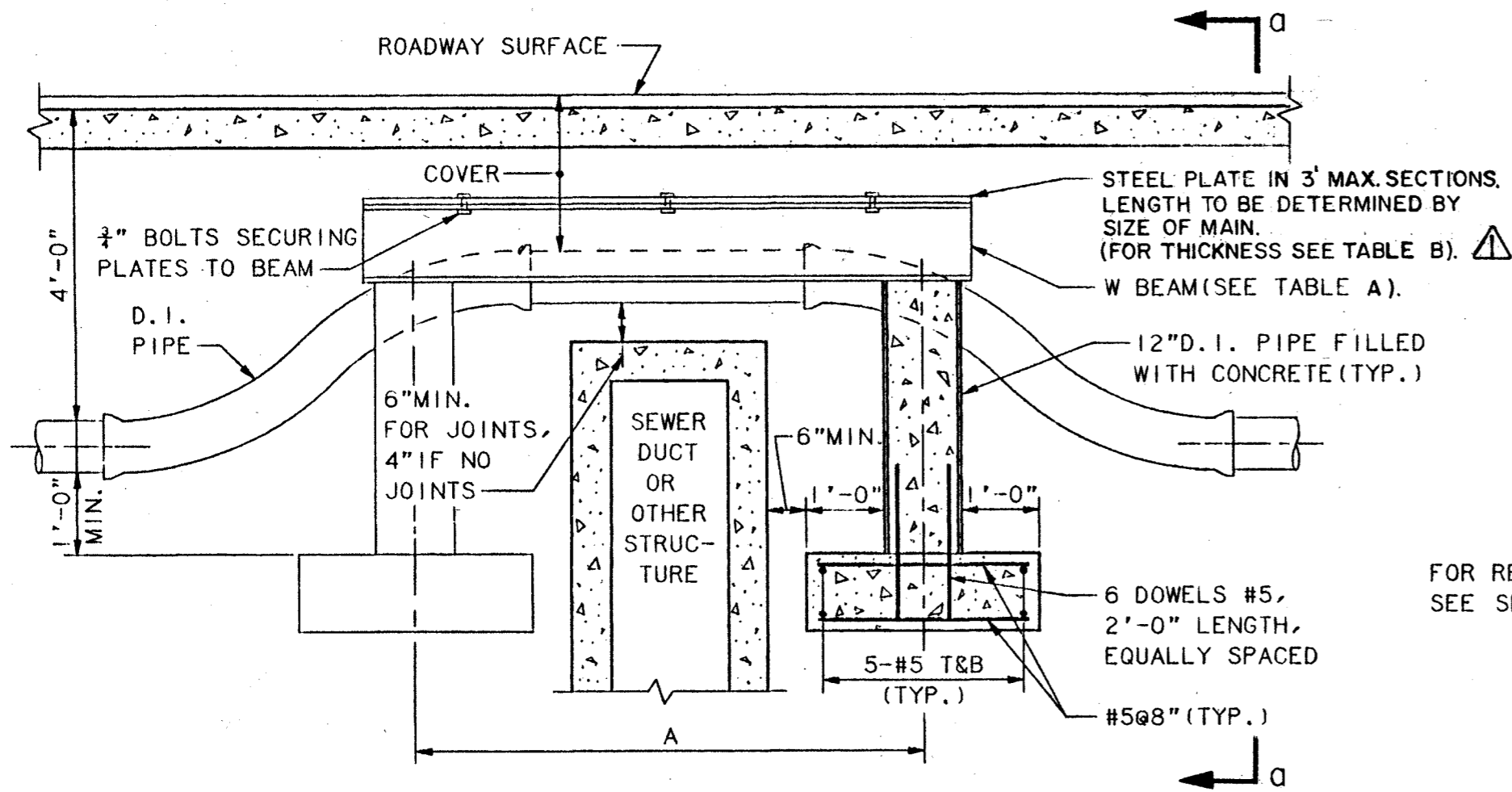
- NOTES:**
- The minimum compressive strength of cast in place concrete,  $f'_c$ , shall be 3500 p.s.i. at 28 days.
  - Air-entraining agents may be used in the concrete, subject to the approval of the Engineer.
  - The allowable concrete slump shall be 2 to 4 inches.
  - Steel for reinforcing concrete and anchor bars shall be Grade 60, and shall conform to the requirements of the Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (ASTM A615 including Supplementary Requirements S1).
  - Steel reinforcement may be slightly moved or bent in the field to clear waterstops, anchors, obstructions and openings as approved by the Engineer.
  - The minimum concrete cover for steel reinforcement shall be as follows:
    - Concrete poured on ground - 3"
    - Surfaces exposed to earth, water or weather - 2"
    - Formed surfaces not exposed to earth, water or weather - 1 1/2"
    - Slab not exposed to earth, water, weather - 1"
    - At keys - 1"
  - Where bars are to be spliced or embedded, the length of splice or embedment shall comply with the latest edition of the Manual of Standard Practice of the American Concrete Institute.
  - Construction joints shall be provided with 6-inch P.V.C. waterstops where indicated on the drawing or as ordered by the Engineer.
  - All exposed corners and edges of the structure shall be chamfered one inch, except where otherwise noted.
  - The invert slab of the chamber shall be float finished.
  - Chamber floor to be sloped 1/8 inch per foot minimum, to the sump.
  - The chamber shall be waterproofed with 4 layers of woven fiberglass fabric saturated with bituminous waterproofing substance on all exterior surfaces including the bottom slab as shown on the drawing.



This drawing, with Drawing No 46104-W, supersedes Drawing No. 29818-X-A, No. 46104-X and 46105-X.

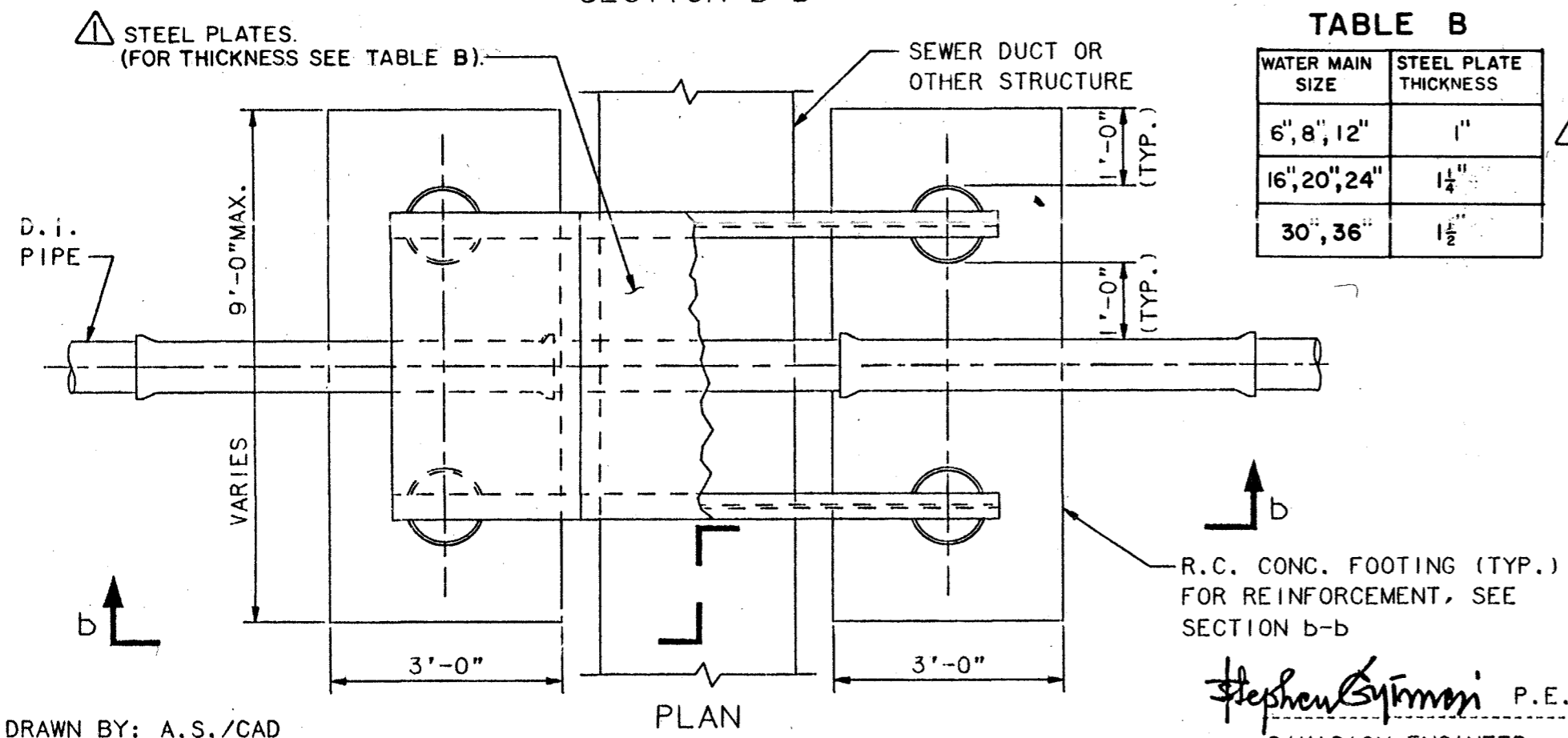
Drawn K.K.  
Traced  
Checked DB  
**Stephen Symon**  
DIVISION ENGINEER P.E.

NO.	DATE	REVISIONS	APP'D BY:	TITLE
<b>CITY OF NEW YORK</b> <b>DEPARTMENT OF ENVIRONMENTAL PROTECTION</b> <b>BUREAU OF WATER SUPPLY</b>				
<b>STANDARD CHAMBER</b> <b>FOR</b> <b>INTERMEDIATE INSULATED FLANGE JOINTS</b> <b>FOR</b> <b>36" TO 72" STEEL AND CONCRETE PIPE</b>				
SCALE: 1/2" = 1'-0"		DATE: SEPTEMBER, 1985		SHEET: 2 OF 2
<b>Walter C. Fitzpatrick</b> CHIEF OF DESIGN P.E.			<b>Edward C. Schuler</b> DEPUTY DIRECTOR P.E.	



**TABLE A**

A ft	M <sub>y</sub> k-ft	S <sub>x</sub> MIN. in <sup>3</sup>	SUGGESTED BEAM SIZE	
5	29.13	15.8	W12x16	W8x18
6	35.7	19.2	W12x19	W8x24
7	42.5	22.9	W12x22	W8x28
8	54.8	30.44	W12x26	W8x35
9	66.73	37.07	W10x30	W10x39
10	79.1	43.94	W12x30	W10x45
11	91.7	50.94	W14x34	W10x49
12	104.7	58.17	W12x35	W10x54
13	117.92	65.51	W14x38	W12x53
14	131.5	73.06	W12x40	W12x58
15	145.3	80.72	W14x43	W12x65



**TABLE B**

WATER MAIN SIZE	STEEL PLATE THICKNESS
6", 8", 12"	1"
16", 20", 24"	1 1/4"
30", 36"	1 1/2"

**NOTES:**

1. OFFSETS SHALL HAVE RESTRAINED JOINTS.
2. CLEAN FILL TO BE THOROUGHLY COMPACTED AROUND PIPE BETWEEN BEAMS.
3. ALL PAVEMENT RESTORATION OVER PLATES TO HAVE 6" MIN. CONCRETE BASE. WHEN THE STEEL PLATE IS ADJACENT TO THE BOTTOM OF THE CONCRETE BASE, A BOND BREAKER SUCH AS TAR PAPER SHALL BE INSTALLED BETWEEN THE PLATE AND THE CONCRETE.
4. THE DESIGN FOR PROTECTION OF MAINS MAY BE VARIED AS REQUIRED FOR A PARTICULAR LOCATION, BUT SHALL CONFORM TO THE GENERAL REQUIREMENTS AS SHOWN ON THIS DRAWING. ANY MAJOR DEVIATION FROM THESE REQUIREMENTS SHALL BE APPROVED BY THE ENGINEER.
5. SUPPORT OF PIERS OR BEAMS DIRECTLY ON SEWER, SUBWAY OR OTHER STRUCTURES SHALL BE APPROVED BY THE ENGINEER.
6. IF COVER IS LESS THAN 1'-6", PIPE SHALL BE INSULATED WITH 2" MIN. THICK OF APPROVED INSULATION WITH ALUMINUM JACKET.

7. DIMENSIONS SHOWN FOR CONCRETE SUPPORT ARE APPLICABLE UP TO AND INCLUDING 36" DIAMETER OFFSET.
8. STEEL BEAMS, EXTERIORS OF PIPE COLUMNS, AND OTHER EXPOSED METAL COMPONENTS SHALL BE COATED WITH COAL TAR ENAMEL BEFORE BACKFILLING THE EXCAVATIONS.
9. ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY

**METHOD FOR PROTECTING  
D.I. WATER MAINS WITH  
SHALLOW (LESS THAN 24") COVER**

SCALE: NOT TO SCALE      MAY 1986

DRAWN BY: A.S./CAD  
CHECKED BY: A.B.

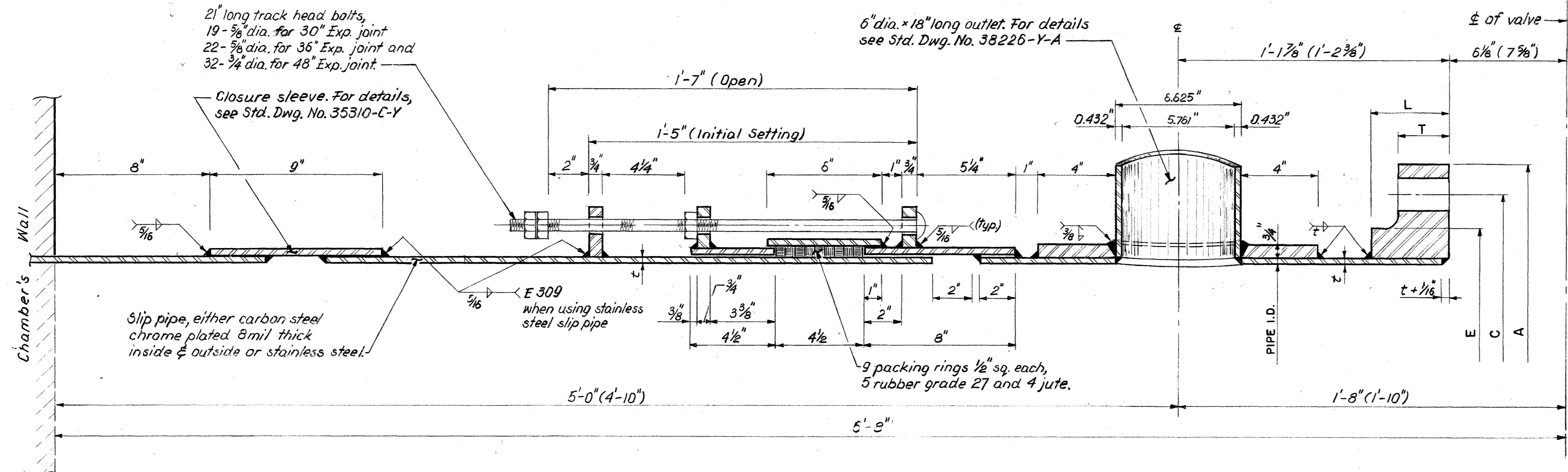
*Stephen Gymer* P.E.  
DIVISION ENGINEER

*Walter C. Fitzpatrick* P.E.  
CHIEF OF DESIGN

*Edward G. Schuler* P.E.  
DEPUTY DIRECTOR

NO.	DATE	REVISIONS	DIV. ENG.	CH. OF DES.	DEP DIR.
1	02-10-87	ADDED TABLE B & NOTE 9	<i>J. Butler</i>	<i>WCF</i>	<i>eco</i>





**NOTES:**

1. Dimension shown between ( ) apply only for 48" dia. expansion joint.
2. Flanges for expansion joints shall be hub flanges, welded front and back with fillet weld size equal to pipe thickness (t). Steel for flanges shall conform to Section 15 Part I of N.Y.C. Specification for "Furnishing, Delivering and Laying Steel Pipe and Appurtenances" latest revision.
3. Flange dimensions shall conform to AWWA Standard ANSI/AWWA C-207-86 for steel hub flanges Class E. (See Table)
4. Bolts and washers for flanges and track head bolts shall be stainless steel type 304 and meet the requirements of ASTM Designation A193-88, Grade B8A, Class 1A; nuts shall be stainless steel type 303 and meet the requirements of ASTM Designation A194-88, Grade 8FA.
5. All welded lap joints shall be air tested. After testing, test holes shall be plugged, ground flush and properly coated.
6. Expansion joint shall be shipped and installed at initial setting (mid position).
7. Except slip pipe, all internal and external surfaces of expansion joint shall be coated with two coats of an NSF approved material submitted for approval.
8. Detailed shop drawings for expansion joints, furnished for each contract, shall be submitted for approval before fabrication.

NO.	DATE	REVISIONS	SECTION CHIEF	CHIEF OF DESIGN	DEPUTY DIRECTOR

PIPE I.D. IN.	O.D. OF FLANGE (A) IN.	NUMBER OF BOLTS	DIAM. OF BOLT CIRCLE (C) IN.	DIAM. OF BOLTS IN.	DIAM. OF BOLT HOLES IN.	FLANGE DIMENSIONS IN.		
						(T)	(L)	(E)
30	38 3/4	28	36	1/4	1/2	2 1/4	3 1/2	32 3/4
36	46	32	42 3/4	1/2	1 3/4	2 3/8	3 3/4	39 1/4
48	59 1/2	44	56	1/2	1 3/4	2 3/4	4 1/8	52 1/4

CITY OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER SUPPLY AND WASTEWATER COLLECTION

**EXPANSION JOINT  
FOR  
30", 36" AND 48" DIA. BUTTERFLY VALVES**

NOT TO SCALE  
MAY, 1993

DRAWN: K.K.  
CHECKED: A.S.

*Dominic R. Butler* P.E.  
SECTION CHIEF, WATER MAINS DESIGN

*Dominic R. Butler* P.E.  
actg DEPUTY CHIEF OF DESIGN

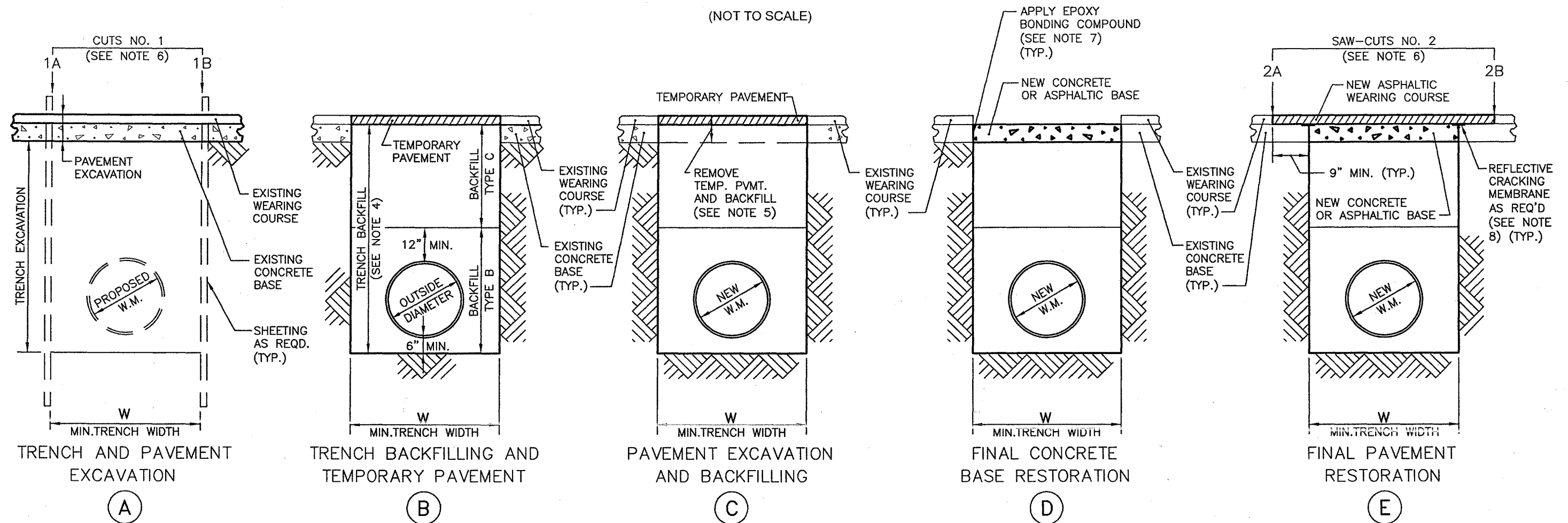
*Michael P. Reenan* P.E.  
CHIEF OF DESIGN

*Max E. ...* P.E.  
DEPUTY DIRECTOR



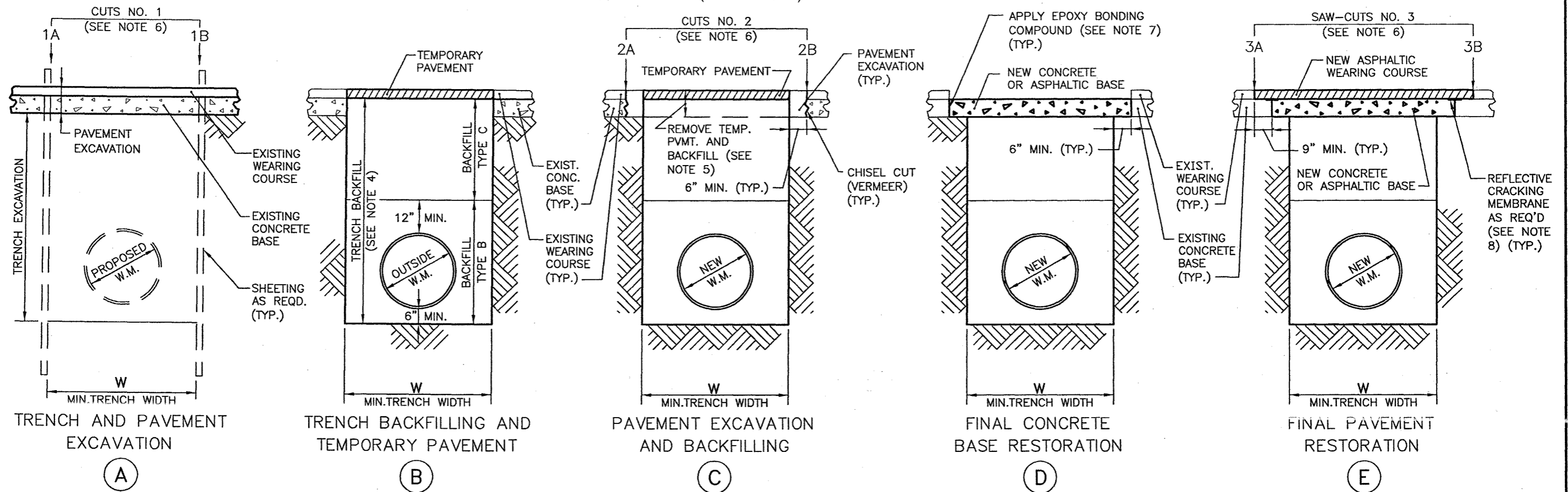
CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
**PAVEMENT EXCAVATION LIMITS FOR  
PERMANENT RESTORATION IN STREETS  
NOT PROTECTED BY N.Y.C. ADM. CODE § 19.144**  
WATER MAINS 20" AND LESS IN DIAMETER

(NOT TO SCALE)

**NOTES:**

- (1) ALL BACKFILL MATERIALS AND METHODS OF COMPACTION SHALL COMPLY WITH THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS OF THE DIVISION OF INFRASTRUCTURE, DEPARTMENT OF DESIGN AND CONSTRUCTION.
- (2) BROKEN STONE BASE OR OTHER SUPPORT UNDER PIPE, AND FILTER FABRIC, INSTALLATION OF WHICH MAY BE REQUIRED, ARE NOT SHOWN.
- (3) THE MINIMUM WIDTH OF TRENCH (W), GOVERNING THE WIDTH OF PAVEMENT EXCAVATION AND REPLACEMENT, IS SPECIFIED IN SECTION 5.02 OF THE STANDARD WATER MAIN SPECIFICATIONS. HOWEVER, WHEN THE BASE PAVEMENT IS UNDERCUT, THE BASE PAVEMENT SHALL BE REMOVED AND ADJUSTED ACCORDINGLY TO ELIMINATE ALL UNDERCUTTING.
- (4) FOR ADDITIONAL INFORMATION ON BACKFILLING TRENCHES AND DESCRIPTION OF BACKFILL TYPES "B" AND "C", SEE SECTION 4.06 OF THE STANDARD WATER MAIN SPECIFICATIONS.
- (5) THERE WILL BE NO ADDITIONAL PAYMENT FOR THE REMOVAL OF TEMPORARY PAVEMENT AND THE BACKFILLING TO THE BOTTOM OF NEW CONCRETE BASE, BUT PAYMENT THEREOF SHALL BE DEEMED INCLUDED IN THE PRICES BID FOR OTHER ITEMS.
- (6) NO PAYMENT FOR CUT NOS. 1 AND 2 THE COSTS THEREOF SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS
- (7) EXPOSED CONCRETE EDGES SHALL BE CLEANED AND COATED WITH AN APPROVED EPOXY BONDING COMPOUND.
- (8) REFLECTIVE CRACKING MEMBRANE SHALL BE PLACED OVER JOINT BETWEEN NEWLY PLACED AND EXISTING CONCRETE BASES AND OVER ALL TRANSVERSE JOINTS OR CRACKS THAT CARRY THROUGH.
- (9) ALL SAW-CUT EDGES OF EXISTING ASPHALT PAVEMENT SHALL BE COATED WITH AN APPROVED ASPHALTIC TACK COAT NOT MORE THAN THREE (3) HOURS PRIOR TO THE RESTORATION OF THE WEARING COURSE.
- (10) FOR DETAILS OF REPLACING PAVEMENTS AND FOUNDATIONS, SEE SECTION 5.33 OF THE STANDARD WATER MAIN SPECIFICATIONS.
- (11) THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47343-Z.

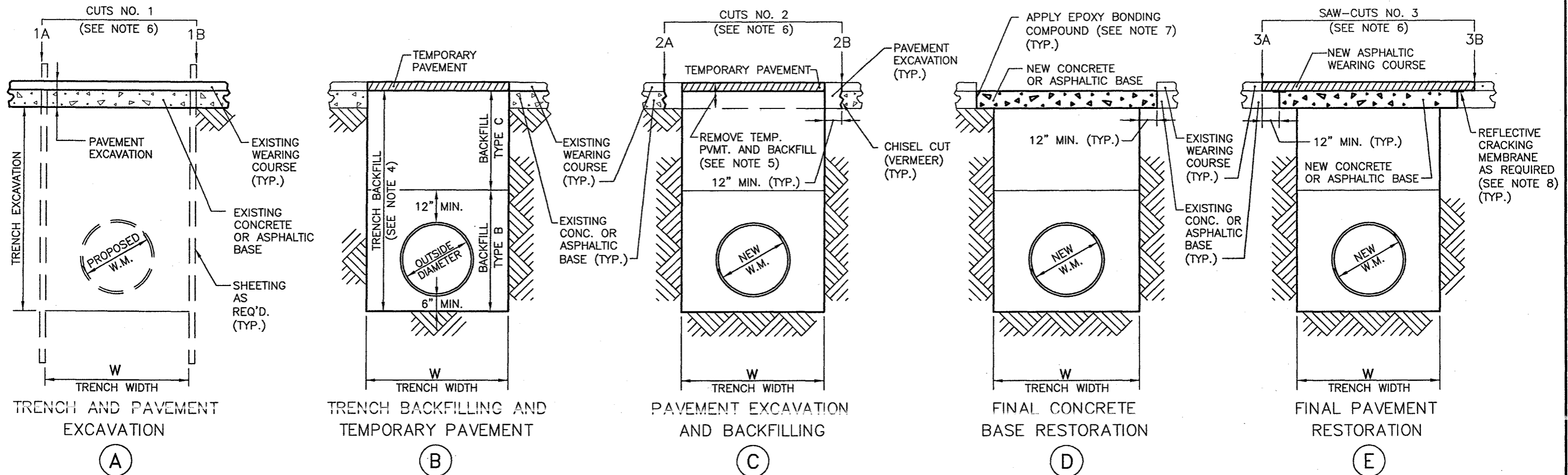
CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
**PAVEMENT EXCAVATION LIMITS FOR  
PERMANENT RESTORATION IN STREETS  
PROTECTED BY N.Y.C. ADM. CODE § 19.144**  
WATER MAINS 20" AND LESS IN DIAMETER  
(NOT TO SCALE)



## NOTES:

- (1) ALL BACKFILL MATERIALS AND METHODS OF COMPACTION SHALL COMPLY WITH THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS OF THE DIVISION OF INFRASTRUCTURE, DEPARTMENT OF DESIGN AND CONSTRUCTION.
- (2) BROKEN STONE BASE OR OTHER SUPPORT UNDER PIPE, AND FILTER FABRIC, INSTALLATION OF WHICH MAY BE REQUIRED, ARE NOT SHOWN.
- (3) THE MINIMUM WIDTH OF TRENCH (W), GOVERNING THE WIDTH OF PAVEMENT EXCAVATION AND REPLACEMENT, IS SPECIFIED IN SECTION 5.02 OF THE STANDARD WATER MAIN SPECIFICATIONS. HOWEVER, WHEN THE BASE PAVEMENT IS UNDERCUT, THE BASE PAVEMENT SHALL BE REMOVED AND ADJUSTED ACCORDINGLY TO ELIMINATE ALL UNDERCUTTING.
- (4) FOR ADDITIONAL INFORMATION ON BACKFILLING TRENCHES AND DESCRIPTION OF BACKFILL TYPES "B" AND "C", SEE SECTION 4.06 OF THE STANDARD WATER MAIN SPECIFICATIONS.
- (5) THERE WILL BE NO ADDITIONAL PAYMENT FOR THE REMOVAL OF TEMPORARY PAVEMENT AND THE BACKFILLING TO THE BOTTOM OF NEW CONCRETE BASE, BUT PAYMENT THEREOF SHALL BE DEEMED INCLUDED IN THE PRICES BID FOR OTHER ITEMS.
- (6) NO PAYMENT FOR CUT NOS. 1 AND 3. THE COSTS THEREOF SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS. CUT NO 2 SHALL BE PAID FOR UNDER THE PAY ITEM OF "SAW-CUTTING PAVEMENT".
- (7) EXPOSED CONCRETE EDGES SHALL BE CLEANED AND COATED WITH AN APPROVED EPOXY BONDING COMPOUND.
- (8) REFLECTIVE CRACKING MEMBRANE SHALL BE PLACED OVER JOINT BETWEEN NEWLY PLACED AND EXISTING CONCRETE BASES AND OVER ALL TRANSVERSE JOINTS OR CRACKS THAT CARRY THROUGH.
- (9) ALL SAW-CUT EDGES OF EXISTING ASPHALT PAVEMENT SHALL BE COATED WITH AN APPROVED ASPHALTIC TACK COAT NOT MORE THAN THREE (3) HOURS PRIOR TO THE RESTORATION OF THE WEARING COURSE.
- (10) FOR DETAILS OF REPLACING PAVEMENTS AND FOUNDATIONS, SEE SECTION 5.33 OF THE STANDARD WATER MAIN SPECIFICATIONS.
- (11) THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47321-A-Z.

CITY OF NEW YORK  
DEPARTMENT OF DESIGN AND CONSTRUCTION  
**PAVEMENT EXCAVATION LIMITS FOR  
PERMANENT RESTORATION**  
WATER MAINS 24" AND LARGER IN DIAMETER  
(NOT TO SCALE)

**NOTES:**

- (1) ALL BACKFILL MATERIALS AND METHODS OF COMPACTION SHALL COMPLY WITH THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS OF THE DIVISION OF INFRASTRUCTURE, DEPARTMENT OF DESIGN AND CONSTRUCTION.
- (2) BROKEN STONE BASE OR OTHER SUPPORT UNDER PIPE, AND FILTER FABRIC, INSTALLATION OF WHICH MAY BE REQUIRED, ARE NOT SHOWN.
- (3) THE MINIMUM WIDTH OF TRENCH (W), GOVERNING THE WIDTH OF PAVEMENT EXCAVATION AND REPLACEMENT, IS SPECIFIED IN SECTION 5.02 OF THE STANDARD WATER MAIN SPECIFICATIONS. HOWEVER, WHEN THE BASE PAVEMENT IS UNDERCUT, THE BASE PAVEMENT SHALL BE REMOVED AND ADJUSTED ACCORDINGLY TO ELIMINATE ALL UNDERCUTTING.
- (4) FOR ADDITIONAL INFORMATION ON BACKFILLING TRENCHES AND DESCRIPTION OF BACKFILL TYPES "B" AND "C", SEE SECTION 4.06 OF THE STANDARD WATER MAIN SPECIFICATIONS.
- (5) THERE WILL BE NO ADDITIONAL PAYMENT FOR THE REMOVAL OF TEMPORARY PAVEMENT AND THE BACKFILLING TO THE BOTTOM OF NEW CONCRETE BASE, BUT PAYMENT THEREOF SHALL BE DEEMED INCLUDED IN THE PRICES BID FOR OTHER ITEMS.
- (6) NO PAYMENT FOR CUT NOS. 1, 2 AND 3. THE COSTS THEREOF SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.
- (7) EXPOSED CONCRETE EDGES SHALL BE CLEANED AND COATED WITH AN APPROVED EPOXY BONDING COMPOUND.
- (8) REFLECTIVE CRACKING MEMBRANE SHALL BE PLACED OVER JOINT BETWEEN NEWLY PLACED AND EXISTING CONCRETE BASES AND OVER ALL TRANSVERSE JOINTS OR CRACKS THAT CARRY THROUGH.
- (9) ALL SAW-CUT EDGES OF EXISTING ASPHALT PAVEMENT SHALL BE COATED WITH AN APPROVED ASPHALTIC TACK COAT NOT MORE THAN THREE (3) HOURS PRIOR TO THE RESTORATION OF THE WEARING COURSE.
- (10) FOR DETAILS OF REPLACING PAVEMENTS AND FOUNDATIONS, SEE SECTION 5.33 OF THE STANDARD WATER MAIN SPECIFICATIONS.
- (11) THIS STANDARD SUPERSEDES DEP STANDARD DRAWING NO. 47321-A-Z.