

# STANDARD CONSTRUCTION DETAILS

Borough of Chambersburg  
100 South Second Street, Chambersburg, PA 17201  
(717) 264-5151

All excavations must have a signed excavation permit issued by the Borough of Chambersburg.

All Blacktop areas must be saw cut before excavation begins. If saw cut becomes broken or ragged during construction it must be re-sawed before final restoration.

#### Bedding / Backfill

Stone bedding 6" under and 12" over all sewer and water mains.  
Sand bedding for copper service requires 6" under and 6" over.

Fill under roadways – see specs and general conditions for construction of streets in the Borough of Chambersburg. Obtain these specs from engineering or public works director.

Fill under sidewalks – 2A aggregate compacted in 12" layers

Fill in soil areas – select materials, free of topsoil, frozen or moisture saturated soil or stone. No material larger than 4" in diameter. Top soil no less than 4" deep used for final grade.

#### Blocking

Pressurized water pipe must use mega lug gland restraints or poured concrete kickers behind all bends, elbows, tees, hydrants and end cap plugs.

#### See Details

Tying into existing manholes must be done by core drill method using a link seal to secure and seal new pipe.

Water and Sewer laterals may be laid in the same trench, but must be 5' apart from edge of pipe to edge of pipe.

Water and Sewer mains must be installed 10' apart from edge of pipe to edge of pipe.

**WATER  
SPECIFICATIONS  
AND  
DETAILS**

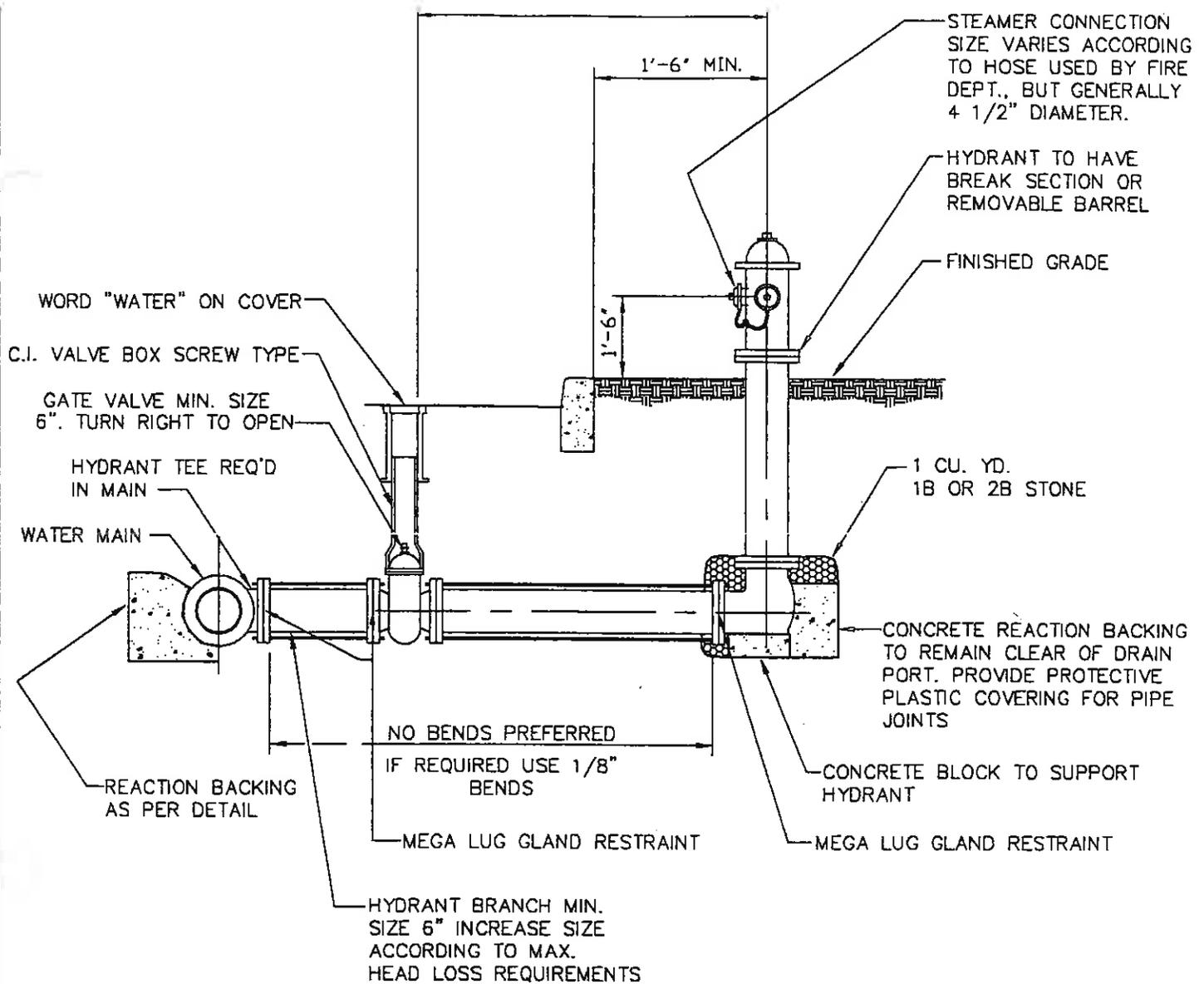
# BOROUGH OF CHAMBERSBURG

## STANDARD WATER DETAILS

### Water System Details

### Drawing No.

Fire Hydrant	W-01
Standard Blow Off	W-02
Yard Hydrant	W-03
Air Release Manhole	W-04
Horizontal Reaction Backing	W-05
Downward Thrust Block	W-06
Upward Thrust Block	W-07
Tapping Sleeve and Valve	W-08
Residential Service Line	W-09
Residential Meter Setting	W-10
Non-Residential Meter Setting	W-11
Standard Installation Metered Domestic Service	W-12
Residential Pit Meter	W-13
Service Entry Detail Domestic and Fire Service	W-14
Utility Service Placement	W-15
Pressure Test Schematic	W-16
Water Testing Requirements	W-17
Concrete Encasement & Pedestal	(Reference sanitary sewer S-19
Pipe Bedding and Envelope	details for backfilling and S-20
Trench Backfill	restoration details) S-21
Temporary Pavement Restoration	S-22
Standard Materials Lists	Appendix A



**NOTES:**

1. MAXIMUM HEAD LOSS 5 LBS. BETWEEN MAIN AND HYDRANT OUTLET FOR 750 GPM FLOW.
2. HYDRANT TO BE PLACED WITH STEAMER CONNECTION FACING STREET @ 1'-6" BEHIND FACE OF CURB OR E.O.P. (TYP.) OR CENTER BETWEEN CURB AND SIDEWALK.
3. MEGA-LUG REQUIRED AT VALVE AND AT HYDRANT.
4. MINIMUM OF 4' OF COVER OVER ALL PIPES.
5. HYDRANT TO HAVE 5 1/4" SEAT OPENING.

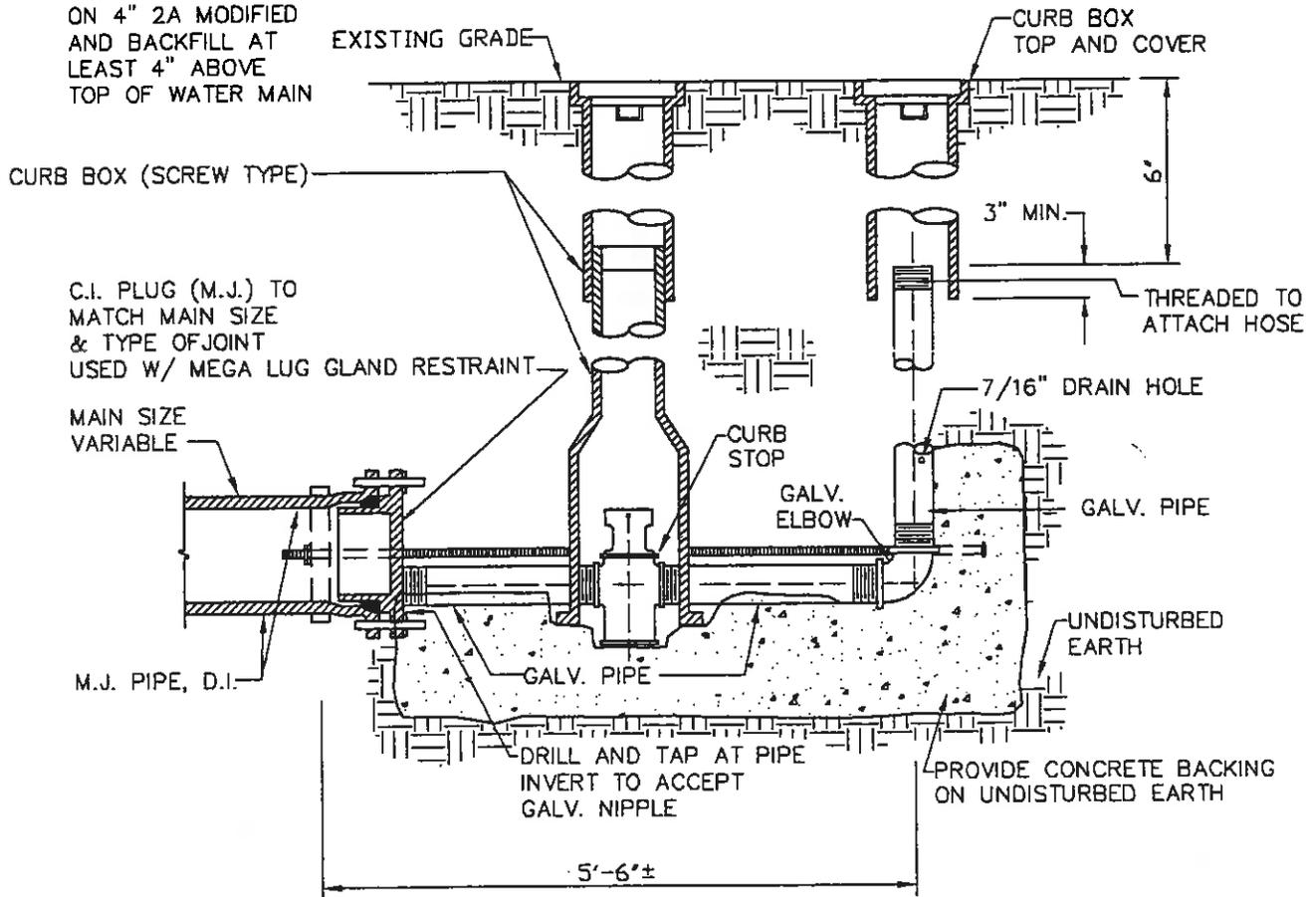
**FIRE HYDRANT DETAIL**  
NOT TO SCALE

**FIRE HYDRANT**  
PREPARED FOR:  
**BOROUGH OF CHAMBERSBURG**



DRAWN BY:	BKF
CHK BY:	ES.
DATE:	MARCH 2003
DWG NO.	CHBG-W01

NOTE:  
VALVE AND VALVE  
BOXES TO BE SET  
ON 4" 2A MODIFIED  
AND BACKFILL AT  
LEAST 4" ABOVE  
TOP OF WATER MAIN

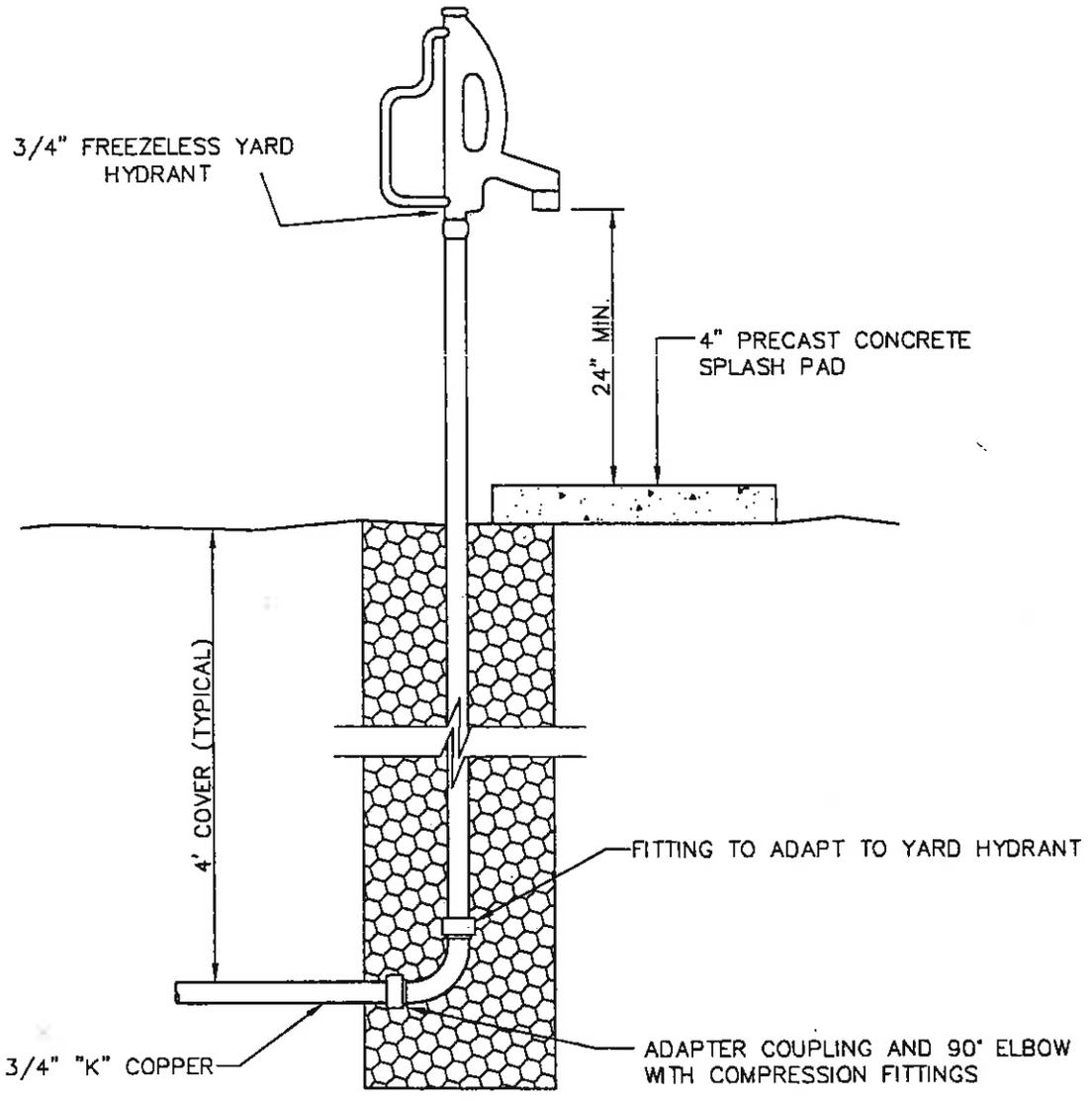


STANDARD BLOW-OFF DETAIL  
NOT TO SCALE

STANDARD BLOW-OFF  
PREPARED FOR:  
BOROUGH OF CHAMBERSBURG

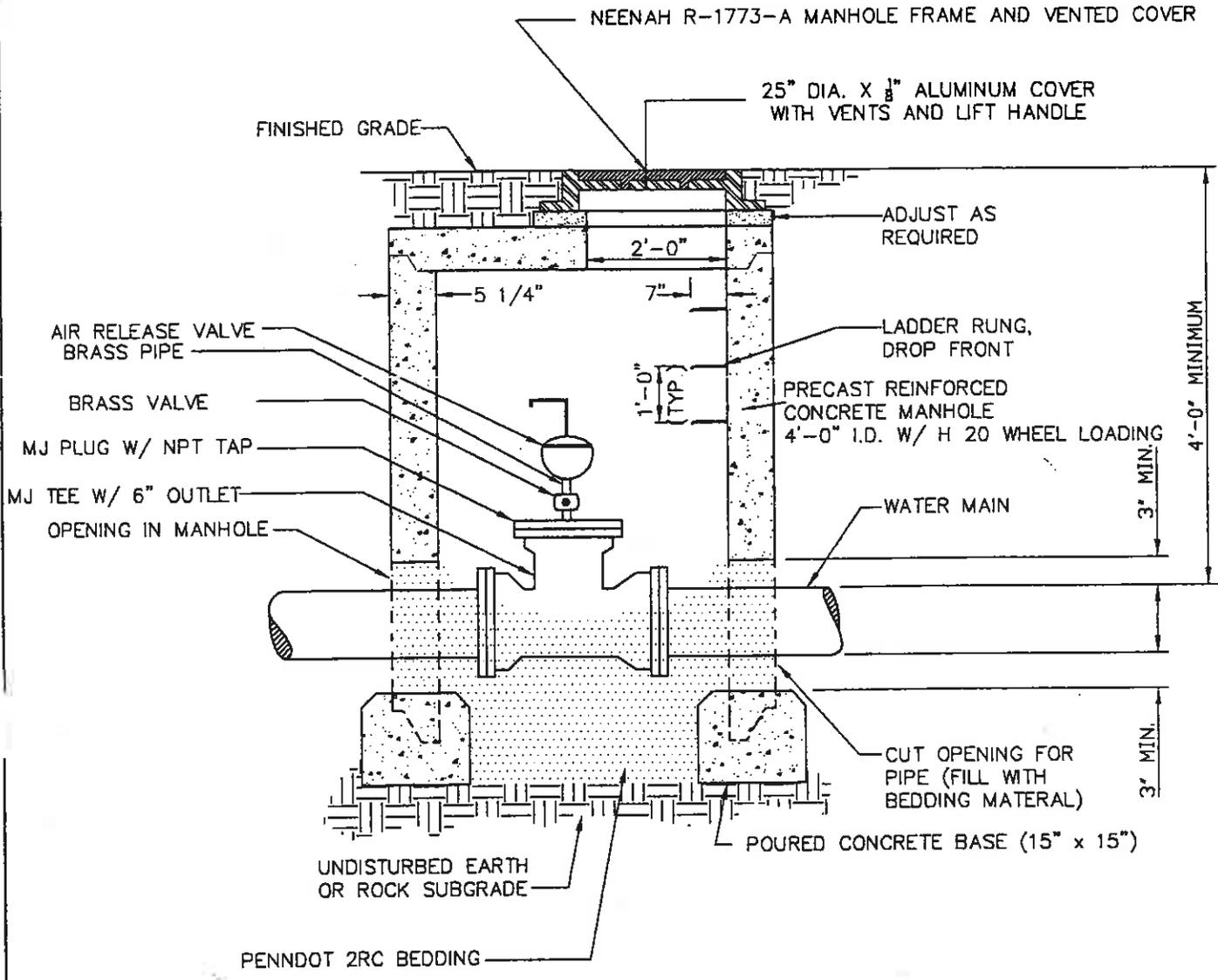


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CHK BY: <i>EL</i>
DATE: MARCH 2003
DWG NO. CHBG-W02



YARD HYDRANT DETAIL  
NOT TO SCALE

<p>YARD HYDRANT</p> <p>PREPARED FOR:</p> <p>BOROUGH OF CHAMBERSBURG</p>		DRAW BY: BKF
		CHK BY: <i>Ed.</i>
		DATE: MARCH 2003
		DWG NO. CHBG-W03

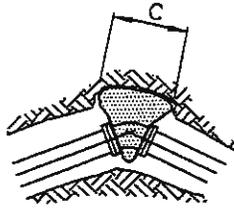


AIR RELEASE VALVE AND  
DOG HOUSE MANHOLE DETAIL  
NOT TO SCALE

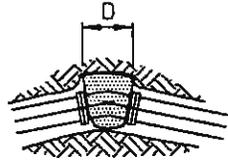
AIR RELEASE MANHOLE  
 PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



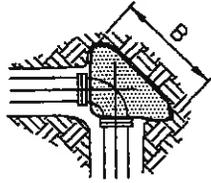
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DATE: MARCH 2003
DWG NO. CHBG-W04



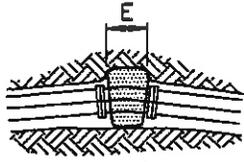
PLAN 45° BEND



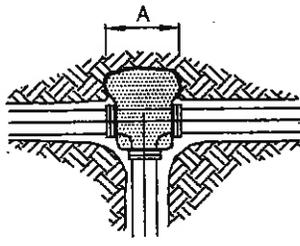
PLAN 22 1/2° BEND



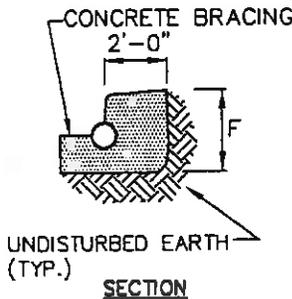
PLAN 90° BEND



PLAN 11 1/4° BEND



PLAN TEE



SECTION

NOTE: PROVIDE PLASTIC COVERING TO PROTECT PIPE JOINTS FROM CONCRETE.

DESIGN PRESSURE	PIPE DIAMETER	REACTION BACKING DIMENSIONS					
		A	B	C	D	E	F
150 PSI	16	5'-6"	7'-9"	4'-2"	2'-2"	—	3'-4"
	12	4'-2"	5'-11"	3'-3"	1'-8"	—	2'-6"
	8	3'-0"	4'-3"	2'-4"	1'-2"	—	1'-8"
	6	2'-2"	3'-4"	1'-10"	0'-11"	—	1'-3"
200 PSI	16	7'-3"	10'-3"	5'-7"	2'-10"	1'-6"	3'-4"
	12	5'-7"	7'-11"	4'-3"	2'-2"	1'-2"	2'-6"
	8	4'-0"	5'-7"	3'-1"	1'-7"	0'-10"	1'-8"
	6	3'-1"	4'-5"	2'-5"	1'-3"	0'-8"	1'-3"
250 PSI	16	9'-3"	13'-2"	7'-1"	3'-6"	2'-3"	3'-4"
	12	6'-4"	8'-11"	5'-4"	3'-5"	1'-9"	2'-6"
	8	5'-0"	6'-11"	3'-10"	1'-11"	1'-3"	1'-8"
	6	3'-10"	5'-6"	3'-9"	1'-10"	1'-1"	1'-3"

REACTION BACKING

NOT TO SCALE

HORIZONTAL REACTION BACKING

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

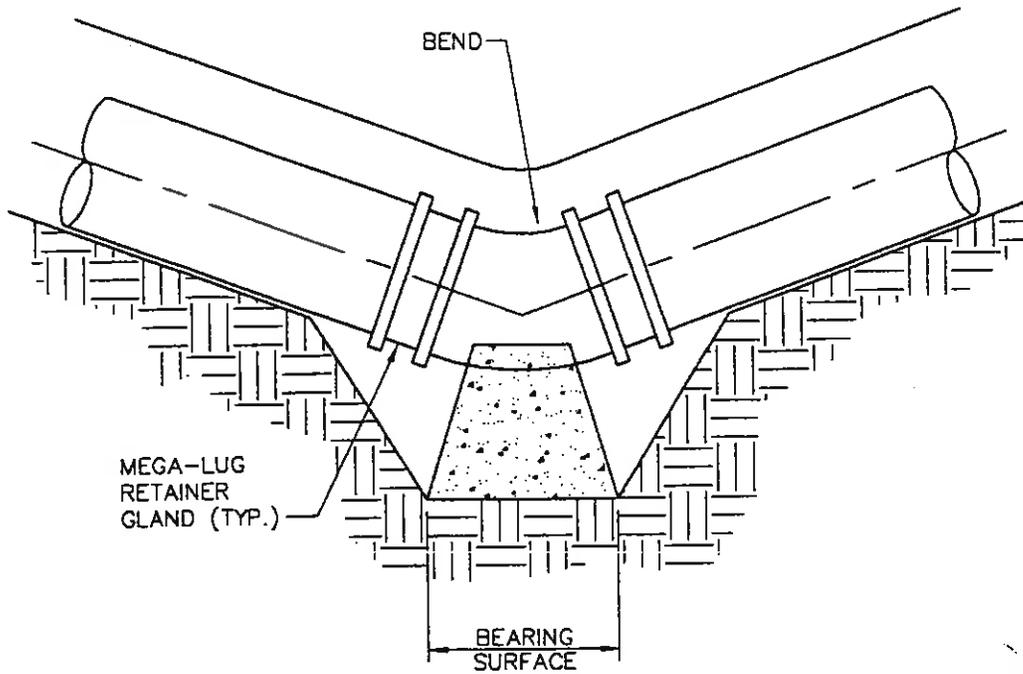


DRAWN BY: BKF

CHK BY: *EL*

DATE: MARCH 2003

DWG NO. CHBG - W05



TYPICAL SECTION  
VERTICAL THRUST DOWNWARD  
NOT TO SCALE

**NOTES:**

1. ALL CONCRETE SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 2500 P.S.I.
2. ALL FITTINGS AND JOINTS SHALL BE COVERED WITH POLYETHELENE FILM BEFORE PLACING CONCRETE.
3. PAINT ALL EXPOSED STEEL WITH TWO COATS OF VALDURA PAINT OR APPROVED EQUAL.
4. FOR THE REQUIRED BEARING SURFACE SEE STANDARD DETAIL.

BEARING SURFACE REQUIRED - SQ. FT.																
HORIZONTAL THRUST BLOCKING AND VERTICAL THRUST DOWNWARD																
100 P.S.I. WORKING PRESSURE																
PIPE SIZE	6" & 8"				10" & 12"				16" 18" 20"				24"			
	DEGREE OF BEND OR DEFLECTION															
TYPE OF BEARING MATERIAL AND ALLOWABLE LOADS	22.5°	45°	90°	D.E.	22.5°	45°	90°	D.E.	22.5°	45°	90°	D.E.	22.5°	45°	90°	D.E.
SAND 0.75 TON/SQ.FT.	3.4	6.0	11.0	6.4	6.7	12.8	23.4	14.2	14.8	28.8	52.9	34.4	26.1	48.3	89.7	64.0
SOFT CLAY 1 TON/SQ.FT.	2.6	4.6	8.2	4.8	5.0	9.6	17.5	10.7	11.2	21.7	39.7	28.2	19.6	36.3	67.3	48.0
SAND & GRAVEL 2 TON/SQ.FT.	1.3	2.3	4.1	2.4	2.5	4.8	8.8	5.3	5.6	10.8	20.0	14.1	9.8	13.1	33.6	24.0
CLAY 4 TON/SQ.FT.	1.0	1.2	2.1	1.3	1.3	2.4	4.4	2.7	2.8	5.4	10.0	7.2	4.9	9.1	16.8	12.0
SOFT ROCK 5 TON/SQ.FT.	1.0	1.0	1.6	1.0	1.0	1.9	3.5	2.2	1.6	4.4	8.0	5.7	3.9	7.3	13.5	9.6
ROCK 15 TON/SQ.FT.	-	-	1.0	0.4	-	1.0	1.2	0.8	1.0	1.4	2.6	1.9	1.3	2.4	4.5	3.2

DOWNWARD THRUST BLOCK

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

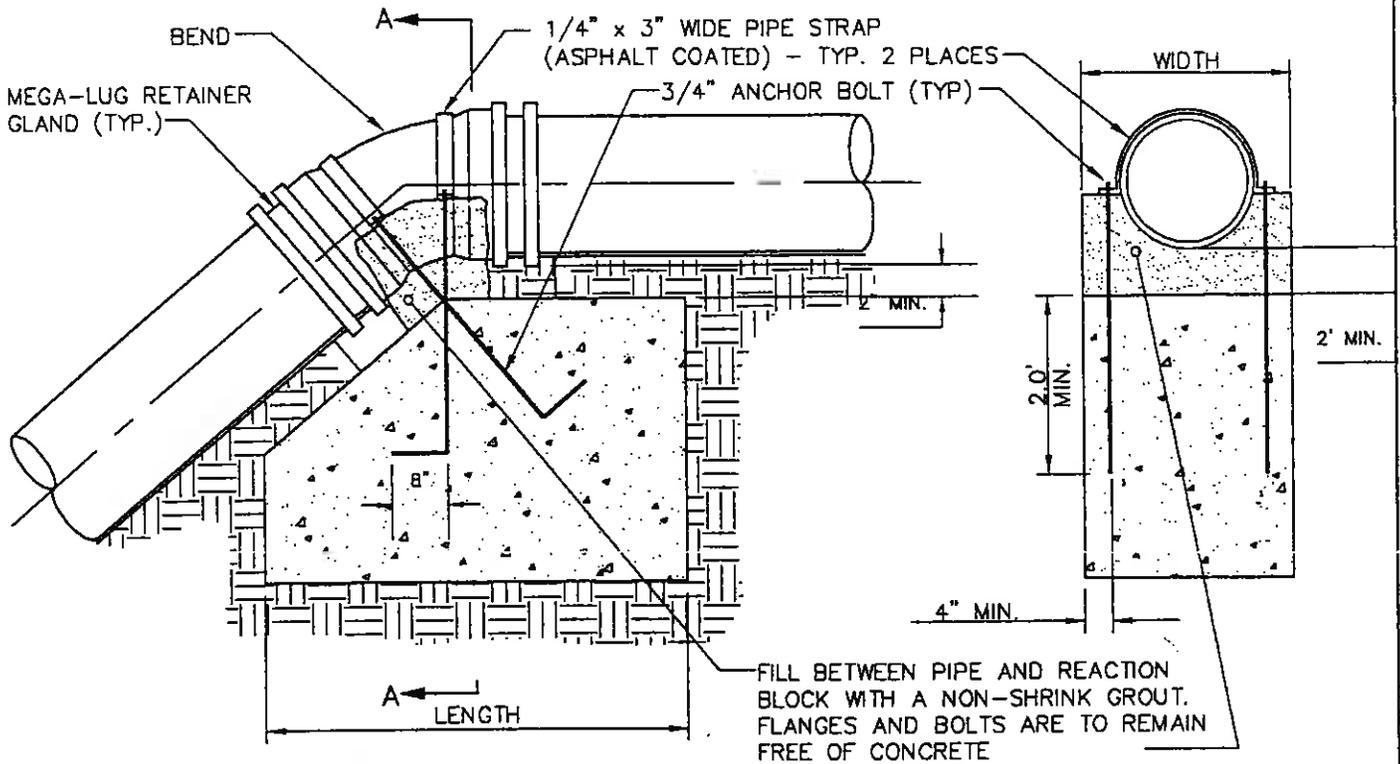


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DATE: MARCH 2003

DWG NO. CHBG-W06



**TYPICAL SECTION  
VERTICAL THRUST UPWARD**  
NOT TO SCALE

**NOTES:**

1. ALL CONCRETE SHALL BE PENNDOT CLASS A.
2. ALL REINFORCING STEEL SHALL BE DEFORMED BARS U-SHAPED AROUND PIPE.
3. ALL FITTINGS AND JOINTS SHALL BE COVERED WITH POLYETHELENE FILM BEFORE PLACING CONCRETE.
4. PAINT ALL EXPOSED STEEL WITH TWO COATS OF VALDURA PAINT OR APPROVED EQUAL.

CONCRETE BLOCKING DIMENSIONS, VERTICAL THRUST UPWARD - 100 P.S.I. WORKING PRESSURE									
PIPE SIZES	LENGTH			WIDTH			DEPTH		
	11.25'	22.25'	45'	11.25'	22.25'	45'	11.25'	22.25'	45'
6" & 8"	3'	4'	6'	3'	4'	6'	3'	4'	6'
10" & 12"	3.5'	4'	7'	3.5'	4'	7'	3.5'	4'	7'
14" & 16"	4'	6'	9'	4'	6'	9'	4'	6'	9'
18" & 20"	5'	6.5'	11.5'	5'	6.5'	11.5'	5'	6.5'	11.5'
24"	5'	9'	12.5'	5'	9'	12.5'	5'	9'	12.5'

**UPWARD THRUST BLOCK**

PREPARED FOR:

**BOROUGH OF CHAMBERSBURG**

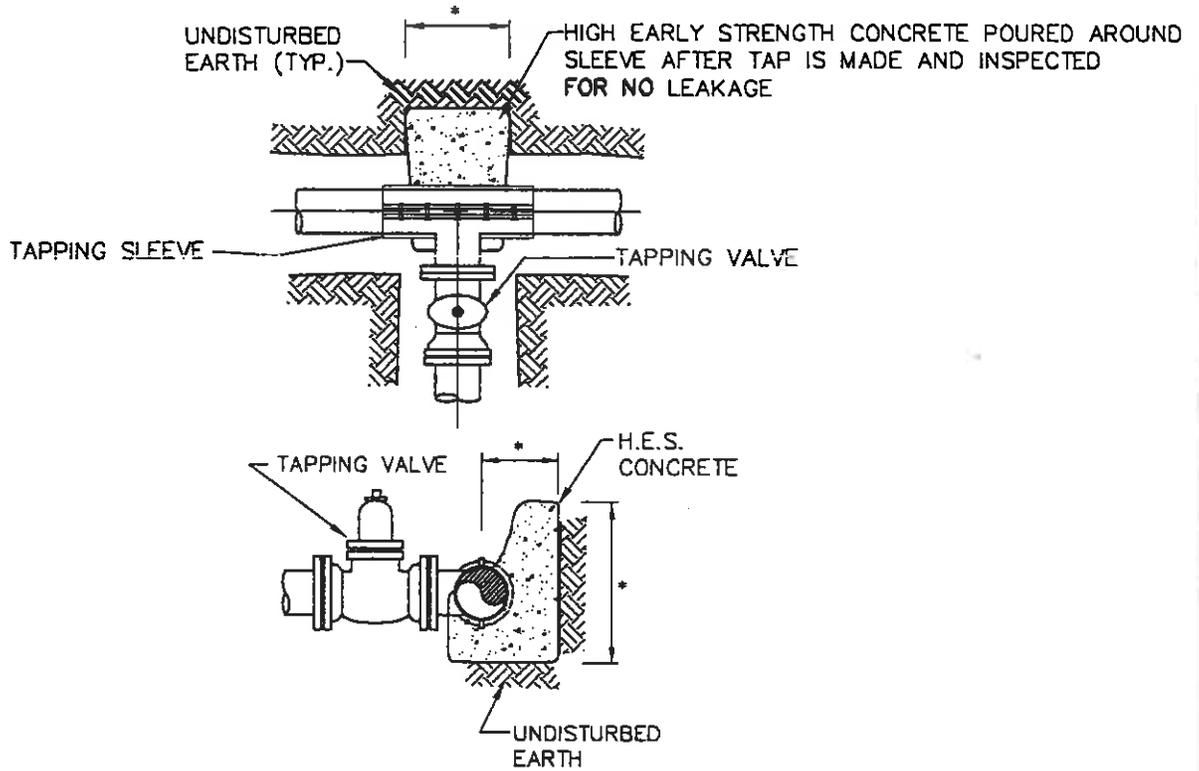


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DATE: MARCH 2003

DWG NO. CHBG-W07



SEE HORIZONTAL REACTION BACKING FOR TEE DETAIL PAGE W05

TAPPING SLEEVE & VALVE  
NOT TO SCALE

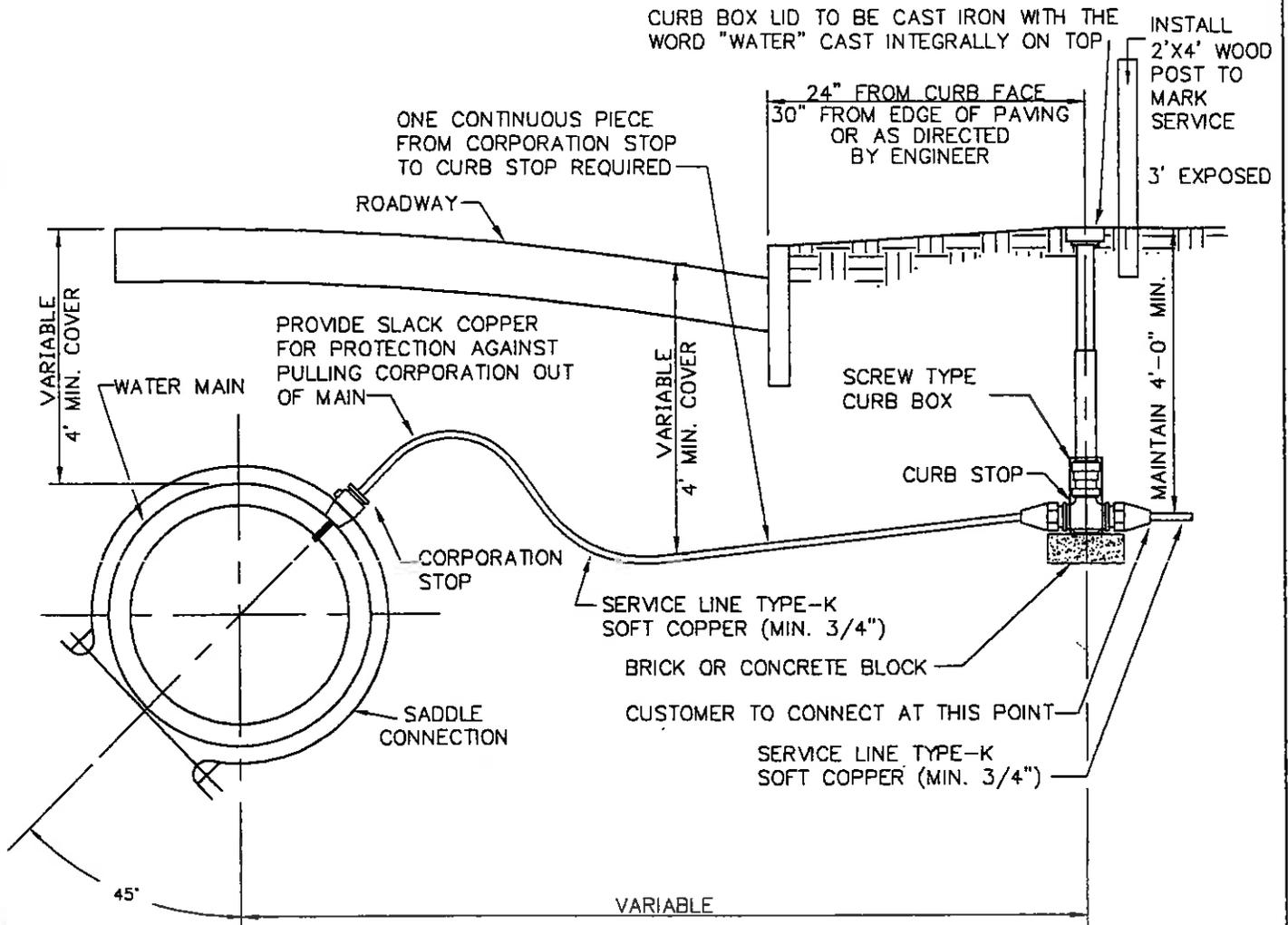
TAPPING SLEEVE & VALVE  
PREPARED FOR:  
BOROUGH OF CHAMBERSBURG



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DATE: MARCH 2003
DWG NO. CHBG-W08

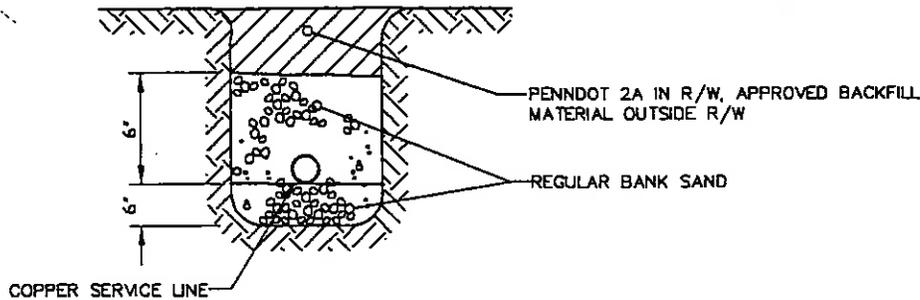
CURB BOX LID TO BE CAST IRON WITH THE WORD "WATER" CAST INTEGRALLY ON TOP

INSTALL 2'X4' WOOD POST TO MARK SERVICE  
3' EXPOSED



NOTES :

1. WET TAPPING UNDER NORMAL LINE PRESSURE IS REQUIRED.
2. CORPORATION STOPS: MUELLER OR FORD F-1000
3. CURB STOPS: MUELLER OR FORD B-44-333-6
4. CURB BOX: TYLER 93-D
5. CORPORATION STOP AND CURB STOP TO HAVE COMPRESSION FITTINGS.
6. DUCTILE PIPE MAY BE DIRECT TAPPED WITH PRIOR APPROVAL FROM WATER DEPT.



TYPICAL RESIDENTIAL SERVICE LINE CONNECTION

NOT TO SCALE

RESIDENTIAL SERVICE LINE

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

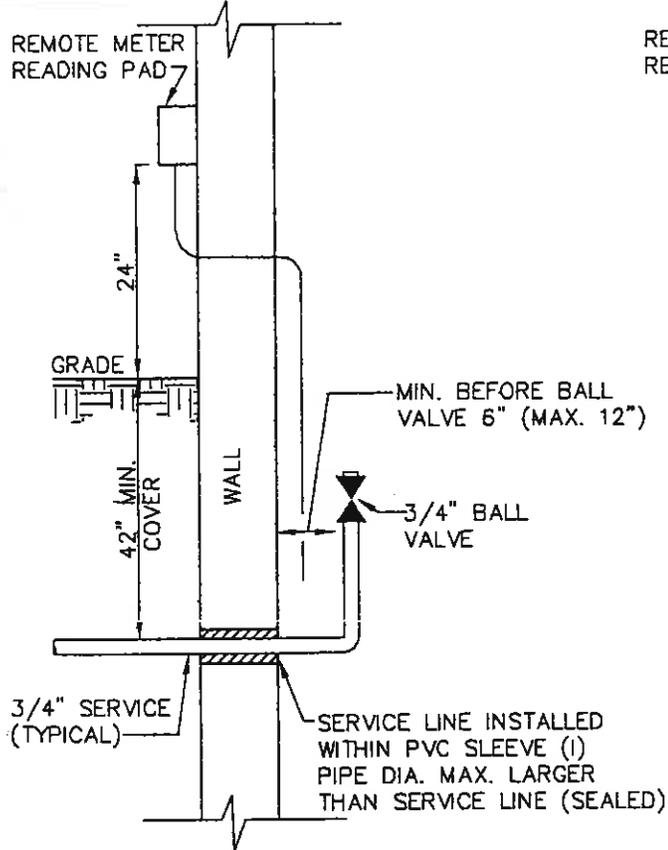


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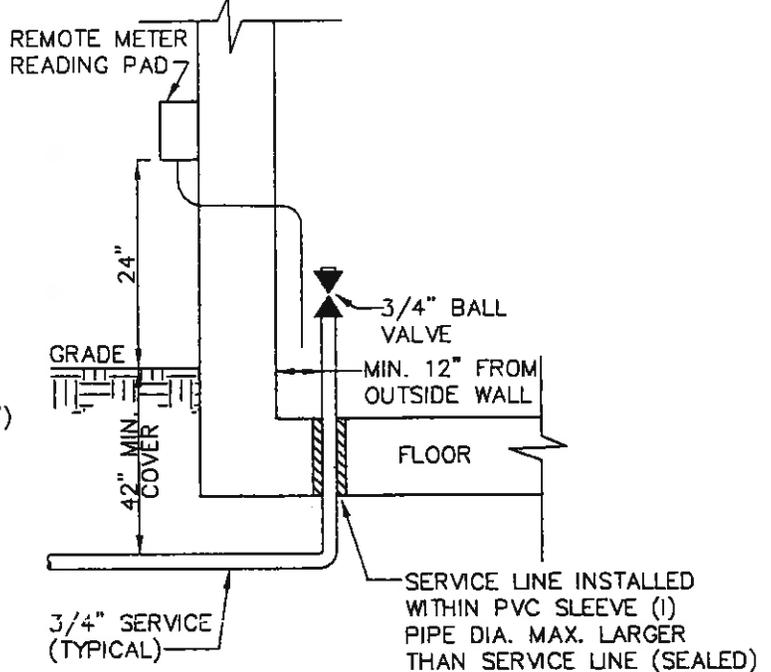
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DATE: MARCH 2003

DWG NO. CHBG-W09



**BASEMENT SERVICE**

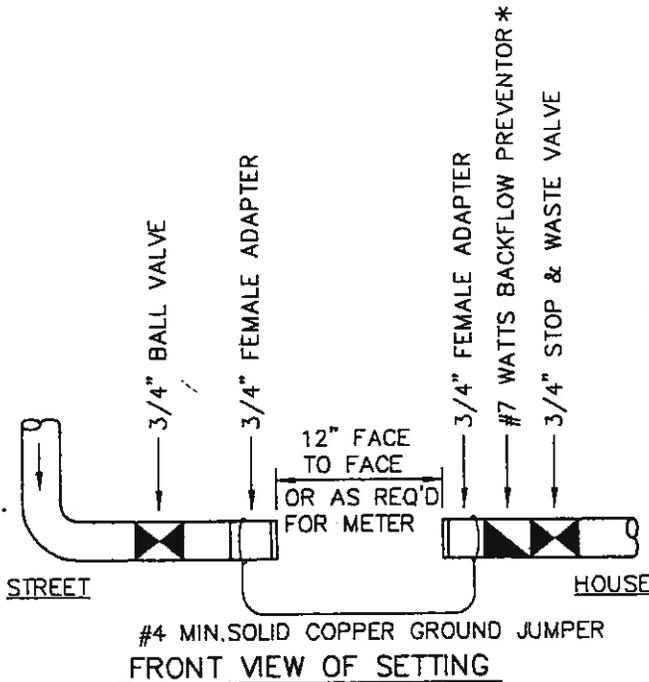


**THROUGH FLOOR SERVICE**

FOR SERVICE LINES INSTALLED IN SHEDS, THE 3/4" SERVICE SHALL BE INSTALLED THROUGH A CORE-DRILLED AND SEALED FLOOR OPENING

**GENERAL NOTES:**

1. NOTIFY BOROUGH INSPECTOR WHEN WATER SERVICE IS READY FOR INSPECTION AND TESTING. DO NOT BACKFILL ANY PORTION OF TRENCH PRIOR TO APPROVAL 24 HOURS NOTICE REQUIRED.
2. CHAMBERSBURG BOROUGH WILL SUPPLY 3/4"x5/8" SR BRONZE REMOTE TYPE METER AND REMOTE METER READING PAD.
3. METER LOCATION MUST BE APPROVED BY THE BOROUGH INSPECTOR.
4. ALL SERVICE LINES ARE TO BE K-TYPE TUBING ONLY WITH NO SWEAT JOINTS OR COUPLINGS UNDERGROUND.
- \* 5. WATTS NUMBER 7 BACKFLOW PREVENTOR WHERE REQUIRED.



**#4 MIN. SOLID COPPER GROUND JUMPER  
FRONT VIEW OF SETTING**

**RESIDENTIAL METER SETTING REQUIREMENTS**

NOT TO SCALE

**RESIDENTIAL METER SETTING REQUIREMENTS**

PREPARED FOR:  
**BOROUGH OF CHAMBERSBURG**

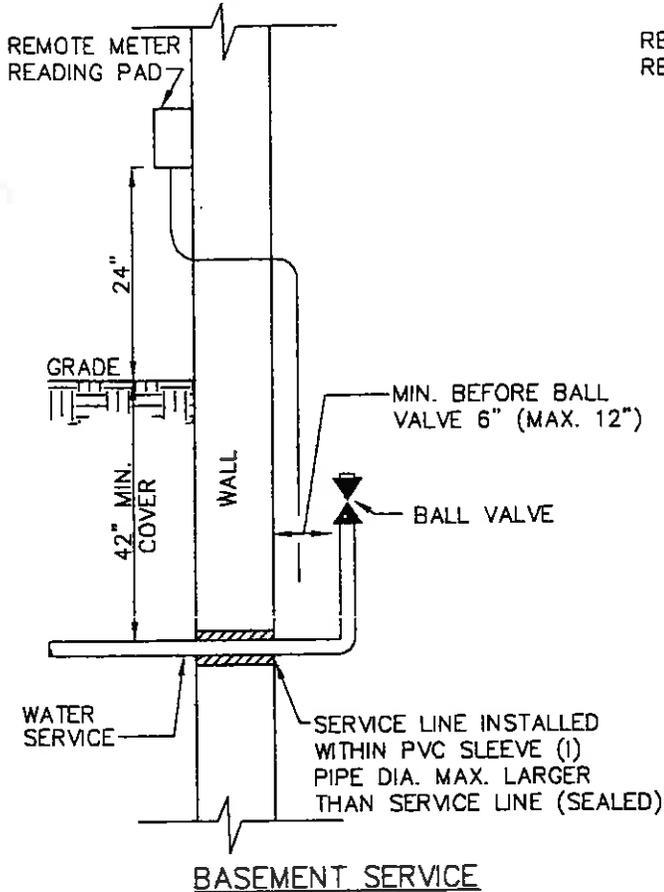


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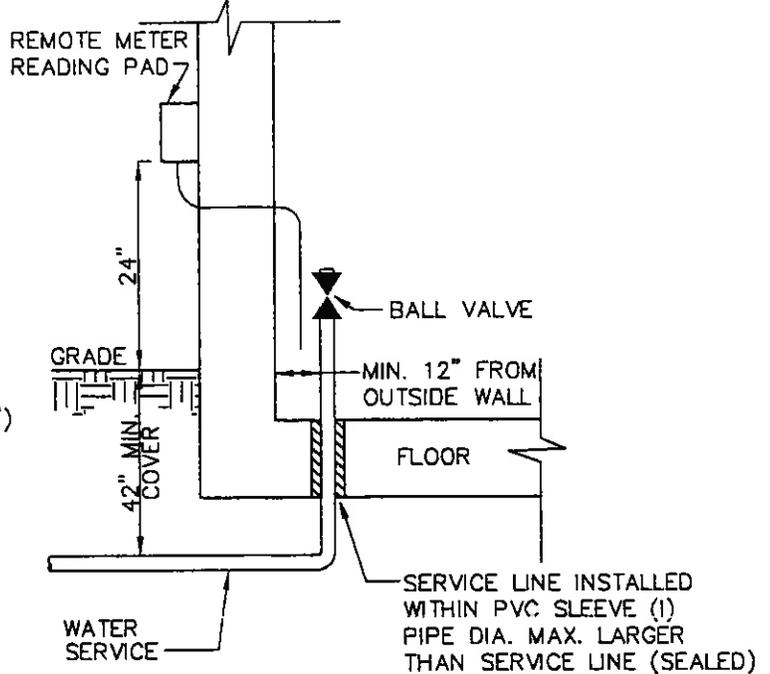
DATE: MARCH 2003

DWG NO. CHBG-W10



BASEMENT SERVICE

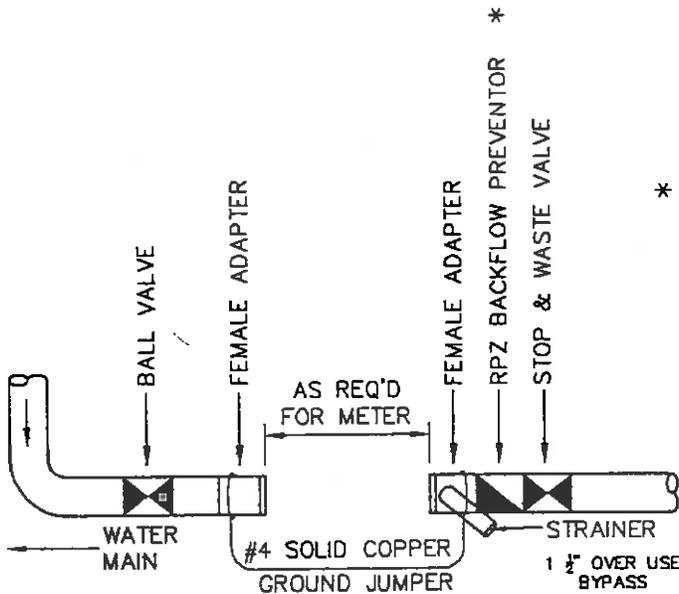
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THROUGH FLOOR SERVICE

GENERAL NOTES:

1. NOTIFY BOROUGH INSPECTOR WHEN WATER SERVICE IS READY FOR INSPECTION AND TESTING. DO NOT BACKFILL ANY PORTION OF TRENCH PRIOR TO APPROVAL.
2. CHAMBERSBURG BOROUGH WILL SUPPLY METER AND REMOTE METER READING PAD. IF UNDER 2" METER PAID FOR BY DEVELOPER.
3. METER LOCATION MUST BE APPROVED BY THE BOROUGH OF CHAMBERSBURG
4. ALL SERVICE LINES ARE TO BE K-TYPE TUBING ONLY WITH NO SWEAT JOINTS OR COUPLINGS UNDERGROUND.
- \* 5. WATTS BACKFLOW PREVENTOR REQUIRED ON ALL NON-RESIDENTIAL, MULTI-FAMILY, OR MULTI-STORY SERVICES
6. SIZE OF SERVICE AND METER TO BE APPROVED BY CHAMBERSBURG BOROUGH
7. SIZE OF VALVES, ADAPTERS, AND BACKFLOW PREVENTERS TO BE SAME AS METER SIZE.



FRONT VIEW OF SETTING

NON-RESIDENTIAL METER SETTING REQUIREMENTS

NOT TO SCALE

NON-RESIDENTIAL METER SETTING REQUIREMENTS

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

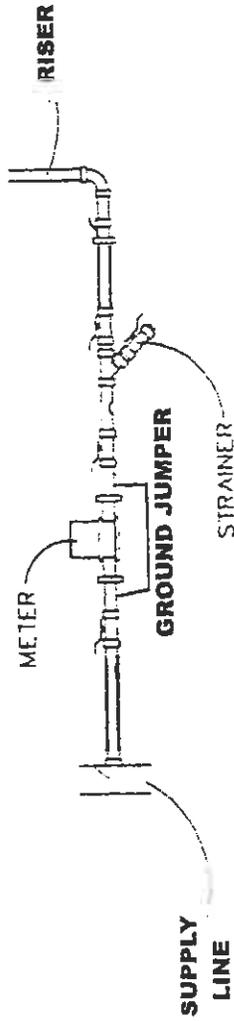


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DATE: MARCH 2003

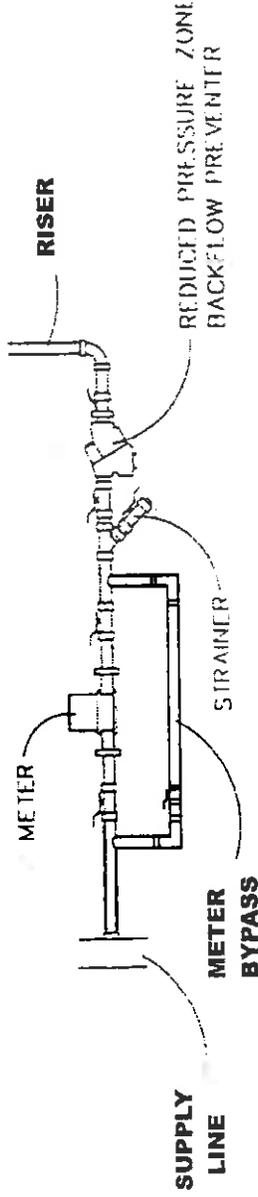
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**DOMESTIC WATER LINE DETAIL**

( 1" AND UNDER )

**ALL GROUND JUMPERS SHALL BE DESIGNED PER THE NEC.  
NORMALLY #4 SOLID COPPER IN RESIDENTIAL UNITS.**



**COMMERCIAL WATER LINE DETAIL**

( 1 1/2" AND OVER )

**STANDARD INSTALLATION  
METERED DOMESTIC SERVICE**

PREPARED FOR

**BOROUGH OF CHAMBERSBURG**

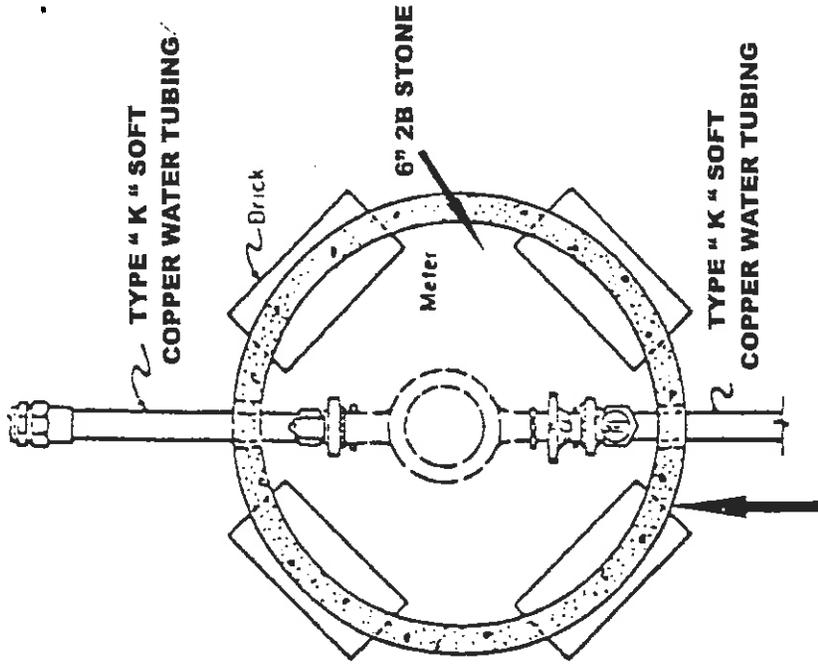


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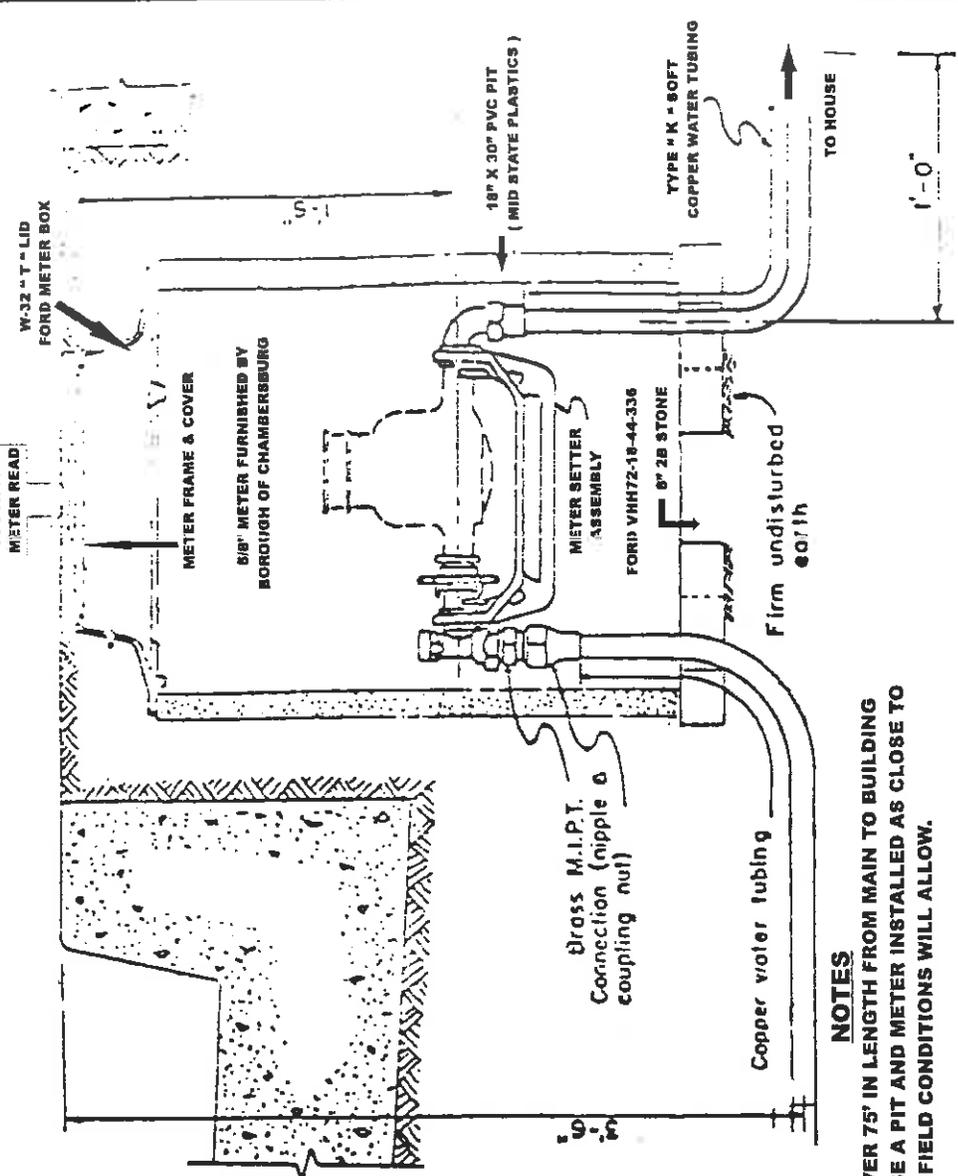
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DATE: MARCH 2003

DRG NO. CHBG- W 12



18" X 30" PVC PIT  
( MID STATE PLASTICS )



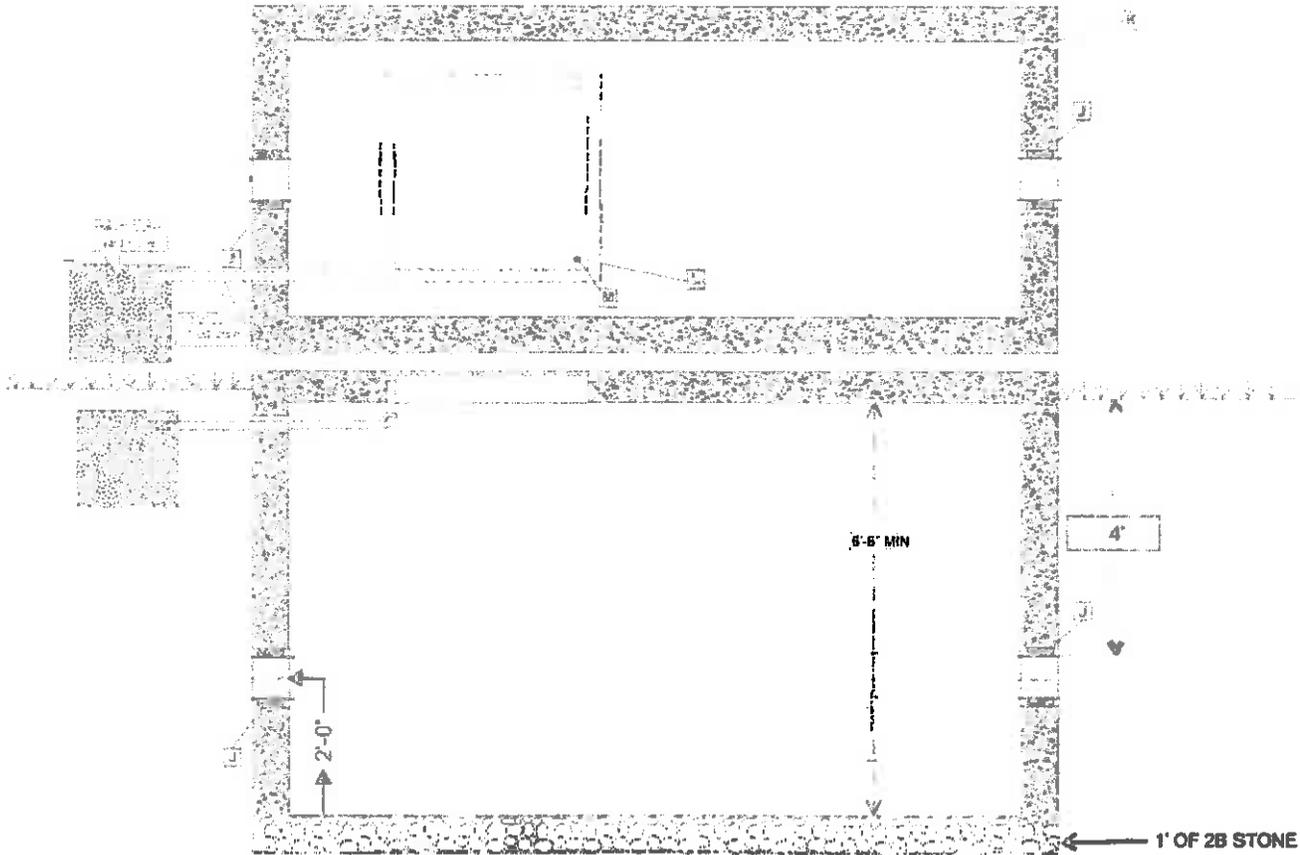
**NOTES**

1. LINES OVER 75' IN LENGTH FROM MAIN TO BUILDING MUST USE A PIT AND METER INSTALLED AS CLOSE TO MAIN AS FIELD CONDITIONS WILL ALLOW.
2. LINES 75' AND UNDER FROM MAIN TO BUILDING MUST INSTALL METER INSIDE BUILDING. LINES MUST BE TO BOROUGH SPECS WITH BOROUGH INSPECTOR ON SITE.



STANDARD INSTALLATION  
METERED DOMESTIC SERVICE  
PREPARED FOR  
BOROUGH OF CHAMBERSBURG

DRAWN BY: BKF
CHECKED BY: <i>EL</i>
DATE: MARCH 2003
DRG NO. <b>W 13</b>



**Notes:**

1. Exact location to be determined in the field.
2. Vault to be sized according to meter assembly.
3. Support stands to be shown according to assembly size.
4. 4" Lines over 75' in length from main to building must use a vault and meter installed as close to main as field conditions will allow.
5. 4" lines 75' in length and under from main to building may install fire assembly inside building . Lines must be built to boroug specs. with boroug inspector on site.

**LIST OF MATERIALS**

ID	Quan	Size	Description	Tag
J	7 ea		LS-400-C Link Seals	***
K	1 ea	5'	High inside dimension precast concrete pit	***
L	1 ea	30"	square aluminum access hatch with drain	***
M	1 ea		meter touch pad readout	***

**VAULT**

**SERVICE ENTRY DETAIL  
DOMESTIC AND FIRE SERVICE**

DWG: W14  
DRAWN: BKF



**LIST OF MATERIALS - 4"**

No.	Name	Quantity	Material
1	Invensys 4" Turbo Meter	1	Bronze
2	Strainer	1	Ductile Iron
3	Mueller Detector Check Valve	1	Cast Iron
4	Invensys 1-1/2" SR Meter	1	Bronze
5	Check Valve	1	Bronze
6	Ball Valve - Locking	2	Bronze
7	Upstream Bolts Supplied as Standard Equipment	8	Type 316 Stainless Steel
	4" Smith-Blair Flanged Coupling Adapter (Optional-Not Shown)	1	Cast Iron

**DIMENSIONS - 4"**

A	Overall Length	51.86"
B	Overall Height	17.00"
C	Center Line to Meter Base	4.75"
D	Center Line to Strainer Base	5.78"
E	Overall Width	23.00"
F	Center Line to Center Line	11.56"
G	Center Line to By-Pass Extreme	16.13"
	Flanged Coupling Adapter Length	4.56"
	By-Pass Size (nom.)	1.50"
	Weight (Lbs)	470

**FLOW RANGES AND ACCURACY LIMITS - 4"**

4"	Continuous Flows: 5 to 1000 GPM
	Intermittent Flows: 1250 GPM
	Low Flows: 1.5 GPM
	Accuracy: ±1.5% of Actual Throughput-95% at Low Flow

**LIST OF MATERIALS - 6"**

No.	Name	Quantity	Material
1	Invensys 6" Turbo Meter	1	Bronze
2	Strainer	1	Ductile Iron
3	Mueller Detector Check Valve	1	Cast Iron
4	Invensys 2" SR Meter	1	Bronze
5	Check Valve	1	Bronze
6	Ball Valve - Locking	2	Bronze
7	Upstream Bolts Supplied as Standard Equipment	8	Type 316 Stainless Steel
	6" Smith-Blair Special 913 Flanged Coupling Adapter (Optional-Not Shown)	1	Fabricated Steel

**DIMENSIONS - 6"**

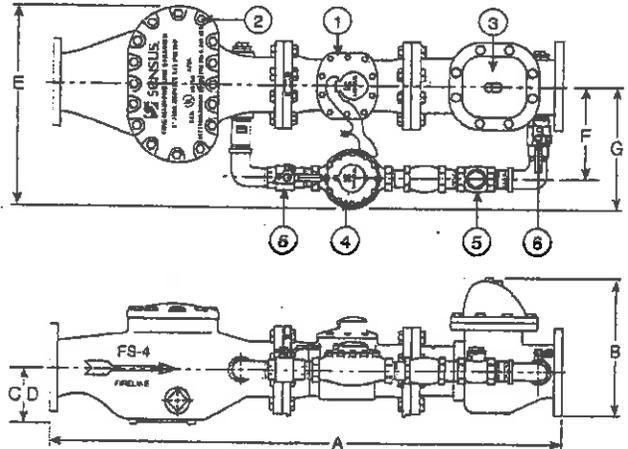
A	Overall Length	67.63"
B	Overall Height	20.63"
C	Center Line to Meter Base	5.75"
D	Center Line to Strainer Base	5.75"
E	Overall Width	27.63"
F	Center Line to Center Line	11.84"
G	Center Line to By-Pass Extreme	17.12"
	Flanged Coupling Adapter Length	5.00"
	By-Pass Size (nom.)	2.00"
	Weight (Lbs)	775

**FLOW RANGES AND ACCURACY LIMITS - 6"**

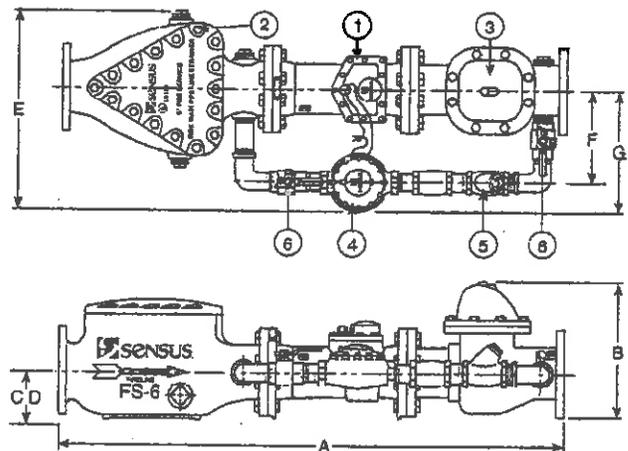
	Continuous Flows: 6 to 2000 GPM
	Intermittent Flows: 2500 GPM
	Low Flows: 2 GPM
	Accuracy: ±1.5% of Actual Throughput-95% at Low Flow

- ① Bronze gate valve optional
- ② Pipeline OD required
- ③ Except at crossover

4"



6"



4" & 6"

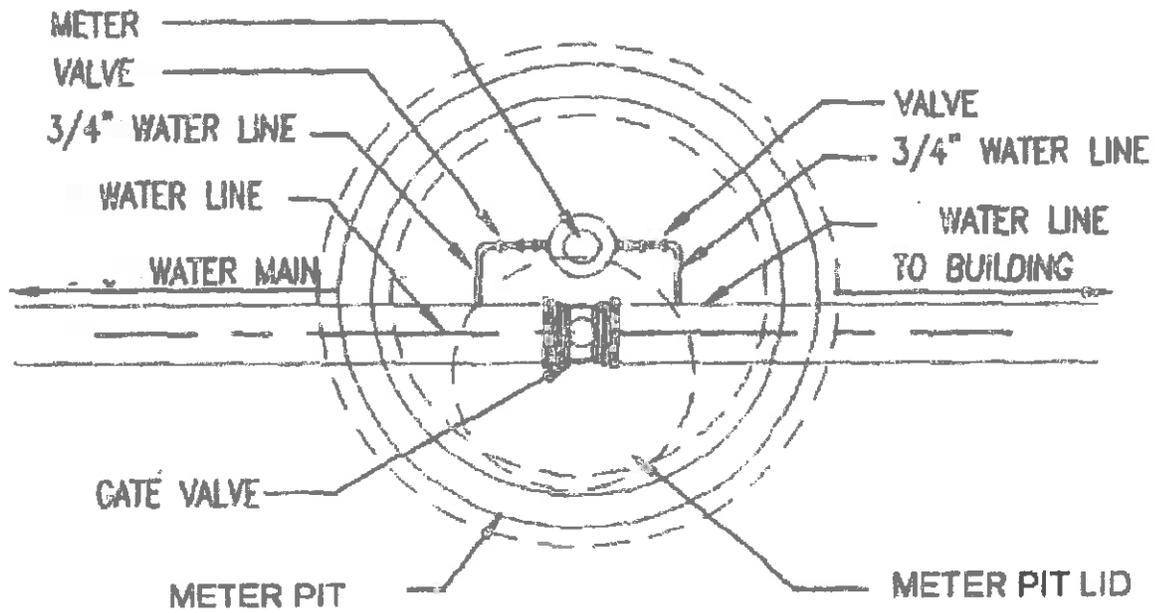
**SERVICE ENTRY DETAIL  
DOMESTIC AND FIRE SERVICE**

**NOTE:**

- 1) Meter must read in cubic feet
- 2) Double detector check valve installed on fireline inside building
- 3) RPZ to be installed on domestic line inside building.

DWG: W 14A  
DRAWN: BKF





1. LINES OVER 75' IN LENGTH FROM MAIN TO BUILDING MUST USE A PIT AND METER INSTALLED AS CLOSE TO MAIN AS FIELD CONDITIONS WILL ALLOW.

**NOTE:**

1) Meter must read in cubic feet

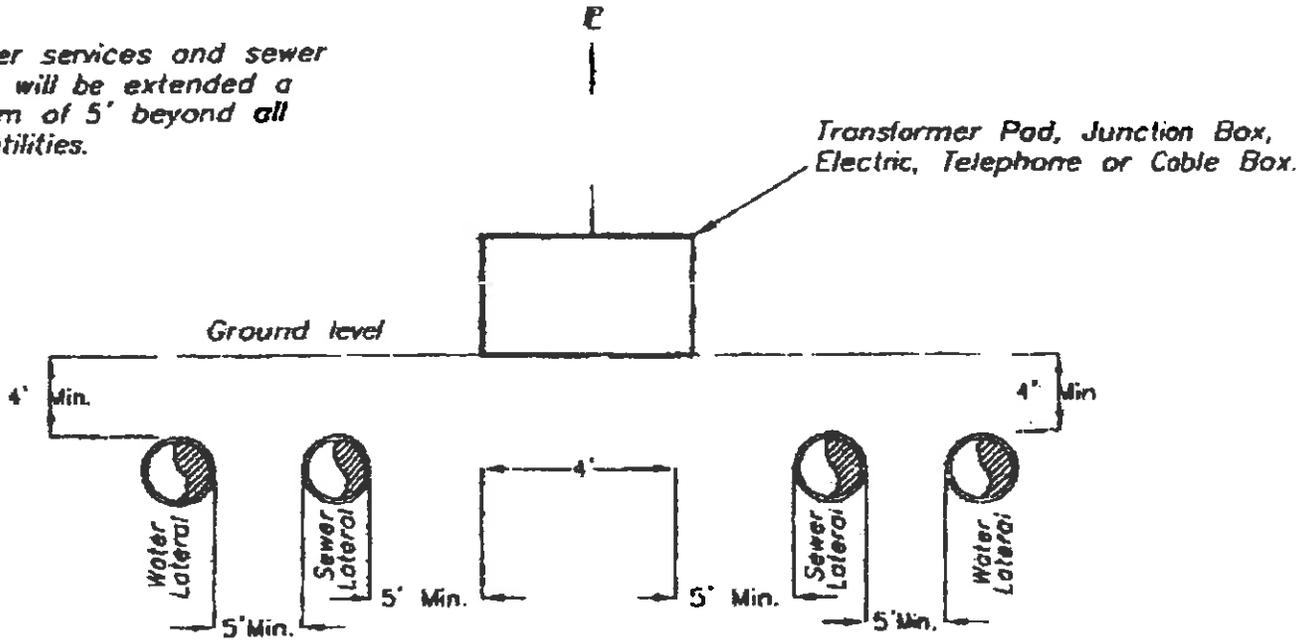
**3/4" WATER LEAK DETECTION  
METER DETAIL**

DWG: W 14B  
DRAWN: BKF



: All water services and sewer laterals shall be located a minimum of 5' away from the electric, telephone, cable or any other utility appurtenance

NOTE: All water services and sewer laterals will be extended a minimum of 5' beyond all other utilities.

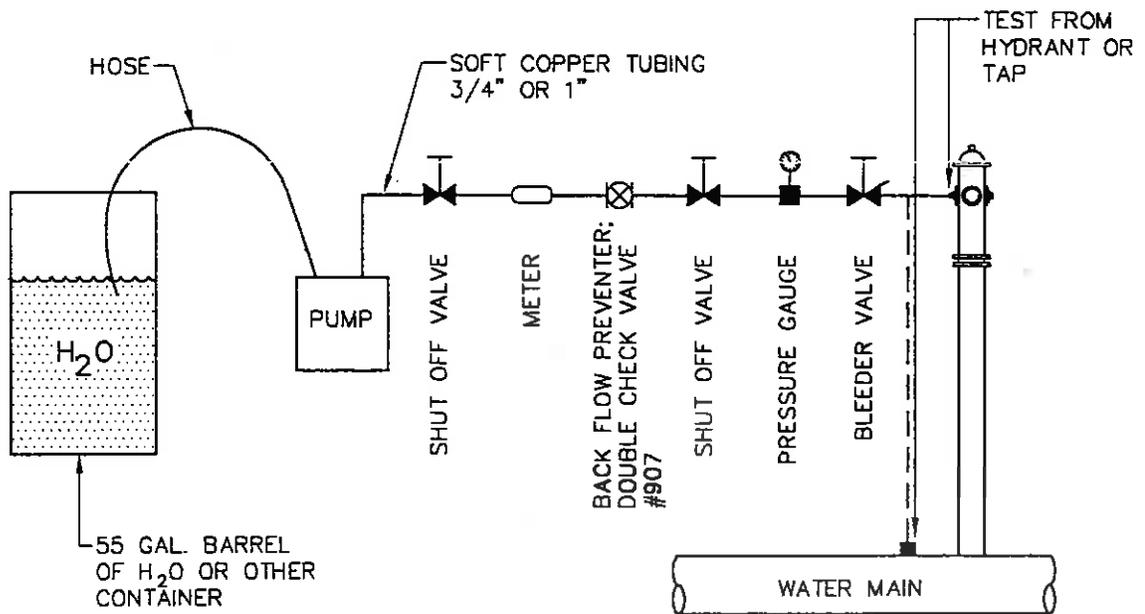


**UTILITY SERVICE HORIZONTAL SEPARATION DETAIL**

No Scale

- NOTE: 1. Each residential unit shall have a separate sewer and water service per unit.  
 2. Each sewer and water service shall have a minimum of 5' horizontal separation.  
 3. The sewer main and water main shall have at least 10' horizontal separation.  
 4. All electric vaults and pedestals shall have 5' horizontal separation from the sewer and water services.

UTILITY SERVICE PLACEMENT PREPARED FOR: BOROUGH OF CHAMBERSBURG		DRAWN BY: BKF
		CHK BY: <i>EL</i>
		DATE: MARCH 2003
		DWG NO. CHBG-W-15



## HYDROSTATIC PRESSURE TEST CONFIGURATION

NOT TO SCALE

**NOTES:**

1. ALL TESTING EQUIPMENT AND FITTINGS MUST BE DISINFECTED IN ACCORDANCE WITH ANSI/AWWA STANDARD C 651-92
2. ALL WATER MAINS SHALL BE PRESSURE TESTED AND LEAKAGE TESTED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA'S STANDARD C-600

PRESSURE TEST SCHEMATIC

PREPARED FOR:

BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF

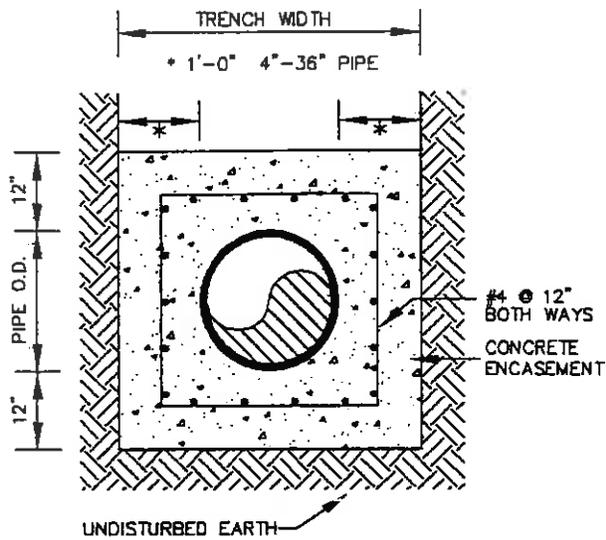
CHK BY: *el*

DATE: MARCH 2003

DWG NO. CHBG-W16

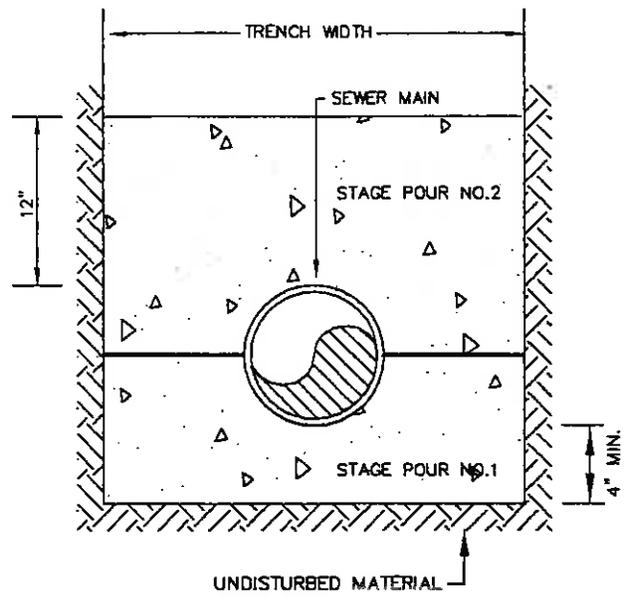
## WATER TESTING REQUIREMENTS

1. Water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge-to-edge.
2. Whenever water mains must cross building drains, storm drains, or sanitary sewers, the water main shall be laid at such an elevation that the bottom of the water main is 18 inches above the top of the drain or sewer. This vertical separation shall be maintained for the portion of the water main located within 10 feet horizontally of any sewer or drain it crosses. The 10 feet is to be measured as a perpendicular distance from the drain or sewer line to the water line.
3. Sewers crossing water mains shall be constructed so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main. Sewer shall have 20 L.F. of 6" concrete encasement centered on the water line.
4. All water mains shall be pressure tested and leakage tested in accordance with the latest edition of AWWA's Standard C-600.
5. All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement.
6. All new or repaired water mains shall be disinfected in accordance with AWWA's Standard C-600.
7. 4' minimum cover over water mains must be maintained.
8. Entire utility trench under proposed roadway shall be backfilled with 2A Modified select backfill.
9. All test are to be performed in the presence of an approved Borough of Chambersburg Inspector.
10. When job is complete (1) one set of Reproducible As Built drawings must be presented to the Borough of Chambersburg Water and Sewer Departments. The Borough of Chambersburg personnel will do a final inspection before they will approve and accept any Water lines.



**REINFORCED  
CONCRETE ENCASEMENT**

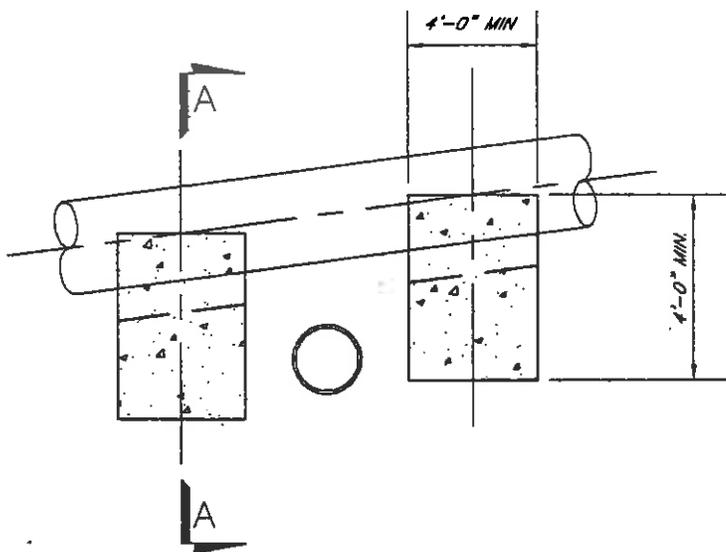
N.T.S.



STAGE 1—INSTALL CONCRETE FROM BOTTOM OF TRENCH TO CENTERLINE OF PIPE  
STAGE 2—AFTER 24 hr. PERIOD INSTALL CONCRETE FROM CENTERLINE OF PIPE TO 12" ABOVE BARREL OF PIPE.

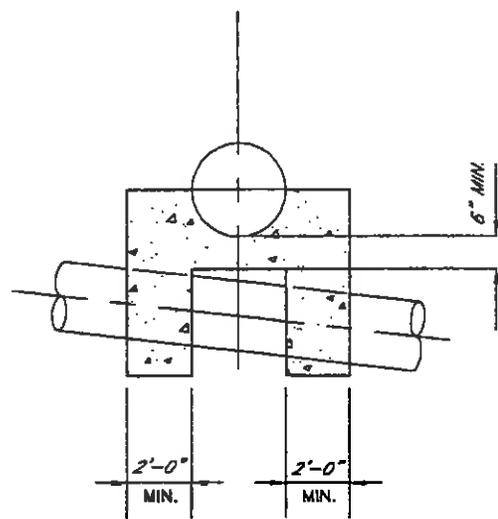
**CONCRETE ENCASEMENT**

N.T.S.



**CONCRETE PEDESTAL**

N.T.S.



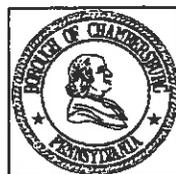
**SECTION A — A**

N.T.S.

**CONCRETE ENCASEMENT & PEDESTAL**

PREPARED FOR:

**BOROUGH OF CHAMBERSBURG**

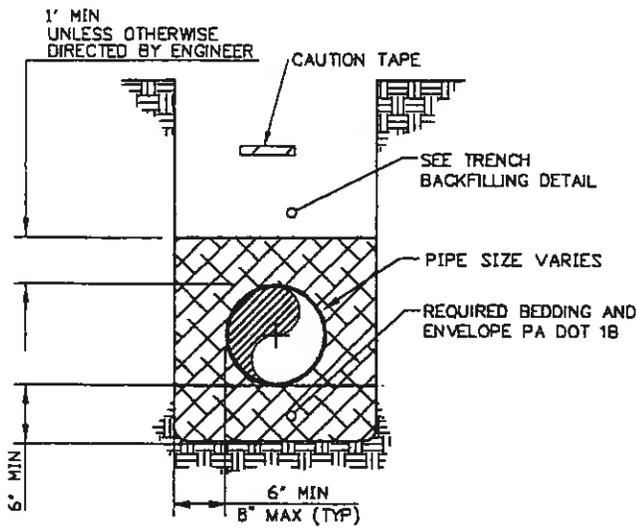


DRAWN BY: BKF

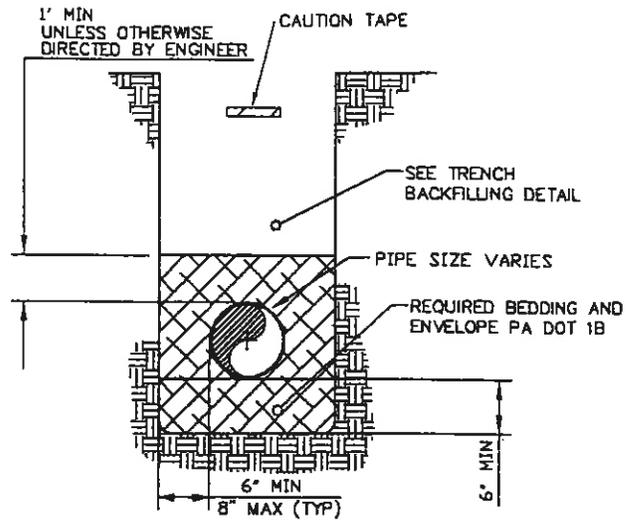
CHK BY: *Ed.*

DATE: MARCH 2003

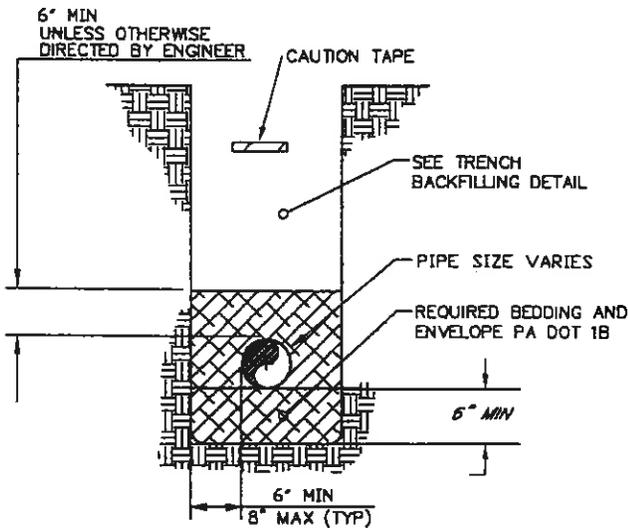
DWG NO. CHBG-S19



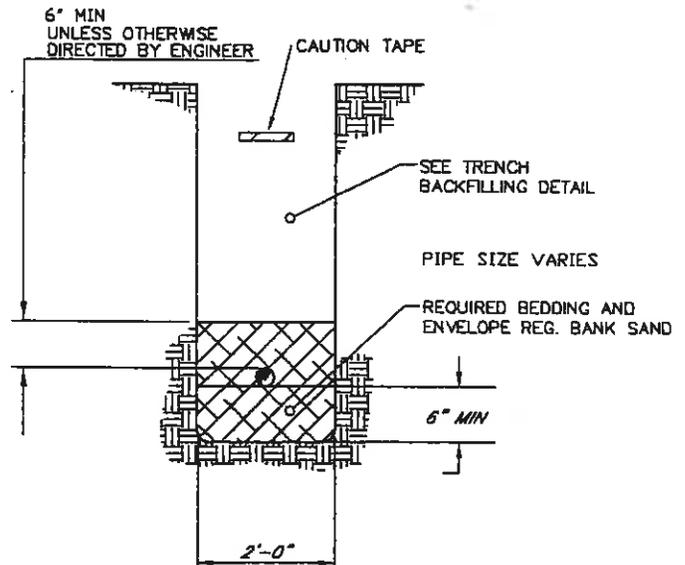
**STANDARD PIPE BEDDING—WATER MAIN**  
NOT TO SCALE



**STANDARD PIPE BEDDING—SANITARY MAIN**  
NOT TO SCALE

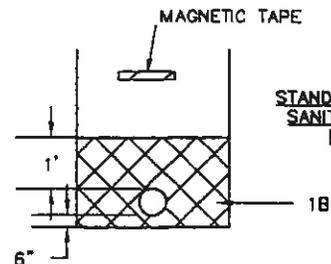
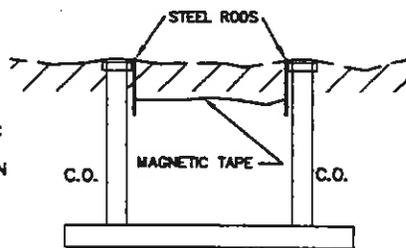


**STANDARD PIPE BEDDING—  
SANITARY LATERAL**  
NOT TO SCALE



**STANDARD PIPE BEDDING—  
WATER SERVICE**  
NOT TO SCALE

NOTE: ALL PLASTIC PIPE EXCEPT SEWER MAINS MUST HAVE MAGNETIC TAPE IN ONE CONTINUOUS RUN ATTACHED TO STEEL RODS AT CLEAN OUTS.



STANDARD PIPE BEDDING  
SANITARY FORCE MAIN  
PLASTIC PIPE

PIPE BEDDING AND ENVELOPE

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

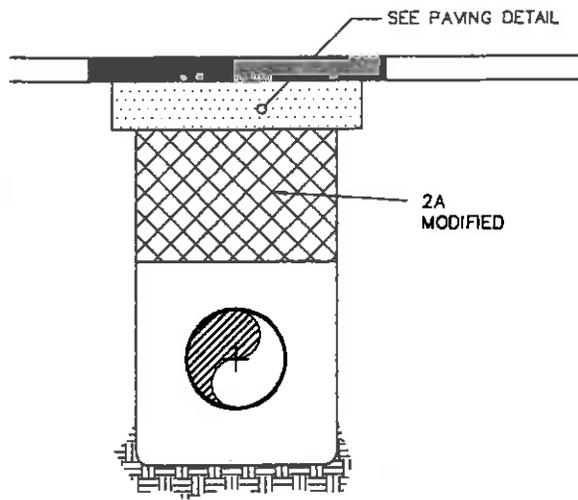


DSN BY: BKF

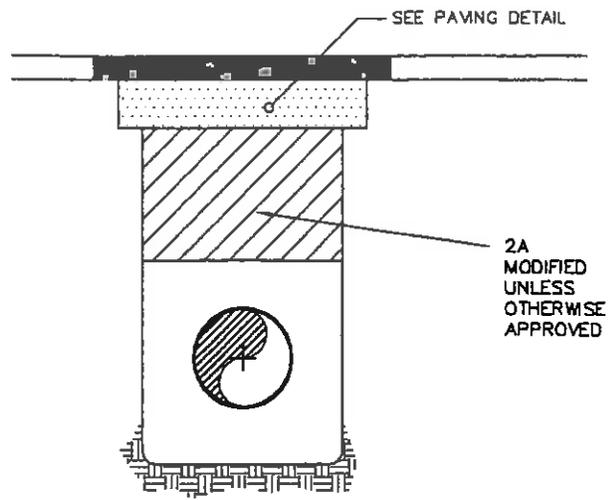
CHK BY: Ed.

DATE: MARCH 2003

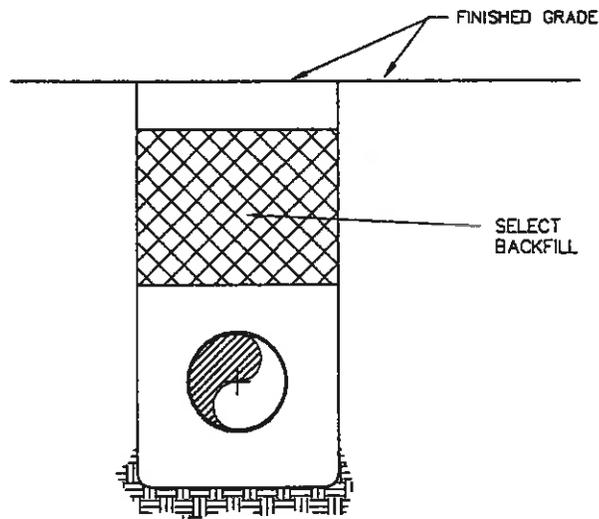
DWG NO. CHBG-S20



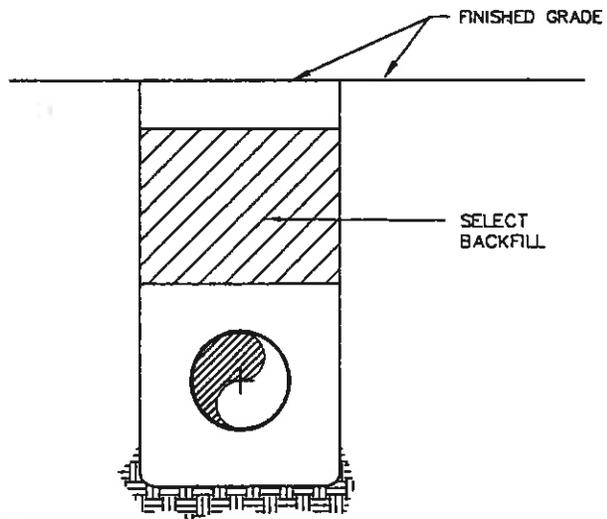
EXISTING ROADS  
PENNDOT R/W-BOROUGH R/W  
 NOT TO SCALE



BOROUGH R/W  
NEW SUBDIVISIONS OR LAND DEVELOPMENTS  
 NOT TO SCALE



UNPAVED AREAS  
WITHIN PUBLIC R/W  
 NOT TO SCALE



UNPAVED AREAS  
OUTSIDE PUBLIC R/W  
 NOT TO SCALE

NOTES :

1. REFER TO BOROUGH OF CHAMBERSBURG SPECIFICATIONS FOR ROAD RESTORATION
2. SPECIFICATIONS MAY BE OBTAINED FROM BOROUGH ENGINEER OR THE PUBLIC WORKS DIRECTOR.

TRENCH BACKFILL

PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF
CHK BY: <i>EL</i>
DATE: MARCH 2003
DWG NO. CHBG-S21

SEAL SURFACE JOINT WITH 1" WIDE  
HOT BITUMINOUS MATERIAL (AC-20 OR BM-1)

2" ID-2 BITUMINOUS BINDER COURSE

CONTRACTOR TO MAINTAIN  
TEMPORARY PAVING

SEE TRENCH BACKFILL DETAIL

EXISTING PAVEMENT

TRENCH WIDTH

### TEMPORARY TRENCH RESTORATION

NO SCALE

TEMPORARY PAVEMENT RESTORATION  
PREPARED FOR:  
BOROUGH OF CHAMBERSBURG

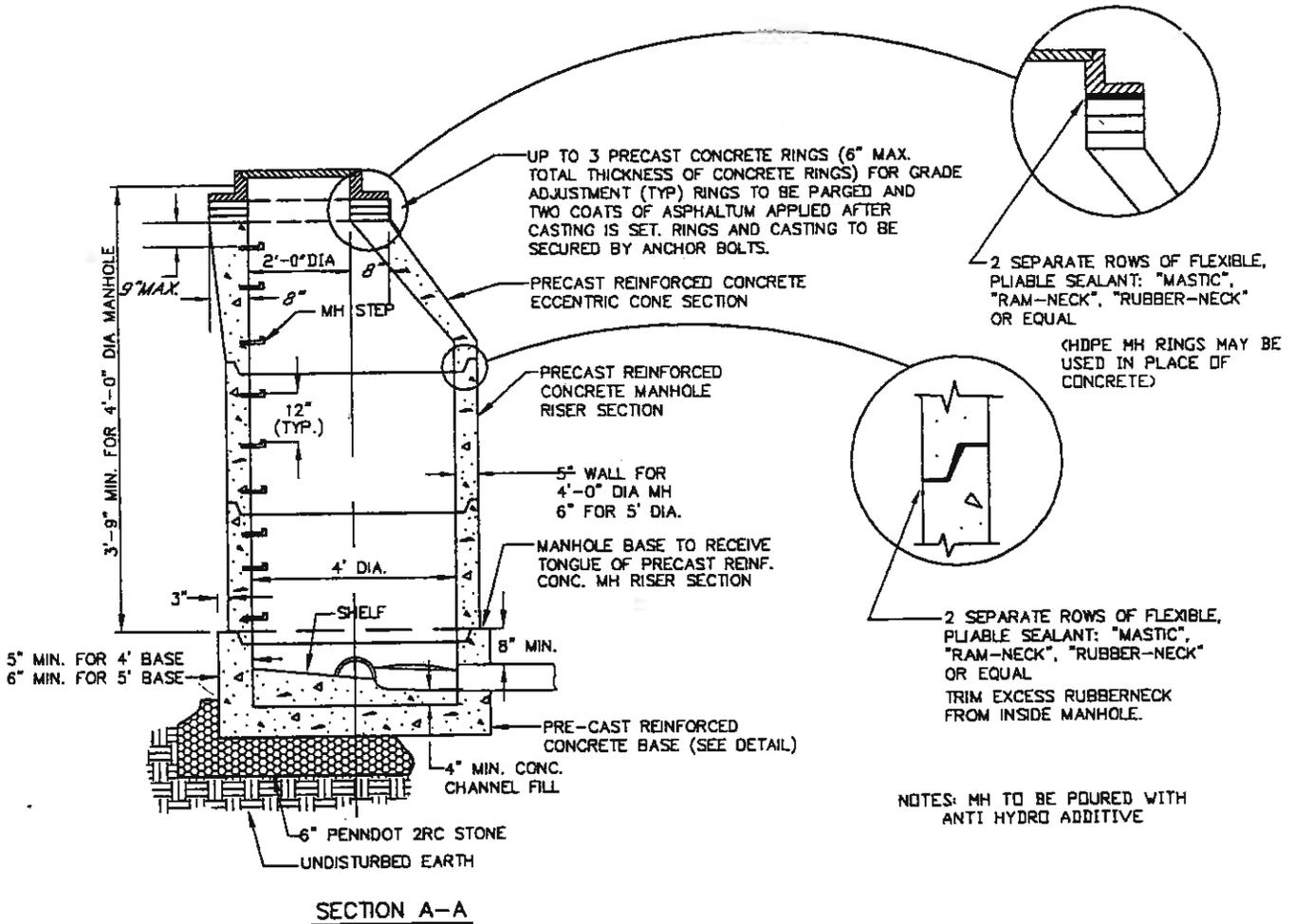
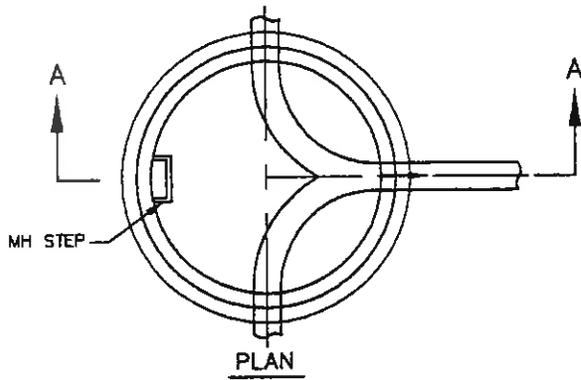


DRAWN BY: BKF
CHK BY: <i>ES.</i>
DATE: MARCH 2003
DWG NO. S-22

**SANITARY  
SEWER  
SPECIFICATIONS  
AND  
DETAILS**

**NOTES:**

1. THE DEPTH OF THE INVERT CHANNEL SHALL BE EQUAL TO 3/4 OF THE DIAMETER OF THE SEWER.
2. THE SHELF SHALL SLOPE TOWARD THE INVERT CHANNEL AT A RATE OF 1" PER FOOT.
3. TYPE "B" MANHOLES (SHALLOW TYPE) TO BE PROVIDED WHERE REQUIRED BY DEPTH CONDITIONS. ALL OTHER MANHOLES TO BE TYPE "A".
4. THE WALL THICKNESS IN A 4'-0" DIA. PRECAST BASE SHALL BE AS FOLLOWS FOR PIPES 16" AND SMALLER, 5" WALL; FOR PIPES 18" AND LARGER, 8" WALL.
5. ALL MANHOLE FRAMES FOR "OFF THE ROAD" MANHOLES SHALL BE BOLTED TO THE CONE SECTION OR CONCRETE SLAB WITH 2"-3/4" DIA. BOLTS WITH WASHERS AND NUTS. BOLTS TO BE AT 180 ON A 36" DIA. BOLT CIRCLE.
6. FOR MANHOLES HAVING 5'-0" DIA AND 6'-0" BASES REDUCTION IN DIAMETER TO 4'-0" SHALL START AT THE FIRST JOINT ABOVE THE UPPERMOST PIPE CONNECTION TO WALL, WHERE DEPTH IS SUFFICIENT.
7. ENTIRE PERIMETER OF MANHOLE SHALL BE BACKFILLED WITH 2A MODIFIED STONE.



**TYPE "A"  
STANDARD MANHOLE DETAIL  
NOT TO SCALE**

**TYPE "A" STANDARD MANHOLE**  
PREPARED FOR:  
**BOROUGH OF CHAMBERSBURG**



DRAWN BY: BKF  
CHK BY: *ES*  
DATE: MARCH 2003  
DWG NO. CHBG-S01

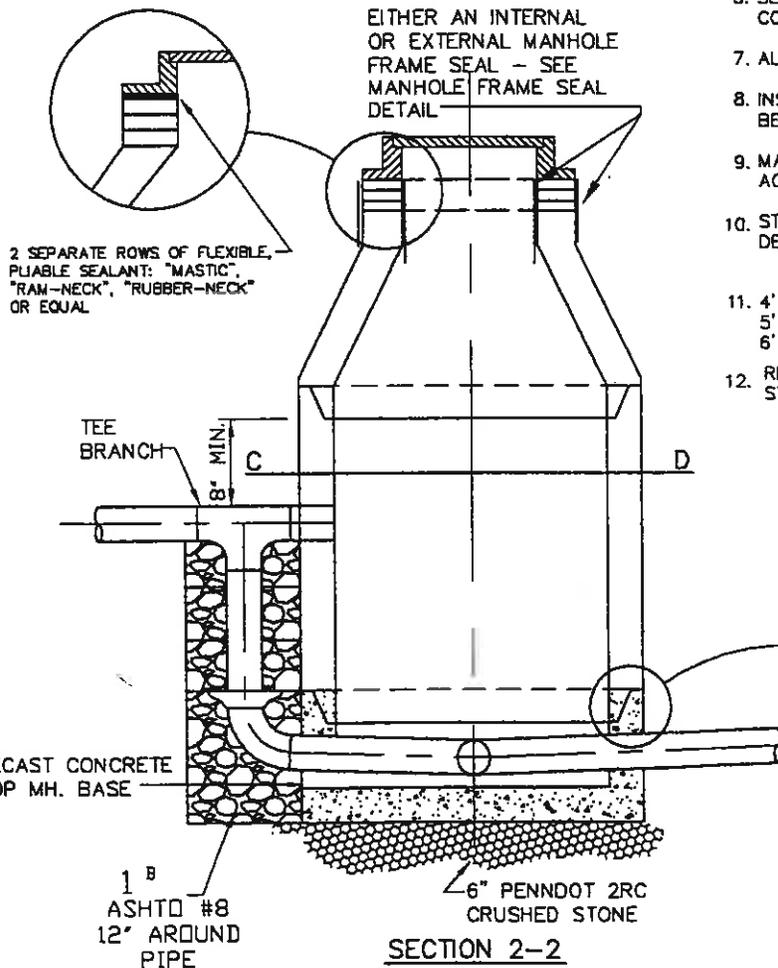
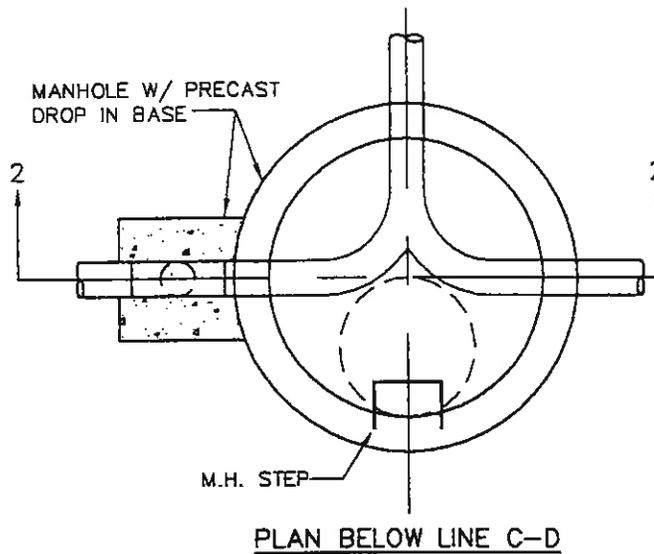
# BOROUGH OF CHAMBERSBURG

## STANDARD SEWER DETAILS

### Sanitary Sewer System Details

### Drawing No.

Type "A" Standard Manhole	S-01
Type "A" Drop Manhole	S-02
Type "B" Standard Manhole	S-03
Deep Manhole Detail	S-04
Precast Manhole Base	S-05
Precast Doghouse Manhole Detail	S-06
Precast Manhole Step	S-07
Standard Manhole Frame and Cover	S-08
Water Tight Manhole Frame and Cover	S-09
Sanitary Lateral – Shallow Sewer	S-10
Sanitary Lateral – Deep Sewer	S-11
Typical Connection to Sewer Main	S-12
Sewer Saddle	S-13
Utility Service Placement	S-14
Sewer Testing Requirements	S-15
Sewer Testing Requirements	S-16
Pressure Sewer Grinder Pump Station	GP-1
	GP-2
	GP-3
Grinder Pump Specifications	GP-4
	GP-5
	GP-6
	GP-7
	GP-8
Concrete Encasement & Pedestal	S-19
Pipe Bedding and Envelope Detail	S-20
Trench Backfill	S-21
Temporary Pavement Restoration	S-22
Standard Materials Lists	Appendix A



**TYPE "A" DROP MANHOLE DETAIL**  
NOT TO SCALE

1. THE DEPTH OF THE INVERT CHANNEL SHALL BE EQUAL TO 3/4 OF THE DIAMETER OF THE SEWER.
2. THE SHELF SHALL SLOPE TOWARD THE INVERT CHANNEL AT A RATE OF 1" PER FOOT.
3. TYPE "B" MANHOLES (SHALLOW TYPE) TO BE PROVIDED WHERE REQUIRED BY DEPTH CONDITIONS. ALL OTHER MANHOLES TO BE TYPE "A". REFERENCE IS MADE TO THE STANDARD DETAILS FOR TYPE A & TYPE B MANHOLES.
4. FOR MANHOLES HAVING 5' DIA. AND 6' DIA. BASE REDUCTION IN DIAMETER TO 4' SHALL START AT THE FIRST JOINT ABOVE THE UPPERMOST PIPE CONNECTION TO WALL, WHERE DEPTH IS SUFFICIENT.
5. ALL MANHOLE FRAMES FOR "OFF THE ROAD" MANHOLES SHALL BE BOLTED TO THE CONE SECTION OR CONCRETE SLAB WITH 2-3/4" DIA. BOLTS WITH WASHERS AND NUTS. BOLTS TO BE AT 180 DEGREES OR 90 DEGREES ON THE BOLT CIRCLE. FOR WATERTIGHT COVERS USE 4-3/4" BOLTS AT 90 DEGREES ON THE BOLT CIRCLE.
6. SEE THE SPECIFICATIONS FOR LENGTH OF PIPE CONNECTIONS TO MANHOLES.
7. ALL CONCRETE SHALL BE 4000 PSI MINIMUM.
8. INSTALL PLASTIC PREFORMED JOINT SEALANT BETWEEN ALL SECTIONS AND UNDER FRAME.
9. MANHOLE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ASTM C478.
10. STEPS TO BE ALUMINUM ALLOY WITH DEPRESSED TREAD, STEEL REINFORCED
11. 4' DIA. MANHOLE - 8" TO 15" PIPES.  
5' DIA. MANHOLE - 18" TO 27" PIPES.  
6' DIA. MANHOLE - 30" TO 48" PIPES.
12. REFERENCE IS MADE TO THE DETAIL FOR STANDARD TYPE "A" MANHOLE.

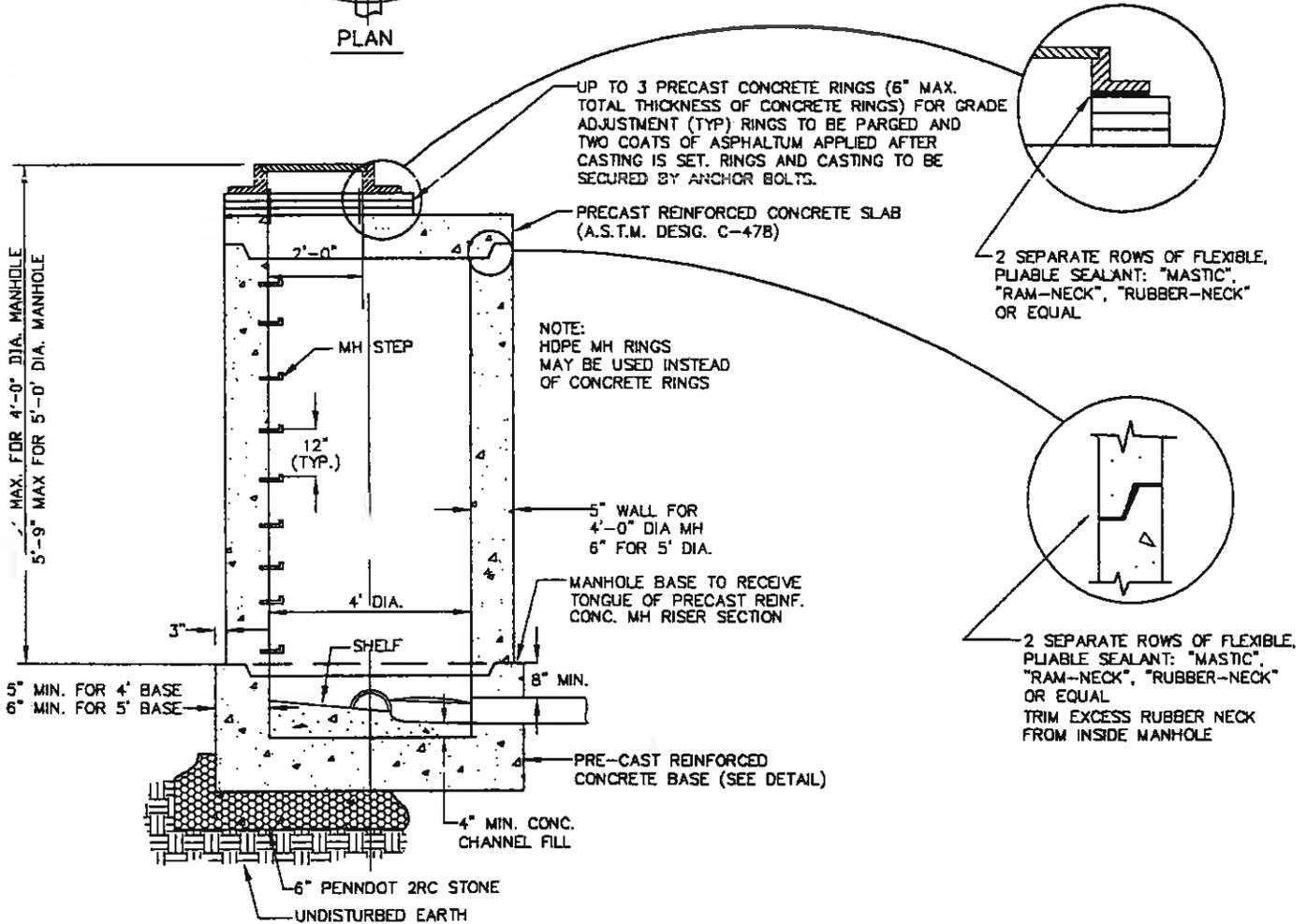
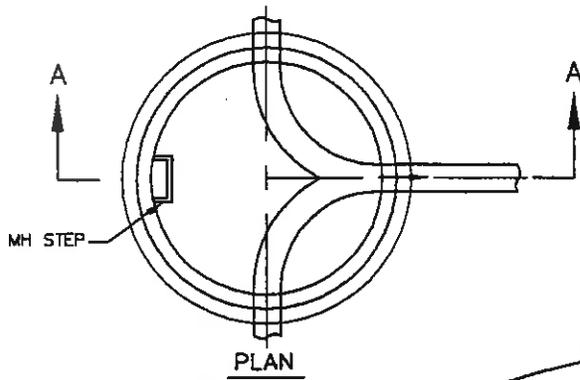
**TYPE "A" DROP MANHOLE**  
PREPARED FOR:  
**BOROUGH OF CHAMBERSBURG**



DRAWN BY: BKF  
CHK BY: *El*  
DATE: MARCH 2003  
DWG NO. CHBG-S02

**NOTES:**

1. THE DEPTH OF THE INVERT CHANNEL SHALL BE EQUAL TO 3/4 OF THE DIAMETER OF THE SEWER.
2. THE SHELF SHALL SLOPE TOWARD THE INVERT CHANNEL AT A
3. TYPE "B" MANHOLES (SHALLOW TYPE) TO BE PROVIDED WHERE REQUIRED BY DEPTH CONDITIONS. ALL OTHER MANHOLES TO BE TYPE "A".
4. THE WALL THICKNESS IN A 4'-0" DIA. PRECAST BASE SHALL BE AS FOLLOWS FOR PIPES 16" AND SMALLER, 5" WALL; FOR PIPES 18" AND LARGER, 8" WALL.
5. ALL MANHOLE FRAMES SHALL BE BOLTED TO THE CONE SECTION OR CONCRETE SLAB WITH 2'-3/4" DIA. BOLTS WITH WASHERS AND NUTS; BOLTS TO BE AT 180° ON A 36" DIA. BOLT CIRCLE.
6. FOR MANHOLES HAVING 5'-0" DIA AND 6'-0" BASES REDUCTION IN DIAMETER TO 4'-0" SHALL START AT THE FIRST JOINT ABOVE THE UPPERMOST PIPE CONNECTION TO WALL, WHERE DEPTH IS SUFFICIENT.



**SECTION A-A**

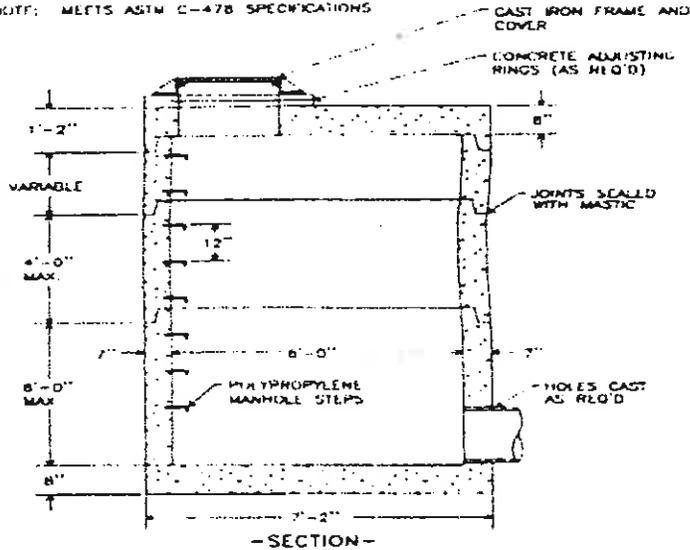
**TYPE "B" STANDARD MANHOLE DETAIL**  
NOT TO SCALE

TYPE "B" STANDARD MANHOLE  
PREPARED FOR:  
BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF  
CHK BY: *Ed.*  
DATE: MARCH 2003  
DWG NO. CHBG-S03

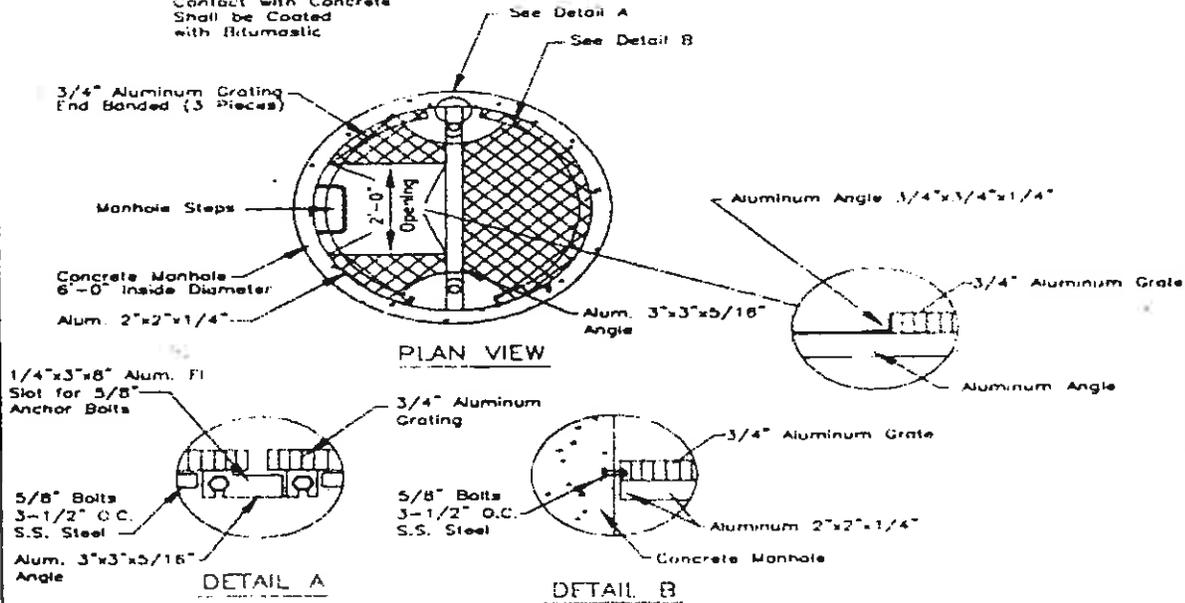
NOTE: MEETS ASTM C-478 SPECIFICATIONS



\*AVAILABLE WITH 5" WIDE FLANGED BASE

PRECAST CONCRETE MANHOLE 6 FT. DIAMETER

NOTE: All Aluminum in Contact with Concrete Shall be Coated with Bitumastic



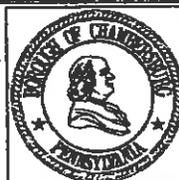
NOTE Platform to be Placed at an Interval of 10 Feet

MANHOLE GRATING DETAIL

DEEP MH DETAIL

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

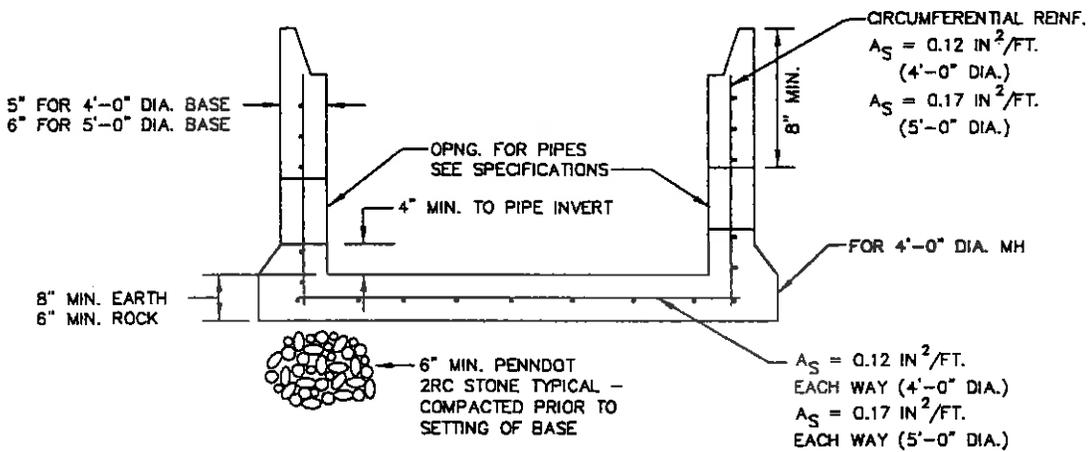
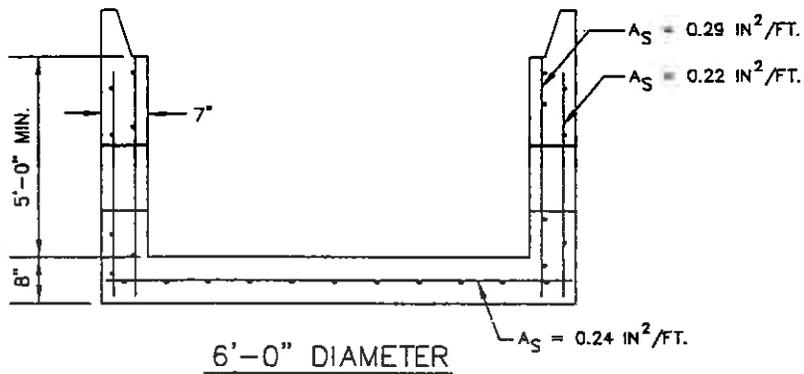


DRAWN BY: BKF

CHK BY: *Ed*

DATE: MARCH 2003

DWG NO. CHBG-S04



4'-0" & 5'-0" DIAMETER

PRECAST BASE

N.T.S.

PRECAST BASE

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

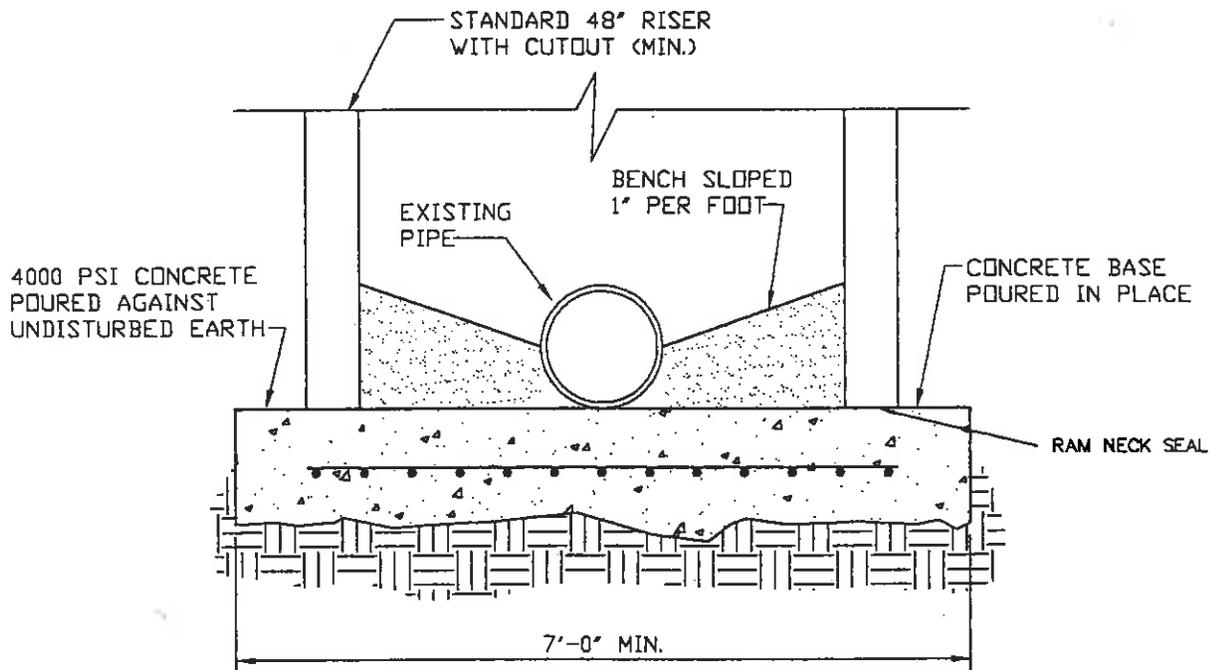
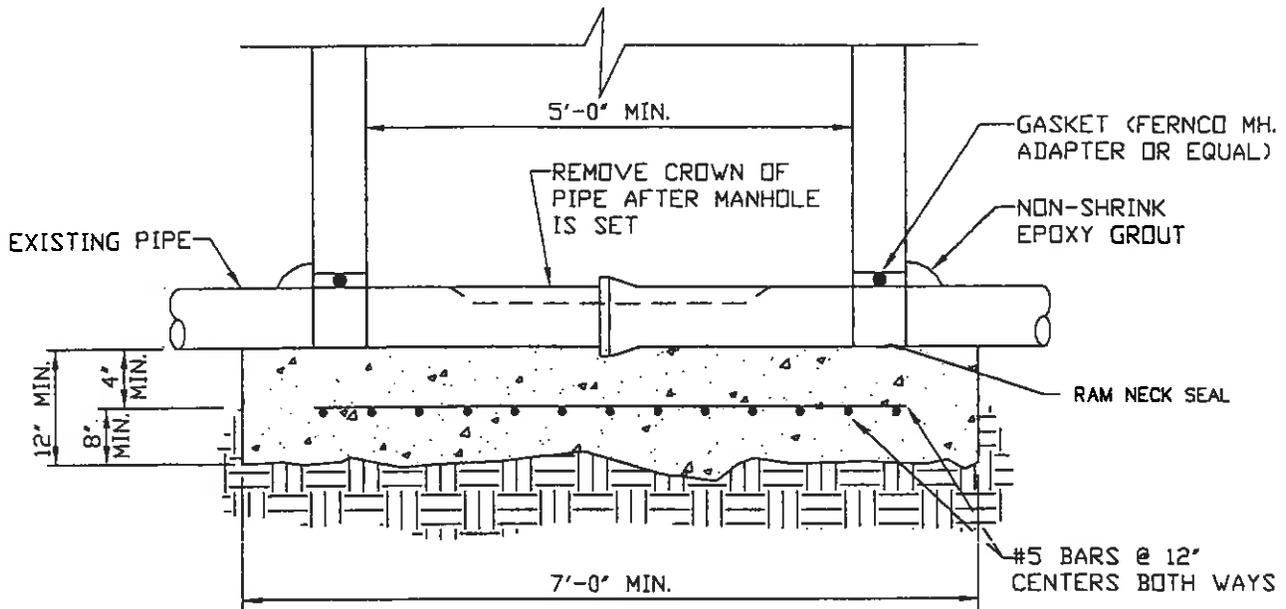


DRAWN BY: BKF

CHK BY: *Ed.*

DATE: MARCH 2003

DWG NO. CHBG-S05



NOTE:  
 EXISTING PIPE TO REMAIN UNTIL EXFILTRATION OR VACUUM  
 TEST ON MANHOLE IS ACCEPTABLE TO AUTHORITY.

DOGHOUSE MANHOLE DETAIL

NOT TO SCALE

- NOTES: 1) POUR BASE AND ALLOW TO SET-UP.  
 2) APPLY 2 ROWS OF RAMNECK FOR DIAMETER OF PRECAST BASE.  
 3) SET FLAT EDGES OF BASE ON RAMNECK.

PRECAST DOGHOUSE MANHOLE

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

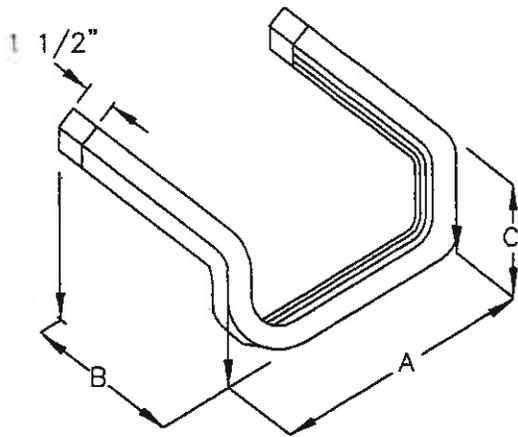


DRAWN BY: BKF

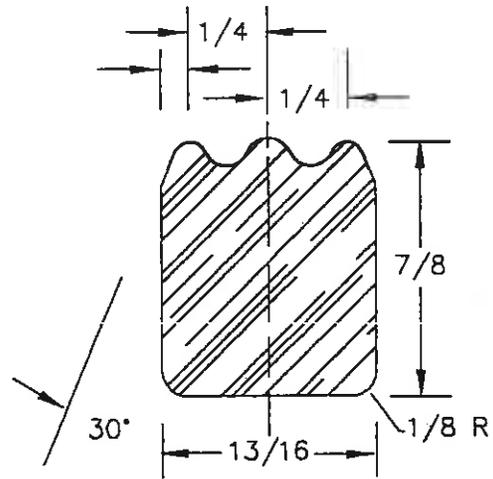
CHK BY: *ES.*

DATE: MARCH 2003

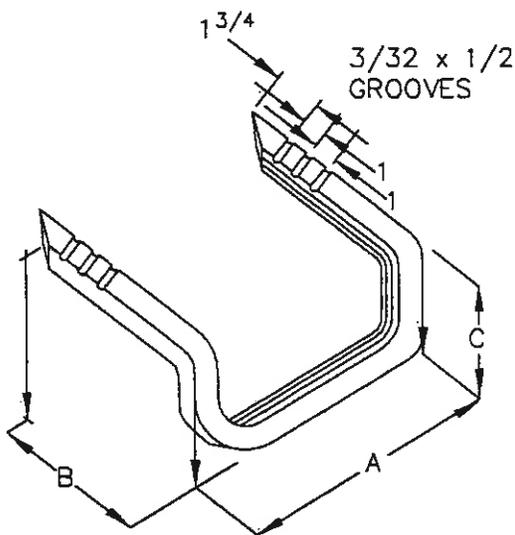
DWG NO. CHBG-S06



PRECAST MANHOLE (TYPE #1)



TYP. CROSS SECTION ON ALL STEPS



PRECAST MANHOLE (TYPE #2)

APPLICATION	DIMENSION (IN.)			
	A	B	C	D
PRECAST M.H. (TYPE 1)	13 3/4	10	3 3/4	—
PRECAST M.H. (TYPE 2)	13 3/4	11	3 3/4	—

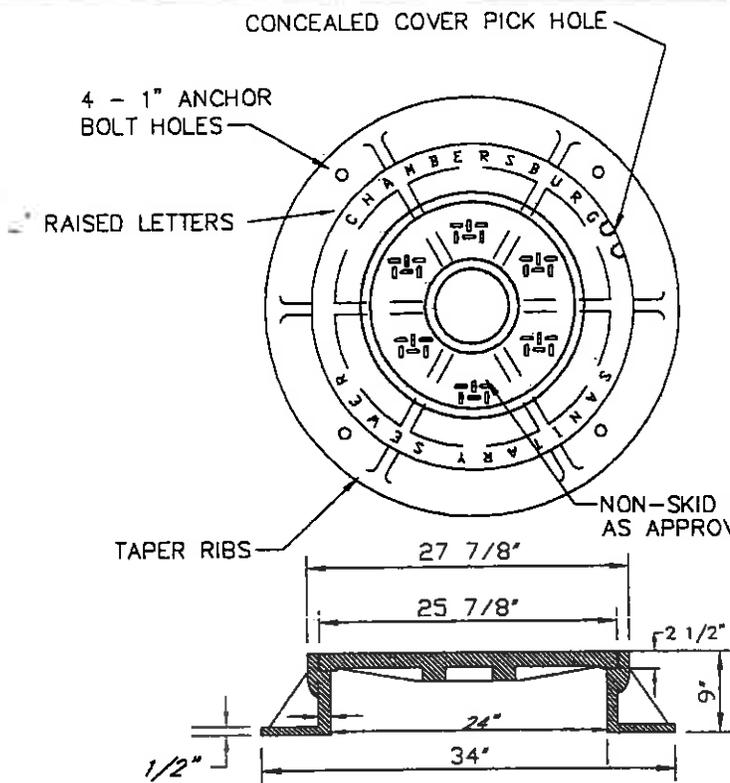
# PRECAST MANHOLE STEPS DETAILS

N.T.S.

PRECAST MANHOLE STEP  
 PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



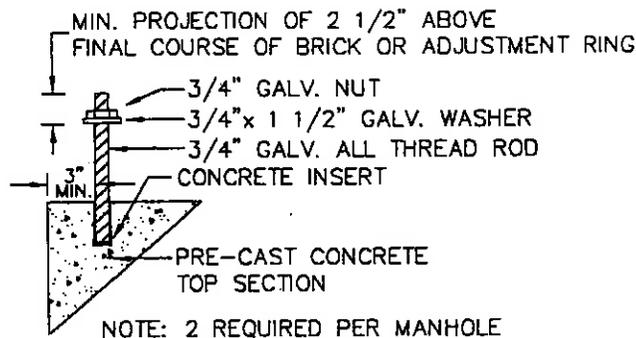
DRAWN BY: BKF  
 CHK BY: *EL*  
 DATE: MARCH 2003  
 DWG NO. CHBG-S07



EAST JORDAN IRON WORKS  
 1-800-325-3549  
 COVER CAT.# 2070770  
 FRAME CAT.# 154510

- NOTE:**
- CASTINGS TO BE GRAY IRON
  - CAST IRON ASTM SPECS. A-48
  - H-20 LOADING
  - LETTERING AS SPECIFIED BY ENGINEER
  - PAINT: ~~1~~ COAT BLACK ASPHALTUM

**STANDARD MANHOLE FRAME & COVER**  
 NOT TO SCALE



NOTE: 2 REQUIRED PER MANHOLE  
PRE-CAST MANHOLE

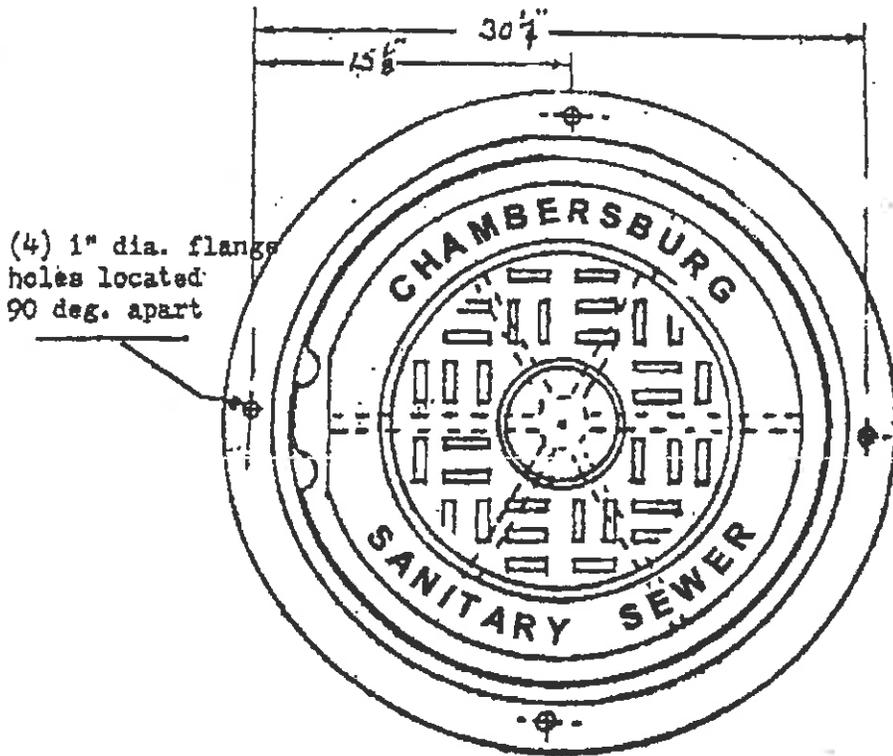
**M.H. ANCHOR BOLT DETAIL**  
 N.T.S.

STANDARD MANHOLE FRAME AND COVER  
 PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



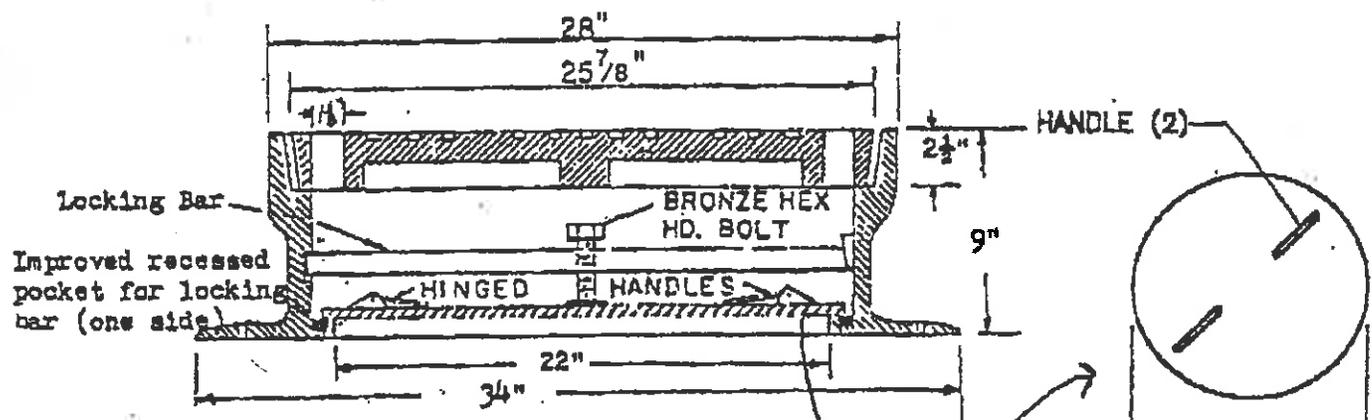
DRAWN BY: BKF  
 CHK BY: *Ed.*  
 DATE: MARCH 2003  
 DWG NO. CHBG-S08

# Heavy Circular Watertight Frames and Covers



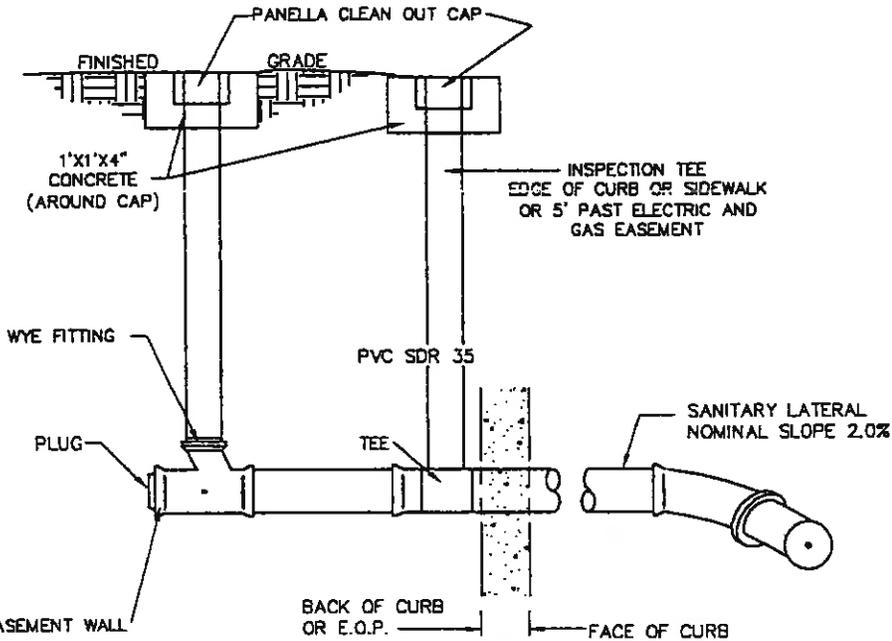
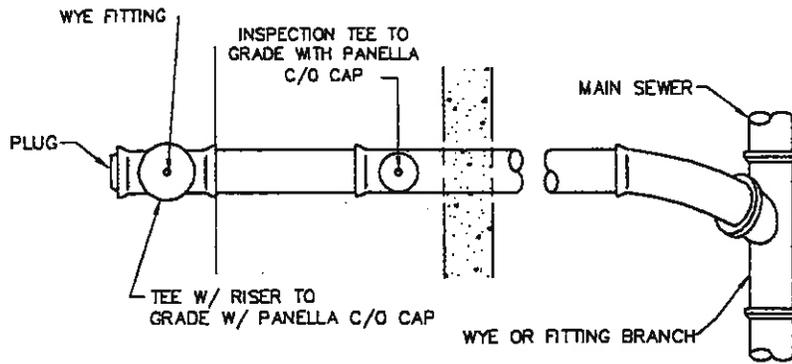
**Model # 2070613  
W/ Inner Cover and  
Accessories**

**MADE IN U.S.A.**



Frame & outer cover - Cast Iron ASTM A-48, Class 30  
 Inner cover, hinges & locking bar - Steel .ASTM A-36  
 Neoprens 'O' ring endless gasket-3/4" dia. solid  
 Inner cover lift handles are hinged type, to prevent breakage  
 Recessed pocket permits installation & removal of inner cover  
 Locking bolt to have a 3/4" dia. shank  
 Weight - approx. 480 lbs.  
 All castings to be coated with a black bituminous asphalt dip

WATERTIGHT MANHOLE FRAME AND COVER PREPARED FOR: BOROUGH OF CHAMBERSBURG		DRAWN BY: BKF
		CHK BY: <i>Ed.</i>
		DATE: MARCH 2003
		DWG NO. CHBG-S09



5' FROM HOUSE OR BASEMENT WALL

**SANITARY LATERAL  
SHALLOW SEWER DETAIL**  
NOT TO SCALE

1' TO 15'  
DEPTH

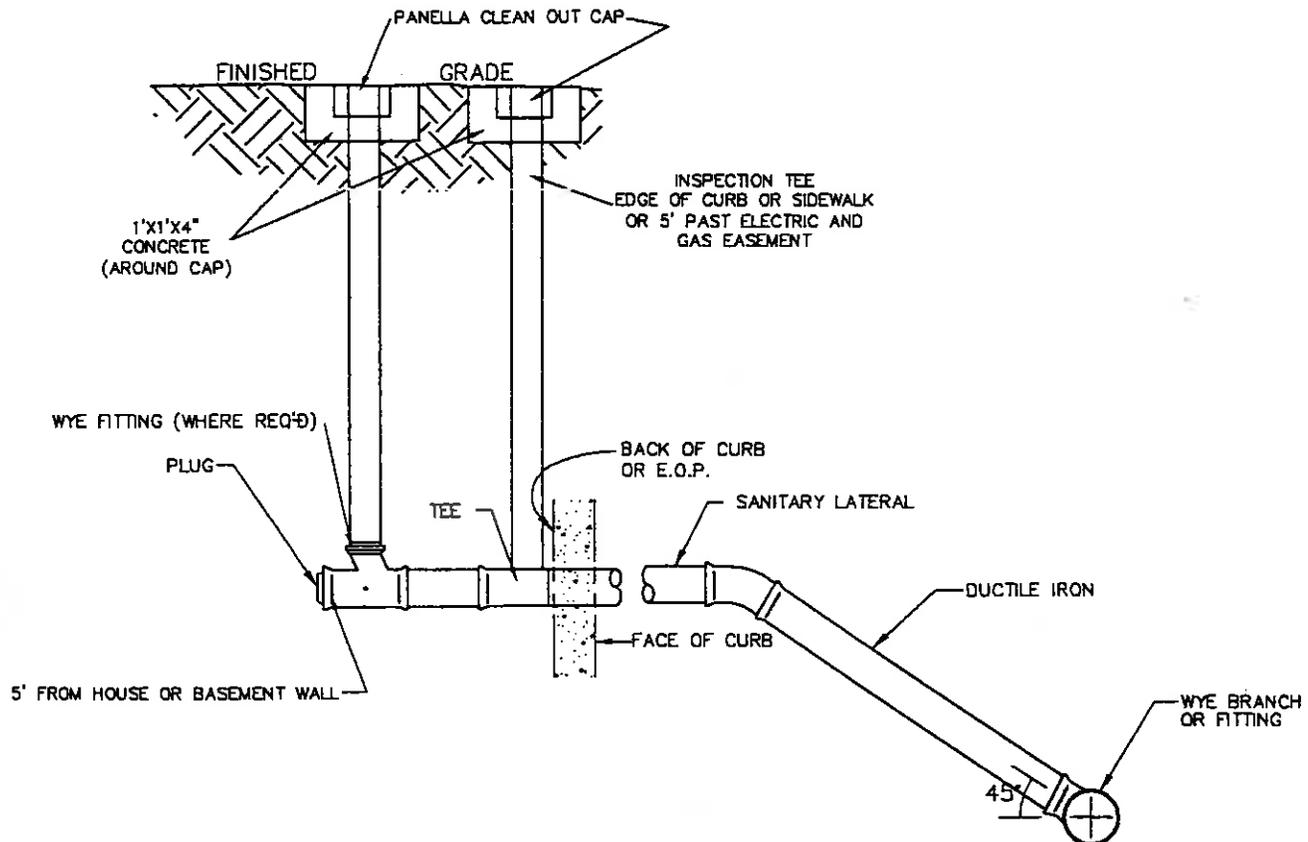
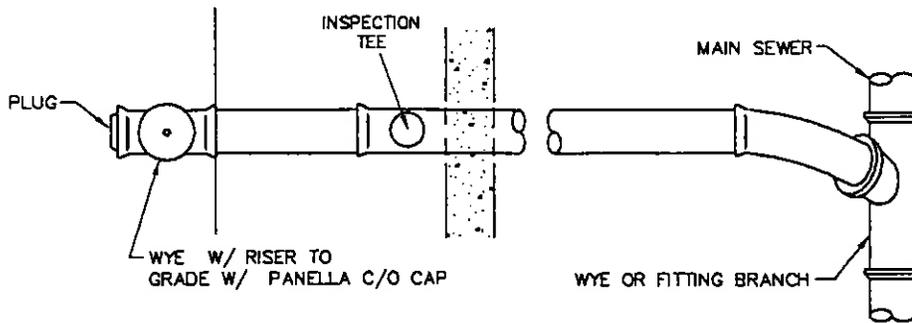
NOTE: INSTALL C/O EVERY 100'

1. CONNECT NEW PVC SEWER LATERAL TO EXISTING HOUSE CONNECTION FOLLOWING PROPER TESTING; AND APPROVAL BY BOROUGH PLUMBING INSPECTOR.
2. ALL OF THE FOREGOING WORK, MATERIALS, TECHNIQUES, RESTORATION AND ETC. TO BE DONE TO THE SATISFACTION OF THE BOROUGH PLUMBING INSPECTOR.

SANITARY LATERAL-SHALLOW SEWER  
PREPARED FOR:  
BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF
CHK BY: <i>EL</i>
DATE: MARCH 2003
DWG NO. CHBG-S10



NOTE: INSTALL C/O EVERY 100'

SANITARY LATERAL  
DEEP SEWER

(LATERALS 15' AND DEEPER REQUIRE DUCTILE IRON PIPE)

N.T.S.

1. CONNECT NEW PVC SEWER LATERAL TO EXISTING HOUSE CONNECTION FOLLOWING PROPER TESTING; AND APPROVAL BY BOROUGH INSPECTOR.
2. ALL OF THE FOREGOING WORK, MATERIALS, TECHNIQUES, RESTORATION AND ETC. TO BE DONE TO THE SATISFACTION OF THE BOROUGH INSPECTOR.

SANITARY LATERAL-DEEP SEWER

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

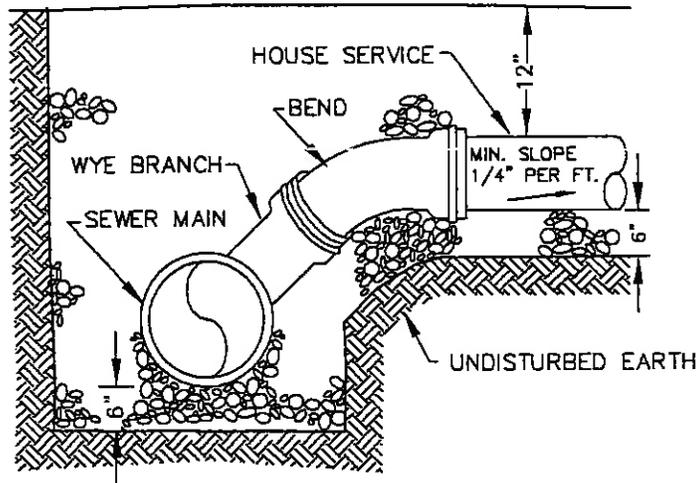


DRAWN BY: BKF

CHK BY: *EJ.*

DATE: MARCH 2003

DWG NO. CHBG-S11



TYPICAL CONNECTION TO SEWER MAIN

N.T.S.

TYPICAL CONNECTION TO SEWER MAIN

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

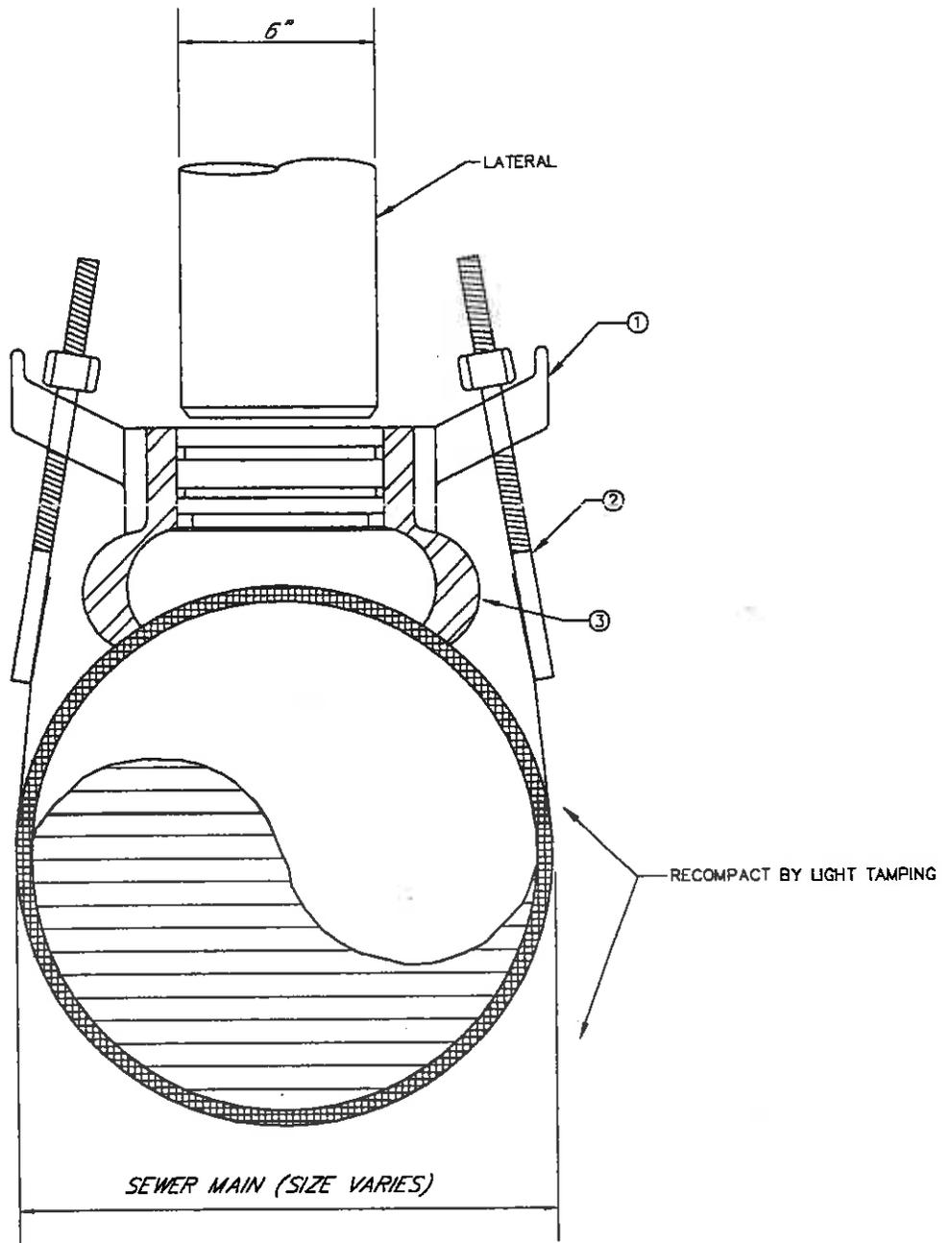


DSN BY: P.C.A.

CHK BY: EJ

DATE: MARCH 2003

DWG NO. CHBG-S12



**NOTES :**

**MATERIALS :**

1. SADDLE CASTING: DUCTILE IRON ASTM 536-80 GRADE 65-45-12 PROTECTED WITH CORROSION RESISTANT PAINT.
2. STAINLESS STEEL 304 ADJUSTABLE STRAP ; BOLTS, NUTS AND WASHERS 1/2" N.C. ROLL THREAD TEFLON COATED. 3 1/2" WIDE BAND TO SPREAD CLAMP FORCE OUT ON PIPE.
3. SEWER SERVICE SDR 35 PIPE - USE HARCO PIPE SADDLE
4. SADDLE MUST BE APPROVED BY BOROUGH INSPECTOR BEFORE INSTALLATION

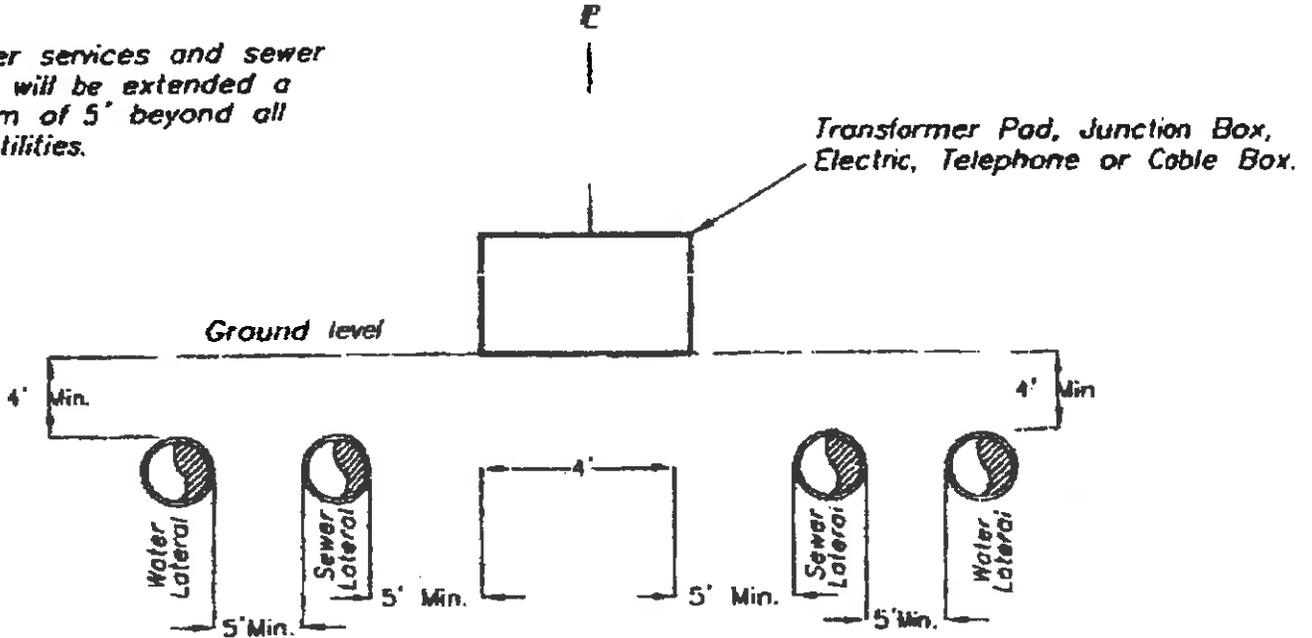
SEWER SADDLE  
 PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



DRAWN BY: P.C.A.  
 CHK BY: *el*  
 DATE: MARCH 2003  
 DWG NO. CHBG-S13

E: All water services and sewer laterals shall be located a minimum of 5' away from the electric, telephone, cable or any other utility appurtenance

NOTE: All water services and sewer laterals will be extended a minimum of 5' beyond all other utilities.



**UTILITY SERVICE HORIZONTAL SEPARATION DETAIL**

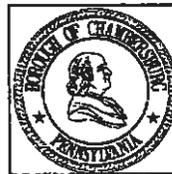
No Scale

- NOTE:
1. Each residential unit shall have a separate sewer and water service per unit.
  2. Each sewer and water service shall have a minimum of 5' horizontal separation.
  3. The sewer main and water main shall have at least 10' horizontal separation.
  4. All electric vaults and pedestals shall have 5' horizontal separation from the sewer and water services.

UTILITY SERVICE PLACEMENT

PREPARED FOR:

BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF

CHK BY: *EJ*

DATE: MARCH 2003

DWG NO. CHBG-S-14

## SEWER TESTING REQUIREMENTS

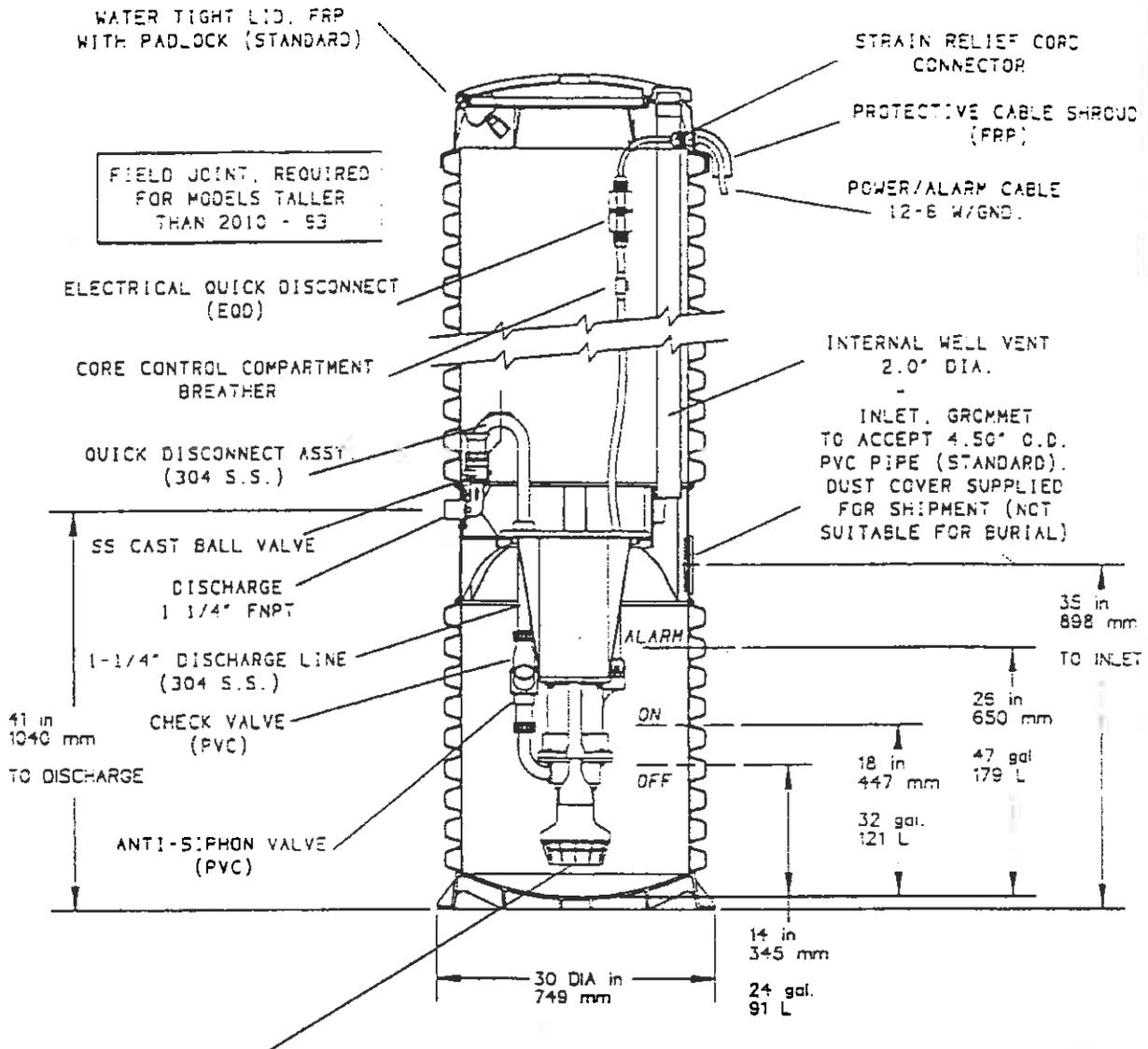
1. Sewer mains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge-to-edge.
2. Sewer laterals may be installed in the same trench as the water service but must be laid 5' apart. The distance shall be measured edged to edge.
3. Exfiltration tests for new manholes are required. These may include water or vacuum testing. In the water test, Exfiltration shall not exceed a rate of 0.019 gallons-a-day per inch of manhole diameter per vertical foot of manhole during a continuous four hour test period. The vacuum testing shall be in accordance with the testing equipment manufacturer's written instructions and the test results compared to the manufacturer's published vacuum test tables.
4. Deflection tests shall be performed on all new sewer mains. The test shall be run not less than 30 days after final backfill has been placed.

No pipe shall exceed a deflection of five percent.

The rigid ball or mandrel used for the deflection test shall have a diameter not less than 95 percent of the base inside diameter or average inside of the pipe, depending on which is specified in the ASTM Specification, including the Appendix, to which the pipe is manufactured. The pipe shall be measured in compliance with ASTM D2122 Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings. The test shall be performed without mechanical pulling devices.

5. All new sewers shall be low pressure air tested in accordance with the test procedure described in ASTM C-828-86 for PVC pipe.
6. Entire utility trench under proposed roadway shall be backfilled with 2A Modified select backfill or other onsite backfill approved by the Borough of Chambersburg Public Works Department.
7. Force main sewer piping shall be tested at (2) two times the maximum working pressure for 15 minutes.

8. All sewer line mains must have a camera view the entire length of the inside of the pipe for the sewer project. Recorded on a video tape with proper documentation and narration to prove which manhole run is being taped. The pipe shall be viewed no earlier than 1 month after installation. This process will be directed by the Borough of Chambersburg and cost shall be the responsibility of the developer and will be billed directly to the developer.
9. All testing and camera operations are to be performed in the presence of an approved Borough of Chambersburg Inspector.
10. When job is complete (1) one set of Reproducible As Built drawings must be presented to the Borough of Chambersburg Water and Sewer Departments. The Borough of Chambersburg personnel will do a final inspection before they will approve and accept any Sewer lines.



SEMI-POSITIVE DISPLACEMENT TYPE PUMP  
 DIRECTLY DRIVEN BY A 1 HP MOTOR  
 CAPABLE OF DELIVERING 9 gpm AT 138' T.D.H.  
 (34 lpm AT 42m T.D.H.)

NOTE: A CONCRETE ANCHOR IS REQUIRED TO PREVENT TANK FROM FLOATING. SEE INSTALLATION INSTRUCTIONS OR SPECIFIC CUT SHEET FOR SIZE AND WEIGHT OF ANCHOR



E.D.A.	GAE	1/02/97	E	1/16
DR BY	CHK'D	DATE	ISSUE	SCALE

environment|one  
 CORPORATION

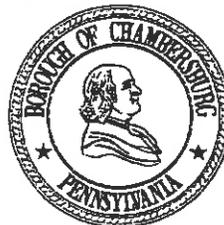
MODEL 2010  
 DETAIL SHEET

PA 0908 P01

# GRINDER PUMP DETAIL

PREPARED FOR

## BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF

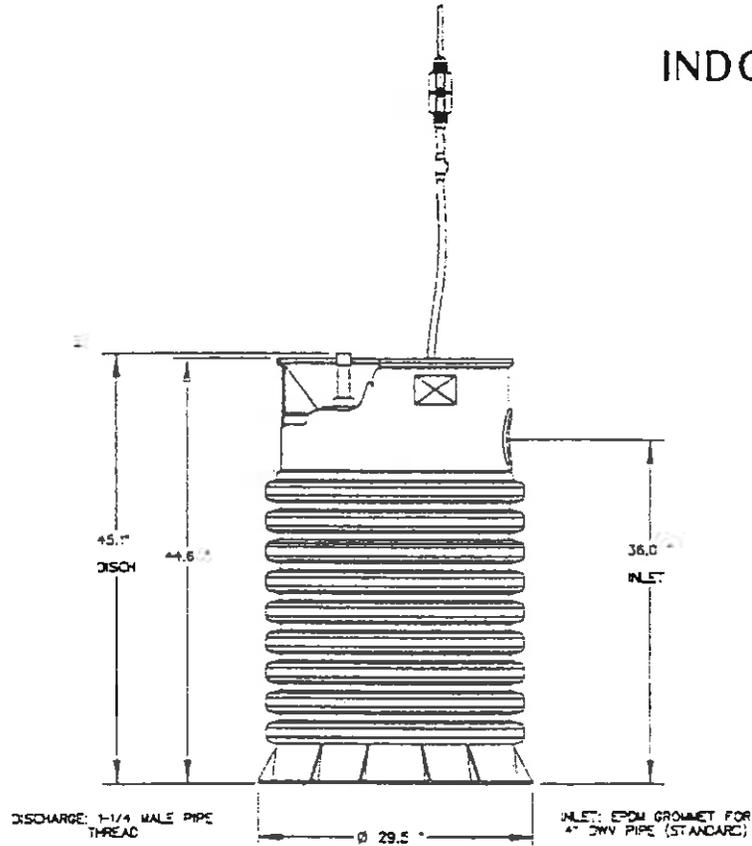
CHECKED BY: *ES.*

DATE: MARCH 2003

DRG NO. CHBG-Gp1

2010-44

INDOOR UNIT



SG	GAE	1/02/97	-	1/18
DR BY	CHK'D	DATE	ISSUE	SCALE

environment | one  
CORPORATION

MODEL 2010-44

PA 0856 P10

# GRINDER PUMP DETAIL

PREPARED FOR

BOROUGH OF CHAMBERSBURG



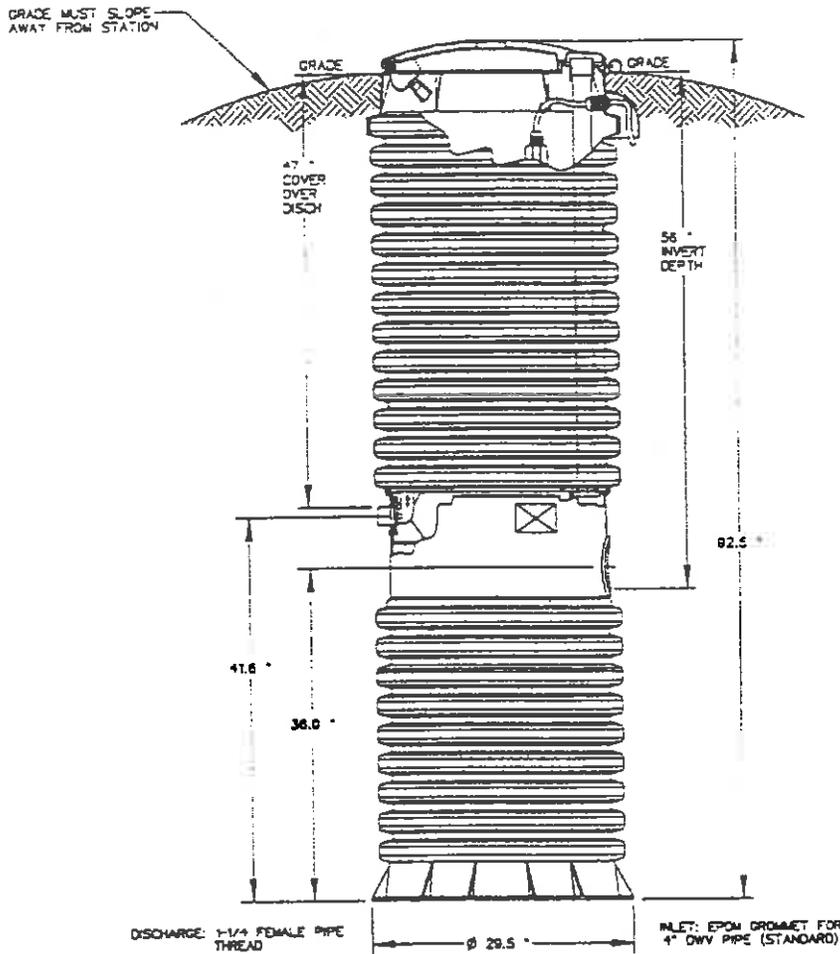
DRAWN BY: BKF

CHECKED BY:

DATE: MARCH 2003

DRG NO. CHBG-GP-2

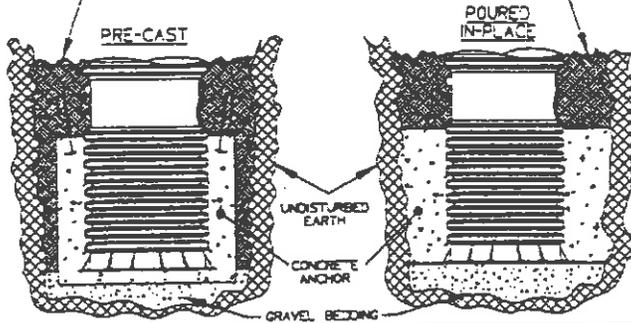
2010-93



==SEE INSTALLATION INSTRUCTIONS FOR FURTHER DETAILS

NOTE: A CONCRETE ANCHOR OF 2600 lbs (17.3 cu ft) IS REQUIRED ON ALL MODEL 2010 93" STATIONS.

FILL TO GRADE WITH CLEAN COMPACTABLE BACKFILL SUCH AS PEA GRAVEL OR CRUSHED STONE, 1/2" - 3/4" IN SIZE. CLAY AND SILTS ARE NOT ACCEPTABLE BACKFILL.



SG	GAE	08/22/96	-	1/1E
DR BY	CHK'D	DATE	ISSUE	SCALE

environmentone CORPORATION

MODEL 2010-83

PA 0856 P04

# GRINDER PUMP DETAIL

PREPARED FOR

BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF

CHECKED BY: *EJ*

DATE: MARCH 2003

DRG NO. CHBG-GP-3

## GRINDER PUMPING UNIT

### PART 1 – GENERAL

#### 1.01 DESCRIPTION

- A. The Work of This Section Includes, but is not limited to:
  - 1. Simplex Grinder Pumping Unit
- B. Related Work Specified Elsewhere:
  - 1. Trenching, Backfilling and Compacting
  - 2. Sanitary Sewer Pipe

#### 1.02 QUALITY ASSURANCE

- A. Design Criteria: The Developer shall provide the following to the Borough of Chambersburg for approval.
  - 1. Capacity, head and RPM
  - 2. Electrical characteristics
  - 3. Pump discharge size
  - 4. Grinder pump unit is UL listed. Free of noise, odor, and electrical fire and health hazards.
  - 5. Unit factory assembled and shipped as a complete unit ready for installation.
  - 6. Manufacturer: Environment One

#### 1.03 SUBMITTALS

- A. Shop Drawings and Product Data: Submit detailed certified dimensional shop drawings and manufacturer's product data for materials and equipment, including wiring and control diagrams. Show complete information concerning materials of construction, fabrication, protective coatings, installation, anchoring fasteners and other details.
- B. Maintenance Data and Operating Instructions: Submit three (3) copies of Operation and Maintenance Manuals for the equipment furnished under this specification. Include a detailed description of the function of each principal component, procedures for starting, operation, shut-down, overhaul and maintenance. Include safety precautions, test procedures, and a catalog cross-reference to commercially available parts.

- C. Maintenance Material: (Spare Parts)
1. Provide one complete set of the manufacturer's recommended spare parts for each pump.
  2. Developer must submit, in writing, storage procedures for all spare parts to ensure adequate protection. Package each part individually or in sets in moisture-proof containers or wrappings, clearly labeled with part name and manufacturer's part/stock number.
  3. Provide any special tools for equipment maintenance. Provide a list of all equipment and tools needed to maintain and calibrate equipment.

## PART 2 – PRODUCTS

### 2.01 GENERAL DESCRIPTION

- A. Each station consisting of one factory assembled unit consisting of a removable watertight cartridge type core assembly inside a tank with an accessway. The principal components of the core assembly include a positive displacement pump and grinder, integral check valve, anti-siphon valve, controls and internal wiring. Provide power and control wiring between the grinder pumping unit and the respective wall box mounted on the outer wall of the Owner's premises.

### 2.02 GRINDER PUMPS

- A. The pump shall be an integral, vertical rotor, motor driven, solids handling pump of the progressive cavity type with a mechanical seal.
- B. The rotor shall be hardened stainless steel. The stator shall be compounded ethylene propylene synthetic elastomer. Use materials suitable for domestic wastewater service.
- C. Grinder/Impeller Assembly:
1. The grinder impeller assembly shall be securely fastened to the pump motor shaft. The grinder shall be rotating type with stationary hardened and ground chrome steel shredding ring spaced in accurate close annular alignment to two rotating stainless steel cutterbars of hardened Type 400 series stainless steel.
  2. Construct grinder to eliminate clogging and jamming under normal operating conditions including starting. Sufficient vortex action shall be created to scour tank free of deposits or sludge banks.

3. The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of "foreign objects", such as paper, wood, plastic, glass, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4" diameter discharge pipe.
- D. Mechanical Seal:
1. Stationary ceramic seat and carbon rotating sealing surface with faces precision lapped and held in position by a stainless steel spring.
- E. Motor:
1. Capacitor start, ball bearing, squirrel cage induction type with low starting current, not to exceed 30 amperes, and high starting torque of 8.4 ft. lbs. Provide an automatic reset and integral thermal overload protector to protect the motor against running overloads or locked rotor conditions.
- F. Integral Check Valve:
1. Equip the pump with a gravity operated, flapper type integral check valve built into the discharge pipe. Full-ported passageway when open. Friction loss shall be less than 6" of water at maximum rated flow.
  2. Type 300 series stainless steel and fabric reinforced synthetic elastomer working parts. Provide an internal non-metallic hinge for the flapper assembly to give maximum degree of freedom for assured seating at low backpressure. High gloss injection molded PVC valve body.
- G. Anti-Siphon Valve:
1. Equip the pump with an integral anti-siphoning air relief valve in the discharge piping below the main check valve to assure that the pump cannot lose prime, even under negative pressure conditions in the discharge piping system. Valve shall automatically close when the pump is running and open when the pump is off.

## 2.03 TANK

- A. Custom molded of high density polyethylene or fiberglass reinforced polyester (FRP) resin to withstand twice the loads developed by placement at the depth indicated on the Drawings. Bottom of the basin integrally sealed into basin wall.
- B. Anti-flotation ring formed as an integral part of basin structure. Tank shall have a nominal wall thickness of 3/16" and a minimum net capacity of 60 gallons.

- C. Basin inside diameter and height as indicated on the Drawings. Bolted and gasketed FRP basin cover.
- D. Discharge piping inside the tank shall be Series 304 stainless steel and terminate outside the accessway bulkhead with a stainless steel, 1-1/4" female NPT fitting.
- E. The discharge piping shall include a stainless steel ball valve rated for 200 psi.

#### 2.04 ACCESSWAY

- A. Provide an integral extension to the FRP tank with an access opening at the top to accept a lockable cover attached with stainless steel, tamper-proof fasteners. Accessway shall include the grinder pump discharge with a surface operable, positive seating quick disconnect coupling and a full ported shut-off valve terminating in a watertight bulkhead fitting with external 1-1/4" male pipe thread. Internal wiring shall terminate in a sealed junction box integral with the accessway and suitable for outdoor use.

#### 2.05 CONTROLS

- A. Provide air-bell level sensors integrally mounted on the motor assembly and connected through air-tight tubing to pressure switches for controlling pump operation and sensing an overflow condition.
- B. Equip each core with a quick disconnect breather assembly complete with check valve to assure reliable operation of pressure switches and to prevent accidental entry of water into motor compartment in the event of accessway flooding.
- C. Provide a wall box mounted on the exterior of the Owner's premises equipped with a visual and audible alarm. Provide power and control wiring from the wall box to the grinder pump units. Power to alarm must be on separate circuit from grinder pump.

### PART 3 – EXECUTION

#### 3.01 GENERAL

- A. Install sewage pump unit where indicated on the Drawings and in accordance with the manufacturer's instructions.

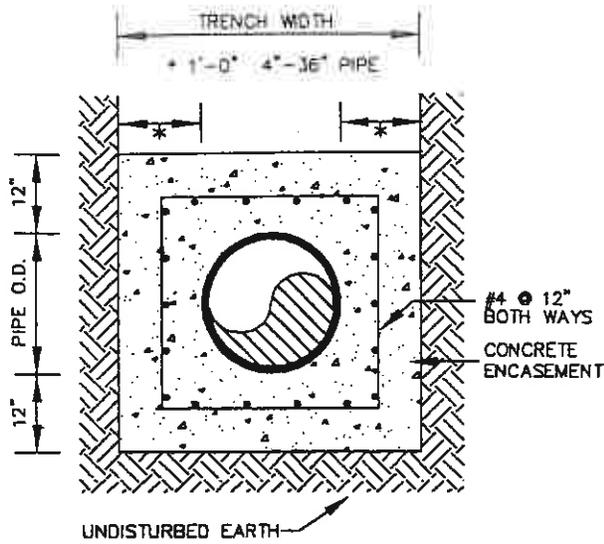
- B. Provide necessary piping, fittings and valves as indicated on the Contract Drawings.
- C. Provide cast-in-place concrete anti-flotation collar around pump basin or anchor basin to concrete pad, as indicated on the Contract Drawings.

### 3.02 START-UP

- A. Upon completion of erection, examine, adjust and test each unit for proper operation under the direction of the manufacturer's field engineer.
- B. Check and adjust liquid level control and alarm settings.

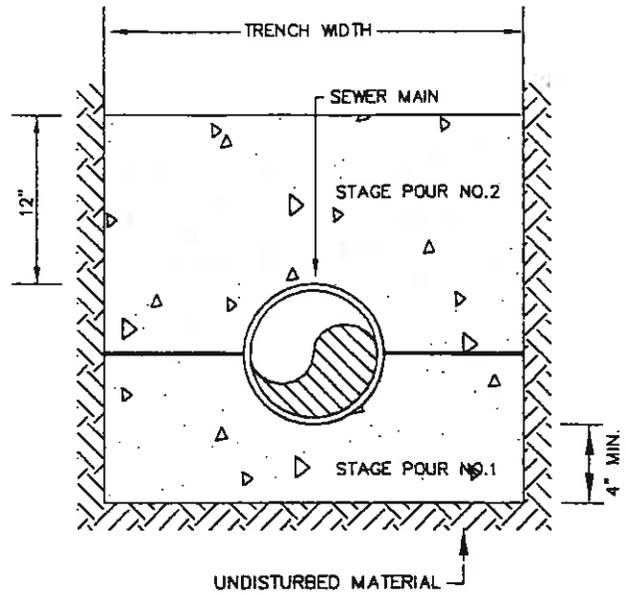
### 3.03 TESTING

- A. Test each grinder pumping station with clean water through minimum of four complete cycles including high-level and low-level conditions to demonstrate correct sequence of pump operation, pump control settings, alarm settings, freedom from pump vibration, noise and overheating.
- B. Demonstrate provision for pump removal and replacement.



**REINFORCED  
CONCRETE ENCASEMENT**

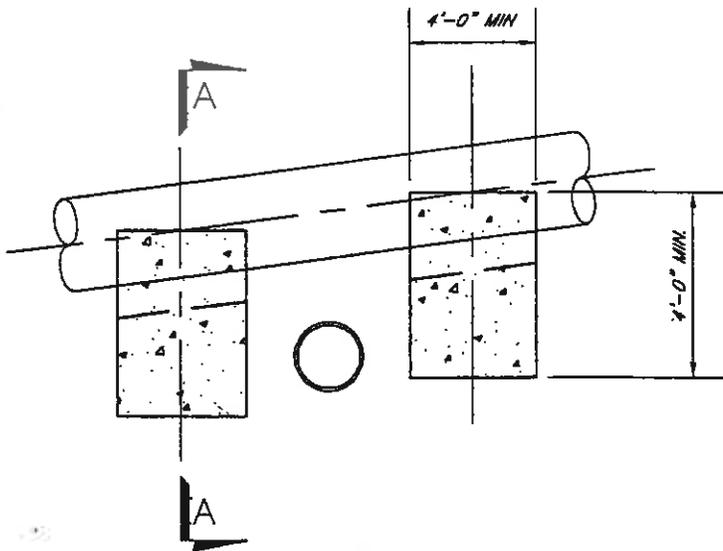
N.T.S.



STAGE 1—INSTALL CONCRETE FROM BOTTOM OF TRENCH TO CENTERLINE OF PIPE  
STAGE 2—AFTER 24 hr. PERIOD INSTALL CONCRETE FROM CENTERLINE OF PIPE TO 12" ABOVE BARREL OF PIPE.

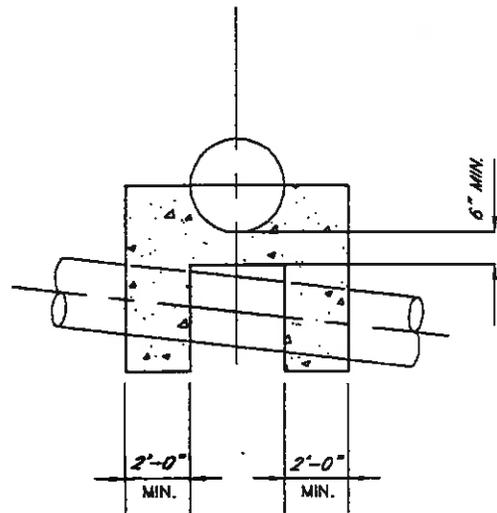
**CONCRETE ENCASEMENT**

N.T.S.



**CONCRETE PEDESTAL**

N.T.S.



**SECTION A - A**

N.T.S.

CONCRETE ENCASEMENT & PEDESTAL

PREPARED FOR:

BOROUGH OF CHAMBERSBURG

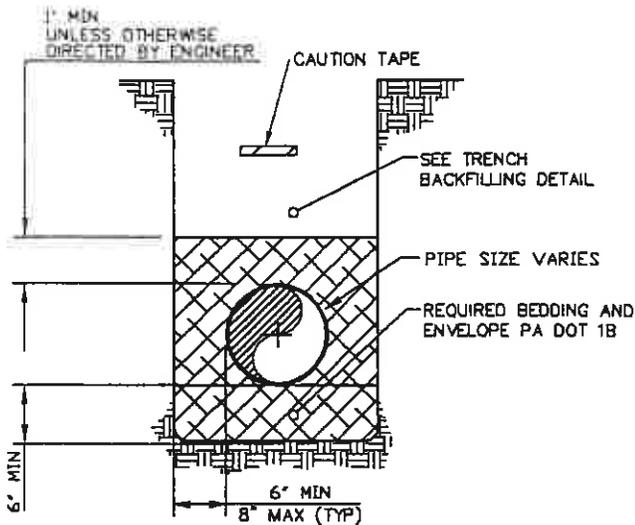


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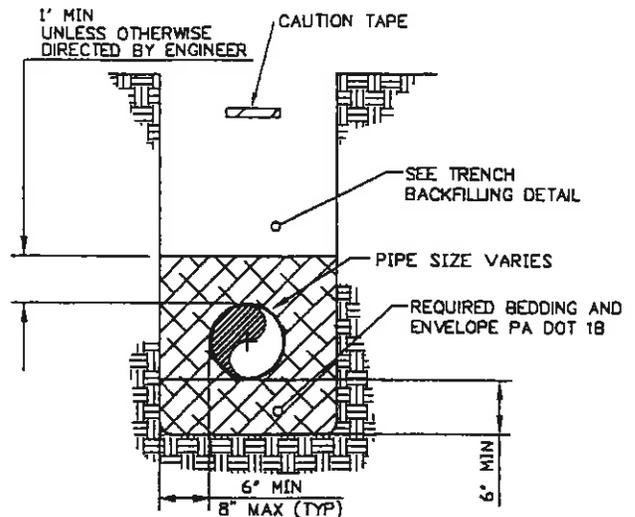
CHK BY: *Ed.*

DATE: MARCH 2003

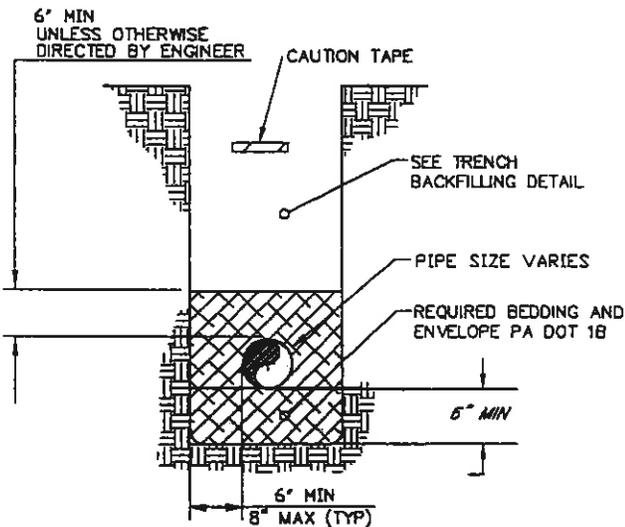
DWG NO. CHBG-S19



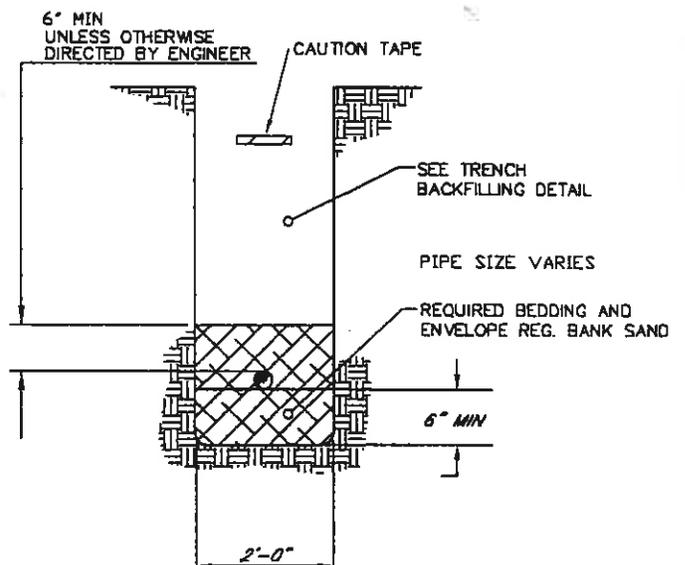
**STANDARD PIPE BEDDING—WATER MAIN**  
NOT TO SCALE



**STANDARD PIPE BEDDING—SANITARY MAIN**  
NOT TO SCALE

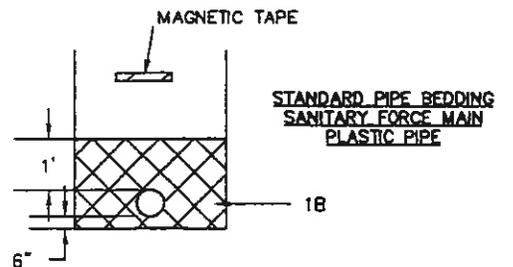
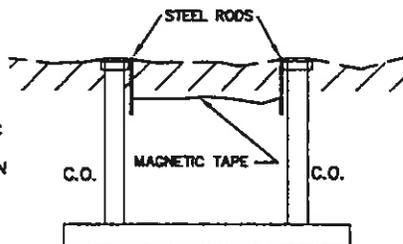


**STANDARD PIPE BEDDING—  
SANITARY LATERAL**  
NOT TO SCALE



**STANDARD PIPE BEDDING—  
WATER SERVICE**  
NOT TO SCALE

NOTE: ALL PLASTIC PIPE EXCEPT SEWER MAINS MUST HAVE MAGNETIC TAPE IN ONE CONTINUOUS RUN ATTACHED TO STEEL RODS AT CLEAN OUTS.



**PIPE BEDDING AND ENVELOPE**

PREPARED FOR:

**BOROUGH OF CHAMBERSBURG**

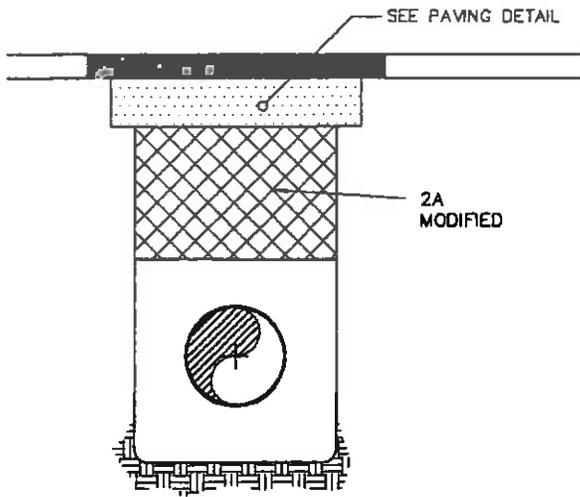


DSN BY: BKF

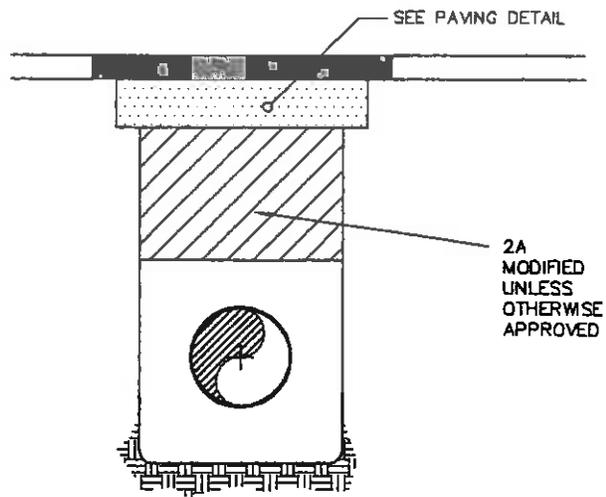
CHK BY: *EJ.*

DATE: MARCH 2003

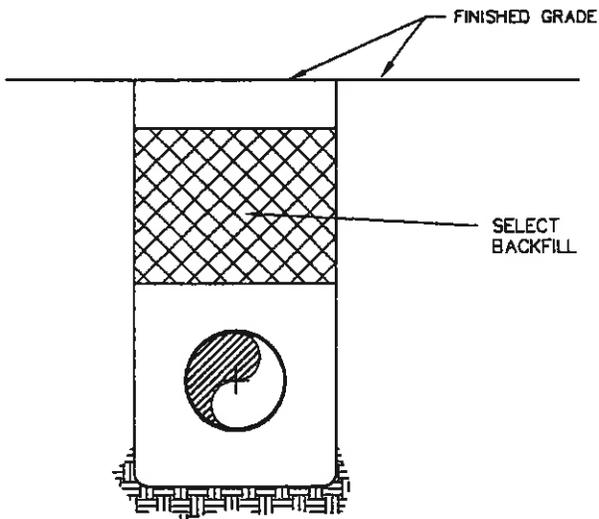
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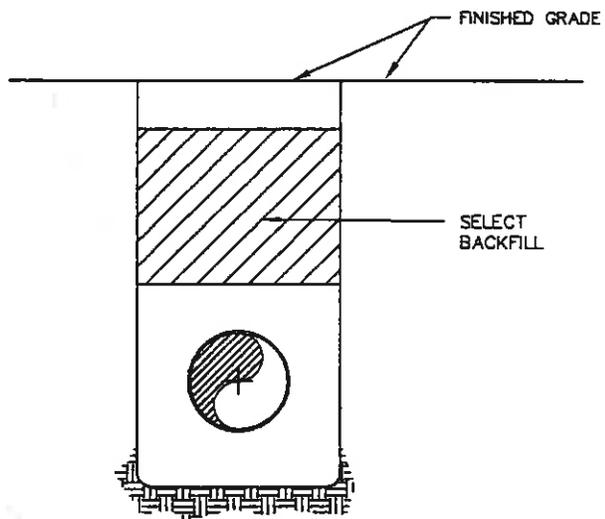
EXISTING ROADS  
PENNDOT R/W-BOROUGH R/W  
 NOT TO SCALE



BOROUGH R/W  
NEW SUBDIVISIONS OR LAND DEVELOPMENTS  
 NOT TO SCALE



UNPAVED AREAS  
WITHIN PUBLIC R/W  
 NOT TO SCALE



UNPAVED AREAS  
OUTSIDE PUBLIC R/W  
 NOT TO SCALE

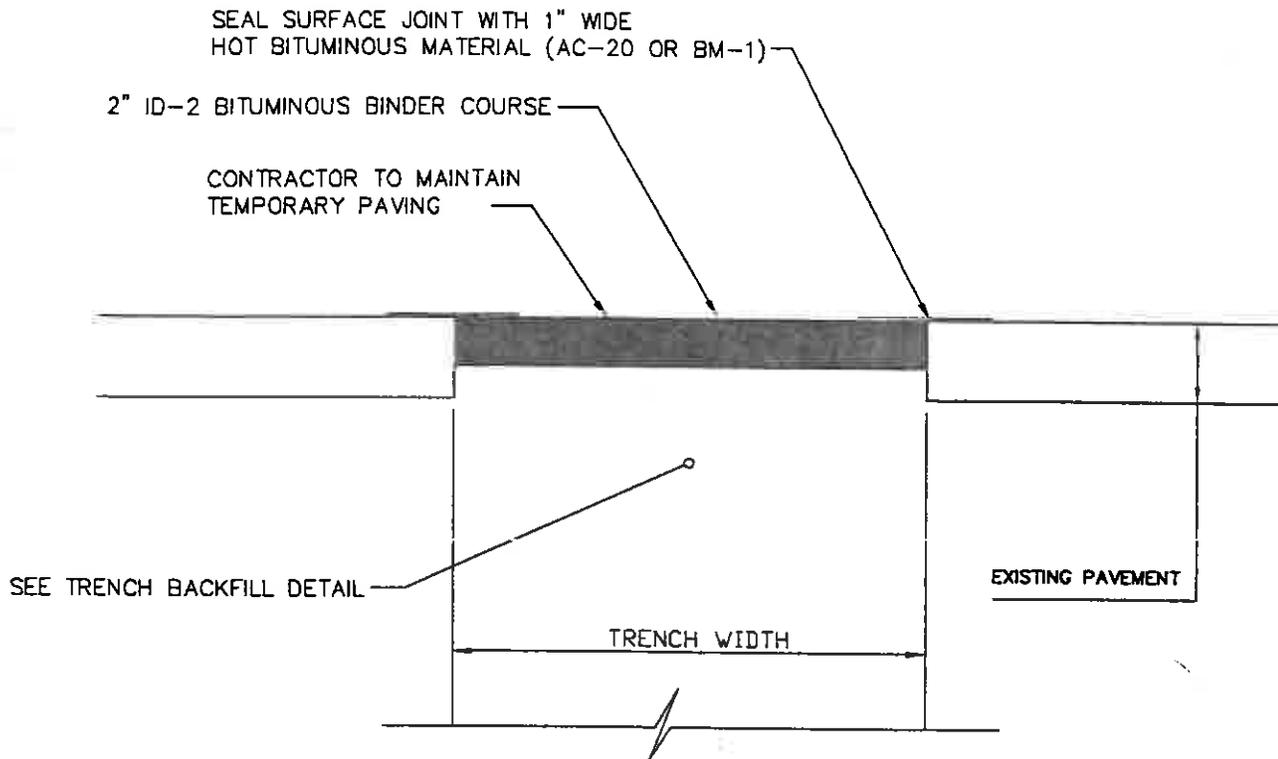
NOTES :

1. REFER TO BOROUGH OF CHAMBERSBURG SPECIFICATIONS FOR ROAD RESTORATION
2. SPECIFICATIONS MAY BE OBTAINED FROM BOROUGH ENGINEER OR THE PUBLIC WORKS DIRECTOR.

TRENCH BACKFILL  
 PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF  
 CHK BY: *EL*  
 DATE: MARCH 2003  
 DWG NO. CHBG-S21



TEMPORARY TRENCH RESTORATION

NO SCALE

TEMPORARY PAVEMENT RESTORATION  
 PREPARED FOR:  
 BOROUGH OF CHAMBERSBURG



DRAWN BY: BKF
CHK BY: <i>ES.</i>
DATE: MARCH 2003
DWG NO. S-22

## **APPENDIX A**

## STANDARD MATERIAL LIST

<u>Material</u>	<u>Manufacturer</u>	<u>Brand Name or Model</u>
<b>1. <u>Water Main:</u></b>		
Ductile Iron Pipe Cement Lined, Thickness Class 52, 4" through 24" Diameter		
Push on Joint	Griffin Atlantic States	
Restrained Joint	Griffin US Pipe	
Flanged & Mechanical Joint	Griffin US Pipe Atlantic States	
<b>2. <u>Ductile Iron Fittings</u></b>		
Pressure Class 350, Mechanical Joint, Compact or Full Size		
	Tyler Pipe Griffin Pipe US Pipe	Trim Tye
<b>3. <u>DIP Mechanical Joint Retaining Gland</u></b>	EBA Iron Sales Ford	MegaLug 1100 Series
<b>4. <u>DIP Bell Joint Repair Clamps</u></b>	Smith-Blair Ford Mueller	274 Bell Jt. Repair Clamp H-771
<b>5. <u>Steel Couplings for DIP and CI Pipe</u></b>	Ford Dresser	FC-1 / FC-2
<b>6. <u>Flanged Coupling Adaptors</u></b>	Ford	FFCA
<b>7. <u>CI and DIP Repair Clamps/Couplings</u></b>	Ford Mueller Romac	510,520,530,500 Series

<u>Material</u>	<u>Manufacturer</u>	<u>Brand Name or Model</u>
<b>8. <u>Tapped Repair Clamp</u></b>	Mueller Mueller Ford Romac	Servi-Seal Xtra-Range Servi-Seal FS1-T CL1, CL2, 306
<b>9. <u>Tapping Sleeve</u></b>	American Darling Mueller	
<b>10. <u>Tapping Sleeve</u></b>	Mueller American Darling	Super Seat Resilient Seat 2500 Series
<b>11. <u>Gate Valves</u></b>		
Resilient Seat, Non-Rising Stem, Open Right, Mechanical Joint Ends, and Flanged Ends, 3" through 12".		
	American Darling Kennedy Valve US Pipe Mueller	2500 Series Kenseal II MetroSeal 250 Super Seal Res. Seat Valve: MJ: A-2360 Flanged: series
<b>12. <u>Butterfly Valves</u></b>		
Resilient Seat, Open Right, 14" and Larger.		
	Pratt American Darling Kennedy Valve Mueller	Groundhog
<b>13. <u>Air/Vacuum/Pressure Release Valves, Universal Or Combination Type</u></b>	Val-Matic	
<b>14. <u>Fire Hydrants</u></b>		
(Post Type, Dry Barrel) Open Left, Square Operating Nuts	American Darling	B-62-B

<u>Material</u>	<u>Manufacturer</u>	<u>Brand Name or Model</u>
15. <u>Indicator Posts</u>	Mueller American Darling	
16. <u>Meter Box</u>	Mid State McDonald	
17. <u>Pit Meter Setter</u>	(Man) Ford	(BNORM) VHH72-18-44-336
18. <u>Cover to Meter Box</u>	Ford	W32
19. <u>Valve Box</u> <u>Screw Type</u>	Tyler Pipe Russel Foundry	Lid to say water
20. <u>Curb Boxes and Lids</u>	Tyler	93-D
21. <u>Curb Stops</u> <u>Compression Type Only</u>	Mueller Mueller Ford	Compression B-44-333-G
22. <u>Corporation Stops</u>	Mueller Ford	B-25008 F-1000
23. <u>PVC Sewer Pipe</u> <u>SDR 35</u>	Cresline J-M Mfg. Diamond Plastics	
24. <u>PVC Gasketed SDR 35</u> <u>Heavy Walled Sewer</u> <u>Fittings (PSM)</u>	Harco Multi Cresline	
25. <u>Saddle Wye for</u> <u>SDR-35 PVC Pipe</u>	Cresline Harco	SM 95 255 Series
26. <u>Saddle Tee for</u> <u>SDR-35 PVC Pipe</u>	Cresline  Harco Multi	SM 92  256 Series

<u>Material</u>	<u>Manufacturer</u>	<u>Brand Name or Model</u>
27. <u>C/O Caps</u> <u>Cast Iron with Brass</u> <u>Counter Sink Lid</u>	Panella	
28. <u>Manhole Precast Cone,</u> <u>Riser, Base sections</u>	York Concrete Monarch Semler	
29. <u>Drop MH Precast Base</u> <u>Section</u>	York Monarch Semler	Outside Drop Outside Drop Outside Drop
30. <u>Butyl Rubber Section Joint</u> <u>Material</u>		Ram-Nek RUB'R-NEK
31. <u>Frame and Cover</u>	East Jordon Iron Works	Cover – 2070770 Frame – 154510
32. <u>Watertight Frame and Cover</u>	East Jordon Iron Works	Watertight – 2070613
33. <u>Cored MH Waterstop</u>	NPC, Inc.	Kor-N-Seal 1
34. <u>Field Installed</u> <u>Waterstops</u>	Harco Linkseal Fernco Or equal	Sand Collar Type CMA Concrete MH Adapter CMA Concrete MH Adapter
35. <u>Force Main Pressure Sewer</u> SDR 21 PVC	Cresline J-M Manufacturing Diamond Plastics	