

# CITY OF WICHITA, KANSAS

## NEIL D. CABLE, P.E., CITY ENGINEER

# STORM WATER DRAIN #197

IN

## WILSON ESTATES MEDICAL PARK

### CITY OF WICHITA PUBLIC PROJECT NO. 468-83564

### OCA NO. 751323

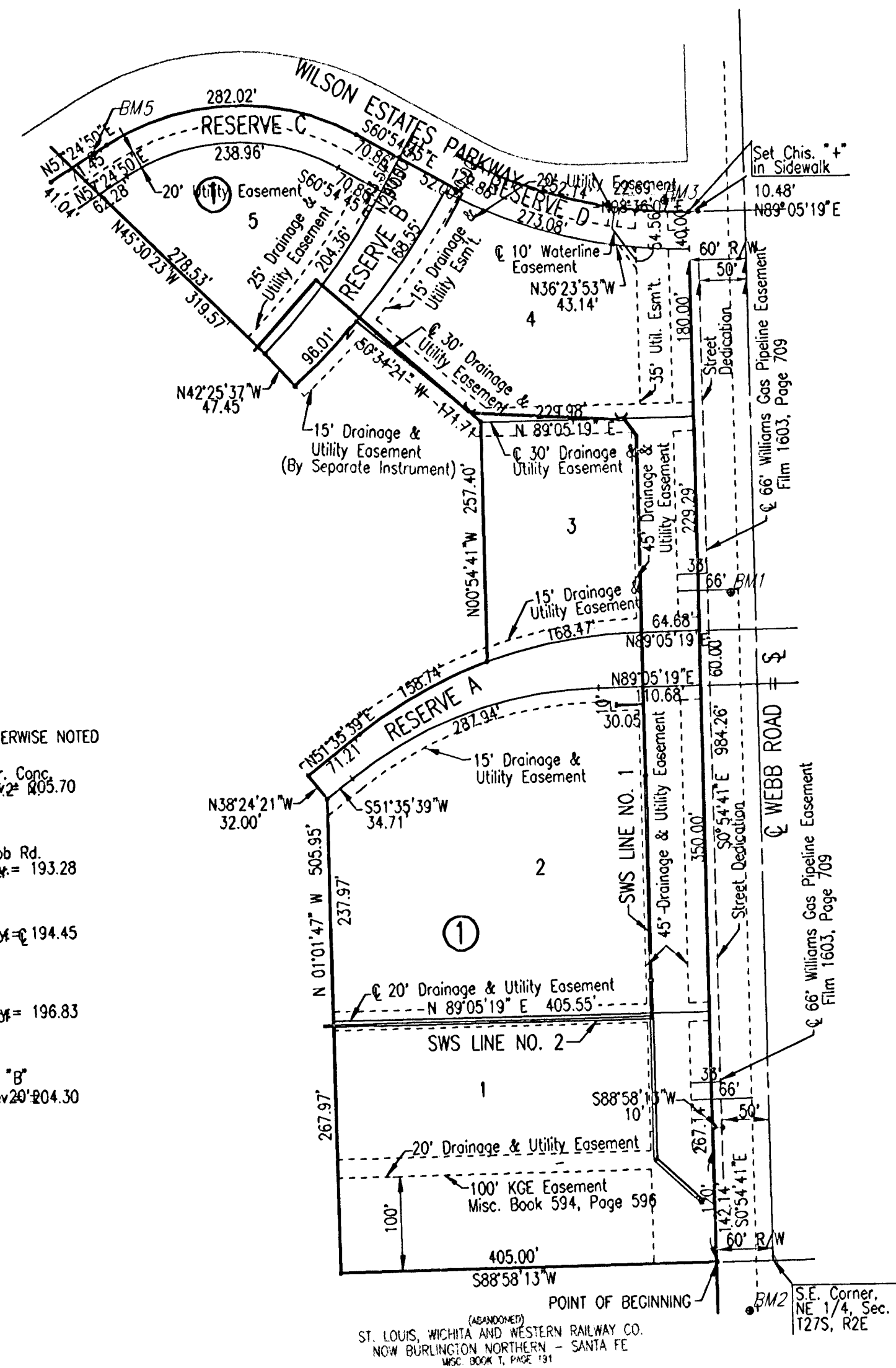
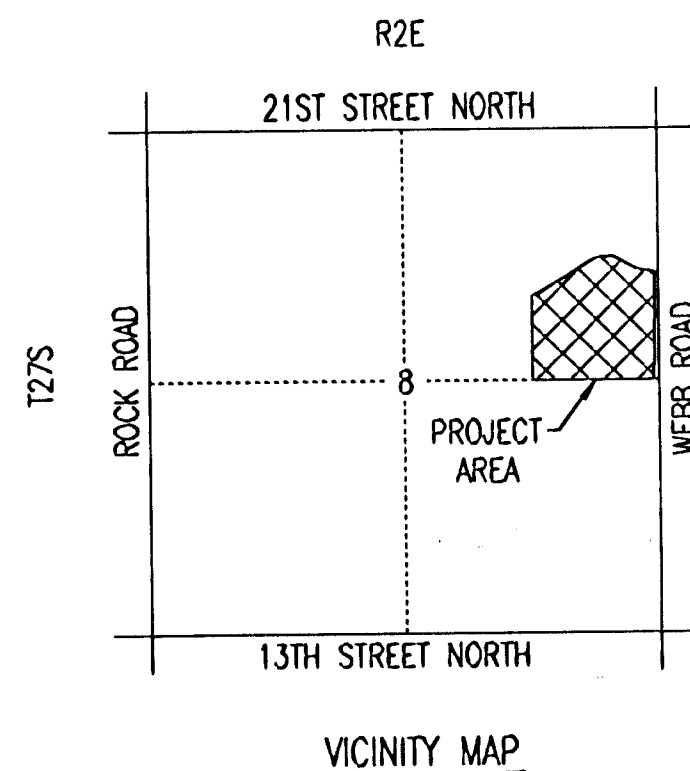
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**NOTE TO CONTRACTOR**

CONTRACTOR SHALL VISIT SITE AND EVALUATE SITE CONDITIONS AT TIME OF BIDDING IN ORDER TO SATISFY HIMSELF OF CURRENT SITE CONDITIONS.

COORDINATE LIST		
POINT	NORTH	EAST
1	14,585.1992	18,654.1580
2	14,630.5440	18,604.0668
3	14,782.8239	18,601.6450
4	14,822.3188	18,601.0168
5	15,041.8416	18,597.5256
6	15,118.3194	18,567.2531
7	15,118.7768	18,596.2854
8	15,409.4219	18,591.6792
9	15,427.5034	18,575.4462
10	15,437.7664	18,409.7748
11	15,522.5977	18,312.9401
12	15,579.7372	18,248.1603
13	15,504.4705	18,180.8709
14	14,780.7893	18,473.4721
15	14,778.0838	18,303.6321
16	14,777.2955	18,254.1487



- Not to Scale
- = 3/4" IRON PIPE W/PEC CAP UNLESS OTHERWISE NOTED
  - C.O.W. BM: City of Wichita Brass Disc. NE Cor. Cong. Vault 415' W. of Webb Rd. and 4392' 405.70' E 21st St. N.
  - BM #1: "d" Top center curb inlet W. side Webb Rd. 66'± N. of E. Entrance to Eastminster = 193.28 Presbyterian Church
  - BM #2: "d" Top W. curb Webb Rd., 16'± S. of E. 194.45 of R.R. Tracks
  - BM #3: Chiseled "d" ctr. curb inlet on S. side Wilson Estates Parkway just W. of Webb Rd. = 196.83
  - BM #5: Chiseled "d" N. side Sidewalk in Res. "B" (S. of Wilson Est. Parkway) mid W. of P.C. = 204.30



Booked  
E-22  
3/24/04  
R.D.L.

**GENERAL NOTES**

UNDERGROUND UTILITY SERVICE LINES AND OVERHEAD UTILITY POLE LINES ARE TO BE ADJUSTED AS NECESSARY BY OTHERS PRIOR TO CONSTRUCTION UNLESS THE PLANS SPECIFICALLY CALL FOR THEIR ADJUSTMENT BY THE CONTRACTOR. EXISTING UTILITIES AND THEIR LOCATION, AS SHOWN ON THE PLANS, REPRESENT THE BEST INFORMATION OBTAINABLE FOR DESIGN. LOCATION INFORMATION HAS BEEN OBTAINED FROM THE VARIOUS UTILITY COMPANIES AND IS EITHER FROM COMPANY RECORD DRAWINGS OR COMPANY PROVIDED FIELD LOCATIONS. THE CONTRACTOR WILL BE REQUIRED TO WORK AROUND EXISTING UTILITIES WITHIN THE RIGHT-OF-WAY WHICH DO NOT CONFLICT WITH PROPOSED CONSTRUCTION. CONTRACTOR SHALL SATISFY HIMSELF OF SUBSURFACE CONDITIONS PRIOR TO BIDDING.

TREES AND SHRUBS IN PUBLIC RIGHT-OF-WAY WHICH ARE IN DIRECT CONFLICT WITH PROPOSED NEW CONSTRUCTION SHALL BE REMOVED BY THE CONTRACTOR WITH THE ENGINEER'S APPROVAL. TREES AND SHRUBS WHICH ARE NOT IN DIRECT CONFLICT WITH PROPOSED NEW CONSTRUCTION SHALL BE SAVED AND PROTECTED FROM DAMAGE.

RUBBLE FROM THE REMOVAL OF MISCELLANEOUS STRUCTURES SHALL BE DISPOSED OF ON SITES TO BE PROVIDED BY THE CONTRACTOR AND APPROVED AS NOTED.

ALL DISPOSAL SITES MUST BE APPROVED BY THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT. MATERIAL EITHER STOCKPILED OR DISPOSED OF IN A FLOOD PLAIN WOULD REQUIRE A KANSAS STATE BOARD OF AGRICULTURE PERMIT. ANY MATERIAL DUMPED IN WATERS OF THE UNITED STATES OR WETLANDS IS SUBJECT TO U.S. CORPS OF ENGINEERS PERMITTING REGULATIONS. ANY MATERIAL BURIED OR STOCKPILED BEYOND APPROVED CONSTRUCTION LIMITS WOULD REQUIRE ADDITIONAL ARCHEOLOGICAL INVESTIGATIONS UNLESS BURIED IN A PREVIOUSLY APPROVED BORROW LOCATION.

ALL APPROVED EXCESS EXCAVATION WHICH IS TO BE WASTED SHALL BE STOCKPILED WITHIN WILSON ESTATES MEDICAL PARK AT NO ADDITIONAL COST TO THE OWNER. STOCKPILE LOCATIONS SHALL BE AS DIRECTED BY MR. GEORGE E. LAHAM, AT 316-292-3950. WASTE MATERIAL SHALL BE GRADED SMOOTH AND SLOPED TO DRAIN. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO OTHER BID ITEMS.

ALL LAWN/TURF AREAS DISTURBED BY CONSTRUCTION OF THE PROPOSED IMPROVEMENTS SHALL BE SEEDED PER THE SPECIFICATIONS OR RESTORED WITH THE SAME GRASS/SOD AS EXISTING. RESTORATION OF DISTURBED AREAS SHALL INCLUDE, BUT NOT BE LIMITED TO, TOP SOIL PREPARATION, SEEDING, MULCH, AND/OR RESEEDING. ALL SEEDING/SODDING WORK SHALL BE IN ACCORDANCE WITH THE CITY OF WICHITA STANDARD SPECIFICATIONS AND THE CITY OF WICHITA ADMINISTRATIVE REGULATION NO. AR78 WHICH GOVERNS CLEANUP AND RESTORATION OR REPLACEMENT FOLLOWING CONSTRUCTION.

CONTRACTOR SHALL PROVIDE A MINIMUM SEVENTY-TWO (72) HOUR ADVANCE NOTICE (EXCLUDING WEEKENDS AND HOLIDAYS) PRIOR TO BEGINNING ANY EXCAVATION, TO KANSAS ONE-CALL SYSTEM, A UTILITY LOCATION SERVICE, AT (316) 687-2470 TO REQUEST THE FOLLOWING UTILITY COMPANIES TO LOCATE ALL EXISTING LINES WITHIN THE PROJECT AREA: K.G.S. GAS, PEOPLES NATURAL GAS, WESTAR ENERGY, SOUTHWESTERN BELL TELEPHONE, COX COMMUNICATIONS, CITY OF WICHITA SEWER MAINTENANCE AND CITY OF WICHITA WATER DEPARTMENT.

THE CONTRACTOR SHALL GIVE ALL PROPERTY OWNERS AND/OR TENANTS OF DEVELOPED PROPERTY ADJUTING THE CONSTRUCTION OF THIS PROJECT A MINIMUM OF TEN (10) DAYS ADVANCE NOTICE PRIOR TO START OF CONSTRUCTION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PRESERVING PROPERTY IRONS. THE CONTRACTOR WILL BE REQUIRED TO RE-ESTABLISH ANY PROPERTY IRONS WHICH ARE DAMAGED OR DESTROYED BY HIS CONSTRUCTION OPERATIONS. SUCH IRONS SHALL BE RE-ESTABLISHED BY A LICENSED LAND SURVEYOR IN ACCORDANCE WITH STATE LAWS.

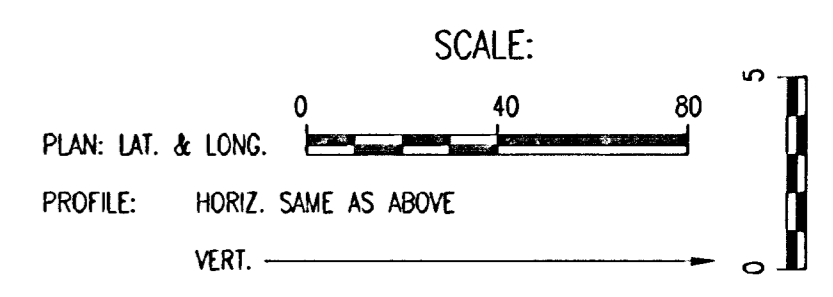
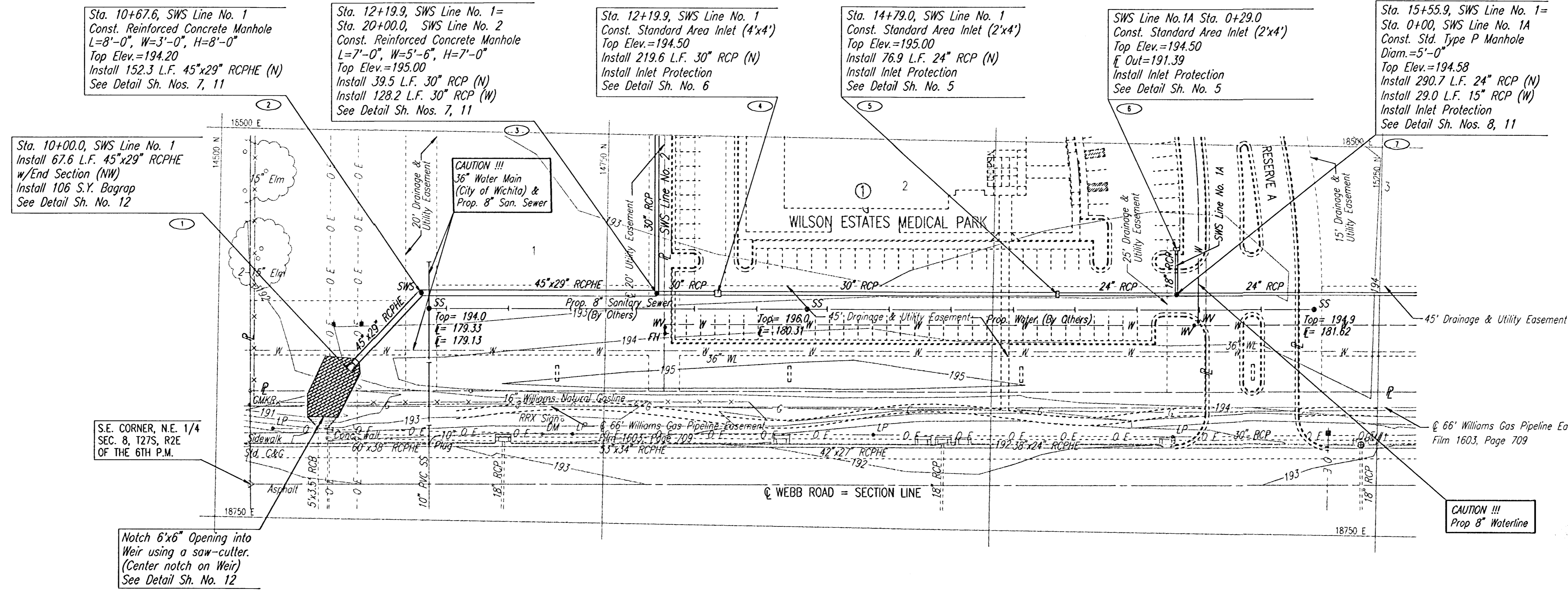
THE WATER DEPARTMENT SHALL LOCATE WATER VALVES ONE TIME DURING CONSTRUCTION WHEN REQUESTED BY THE CONTRACTOR. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PRESERVE SUCH FIELD LOCATIONS DURING THE CONSTRUCTION PROCESS. WATER VALVES, WATER VALVE BOXES OR FIRE HYDRANTS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN EXPENSE.

**JANUARY 2003**  
**PLANS PREPARED BY**  
**PROFESSIONAL ENGINEERING CONSULTANTS, P.A.**  
**ENGINEERS**  
**WICHITA, KANSAS**

DATE: \_\_\_\_\_  
 BY: \_\_\_\_\_  
 CHECKED: \_\_\_\_\_  
 PLAN

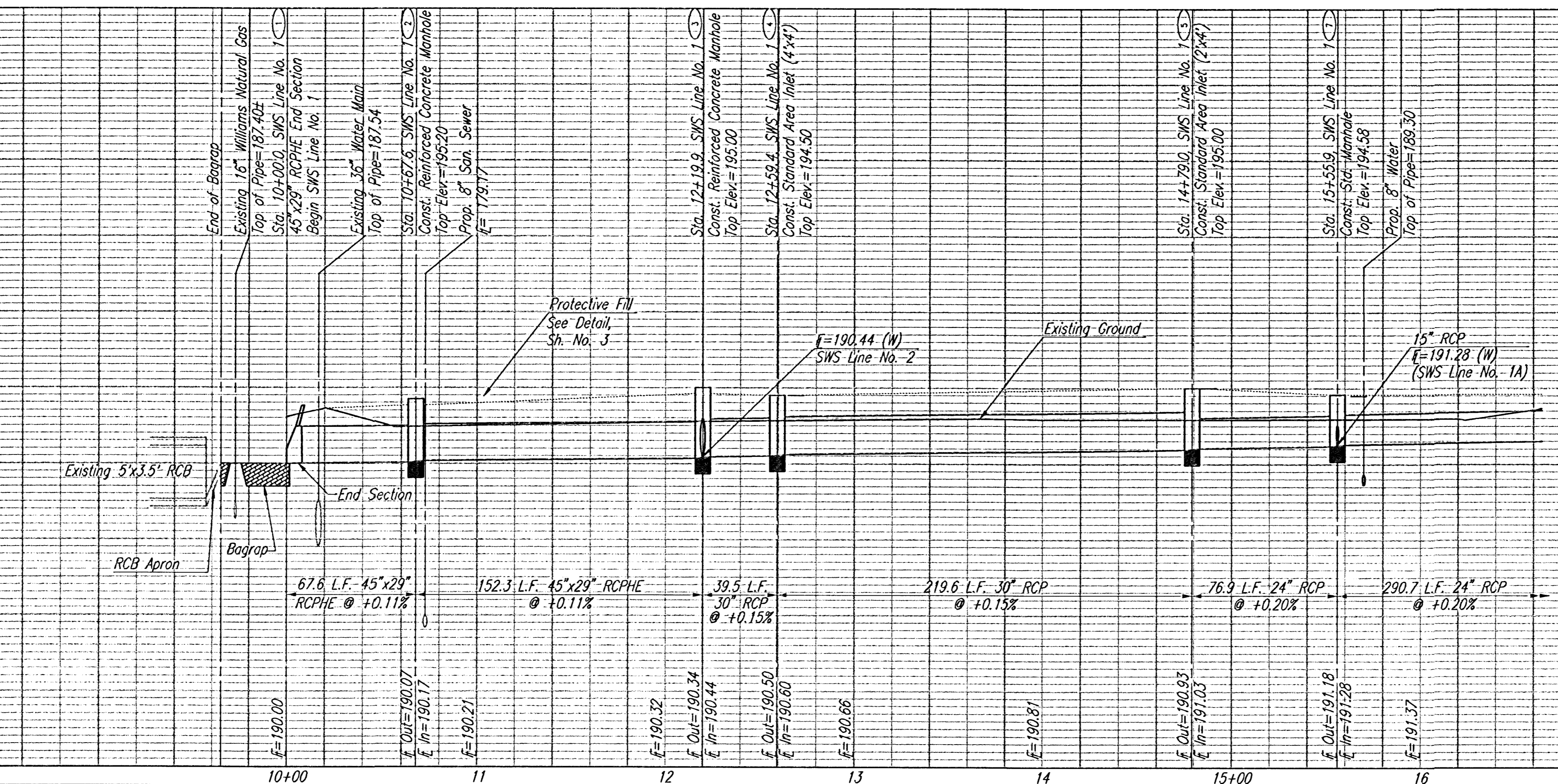
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 BY: \_\_\_\_\_  
 CHECKED: \_\_\_\_\_  
 PROFILE

DSNR: SAW OPER: SPL SCALE: 1"=40.00'  
 Q:\2002\02620\SS-SWS\SWS\02swn101b 01-07-2003 10:02:08 am



COORDINATE LIST		
POINT	NORTH	EAST
1	14,585.1992	18,654.1580
2	14,630.5440	18,604.0668
3	14,782.8239	18,601.6450
4	14,822.3188	18,601.0168
5	15,041.8416	18,597.5256
6	15,118.3194	18,567.2531
7	15,118.7768	18,596.2854

① = COORDINATE POINT NO.



CITY OF WICHITA, KANSAS  
 NEL D. CASE, P.E. - CITY ENGINEER  
 WILSON ESTATES MEDICAL PARK

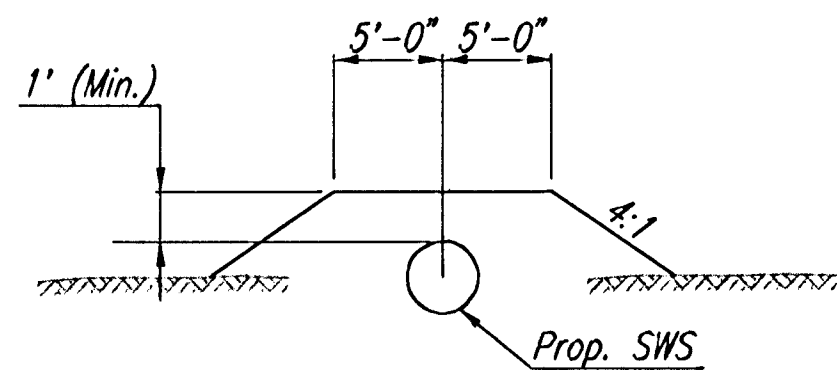
**SWS LINE NO. 1**  
 STA. 10+00.0 TO STA. 15+55.9  
 PUBLIC PROJECT NO. 157-468-85954

Professional Engineering Consultants, P.A.  
 303 S. TOPEKA - WICHITA, KANSAS 67202  
 316-262-2691 • FAX 316-262-3003

Designed By: SPL, DRC  
 Job No. 36-02620-3432  
 Date January 2003

Drawn By: SPL

DATE	
BY	
CHECKED	
CHECKED	
PLAN	



**PROTECTIVE FILL DETAIL**

Protective fill shall be provided where cover over the prop. SWS is less than 1 foot. (Cost Subsidiary to Pipe Installation)

Sta. 18+46.6, SWS Line No. 1  
Const. Adjustable Manhole  
L=5'-0", W=5'-0"  
Top Elev.=197.40  
Install 24.3 L.F. 24" RCP (NW)  
See Detail Sh. Nos. 9, 11

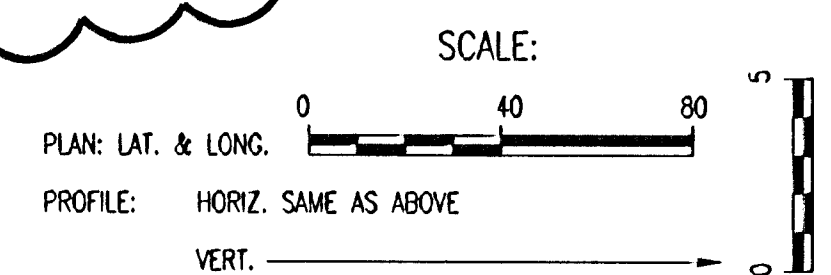
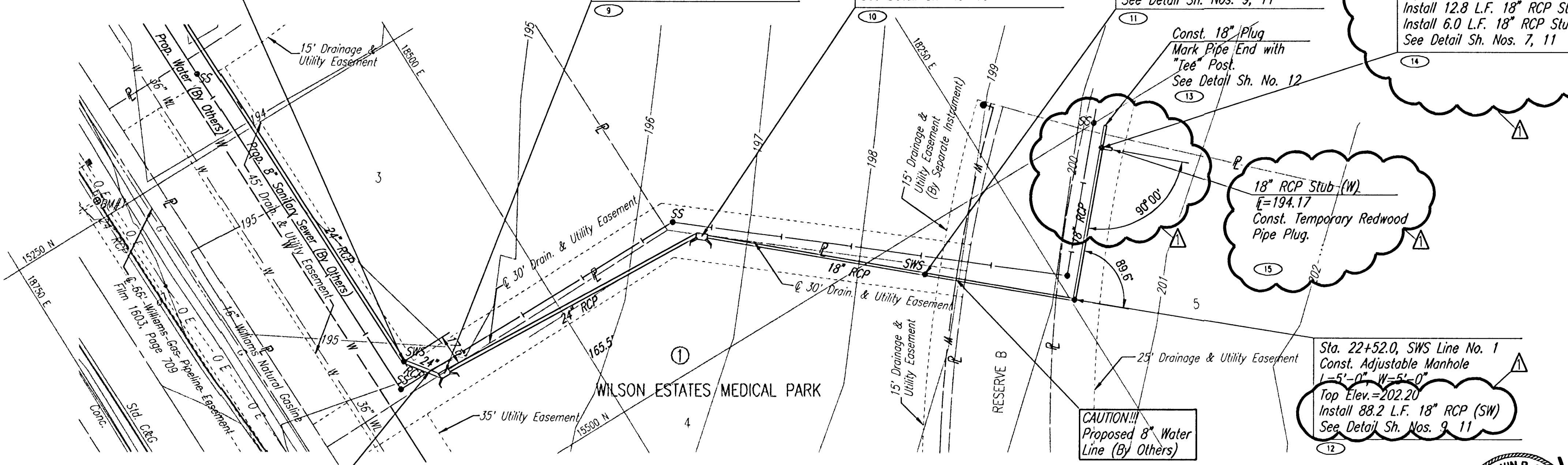
Sta. 18+70.9, SWS Line No. 1  
Const. Std. Type 1A Curb Inlet  
L=5'-0", W=6'-0"  
Top Elev.=197.50  
Install 166.0 L.F. 24" RCP (W)  
See Detail Sh. No. 10

Sta. 20+36.9, SWS Line No. 1  
Const. Std. Type 1A Curb Inlet  
L=5'-0", W=5'-0"  
Top Elev.=199.50  
Install 128.7 L.F. 18" RCP (NW)  
See Detail Sh. No. 10

Sta. 21+65.6, SWS Line No. 1  
Const. Adjustable Manhole  
L=4'-0", W=4'-0"  
Top Elev.=201.00  
Install 86.4 L.F. 24" RCP (NW)  
See Detail Sh. Nos. 9, 11

Sta. 23+40.2, SWS Line No. 1  
Const. Reinforced Concrete Manhole  
L=5'-0", W=5'-0"  
Top Elev.=201.60  
Install 12.8 L.F. 18" RCP Stub(SW)  
Install 6.0 L.F. 18" RCP Stub(W)  
See Detail Sh. Nos. 7, 11

Sta. 22+52.0, SWS Line No. 1  
Const. Adjustable Manhole  
L=5'-0", W=5'-0"  
Top Elev.=202.20  
Install 88.2 L.F. 18" RCP (SW)  
See Detail Sh. Nos. 9, 11

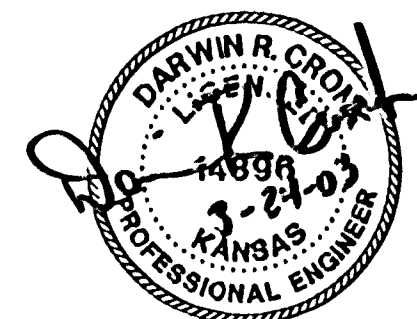


COORDINATE LIST		
POINT	NORTH	EAST
8	15,409.4219	18,591.6792
9	15,427.5034	18,575.4462
10	15,437.7664	18,409.7748
11	15,522.5977	18,312.9401
12	15,579.7372	18,248.1603
13	15,304.4705	18,180.8709
14	15,514.0060	18,189.3958
15	15,518.0050	18,184.9228

8 = COORDINATE POINT NO.

**CAUTION!!!**  
Proposed 8" San. Sewer (By Others)

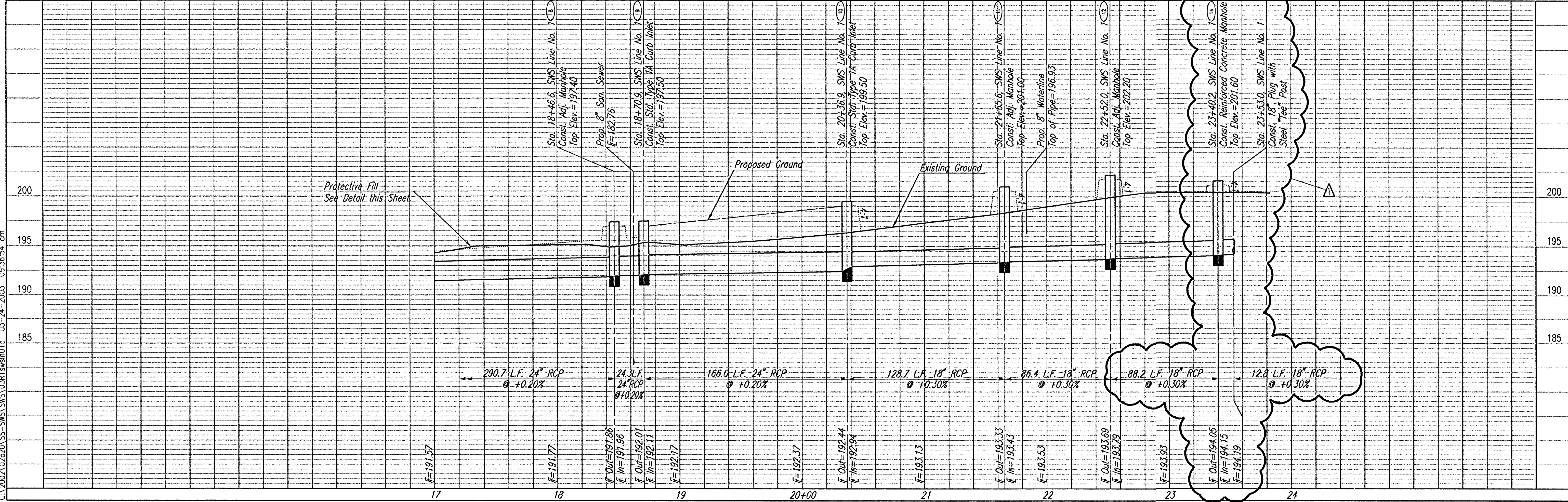
**CAUTION!!!**  
Proposed 8" Water Line (By Others)



ADD REINFORCED CONCRETE MANHOLE AND STUB (W) 3-24-03

DATE	
BY	
CHECKED	
CHECKED	
PROFILE	

DSNR: SAW OPER: SPL SCALE: 1"=40.00  
GL: 2002.07.02.00.55-SWS SWS\JDR\15win\01c 03-24-2003 09:36:54 am

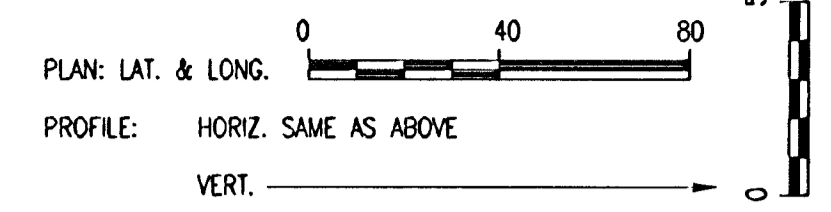


CITY OF WICHITA, KANSAS  
NEIL D. COBLE, P.E., CITY ENGINEER  
WILSON ESTATES MEDICAL PARK  
**SWS LINE NO. 1**  
STA. 18+46.6 TO STA. 23+53.0  
PUBLIC PROJECT NO. 197-468-83564

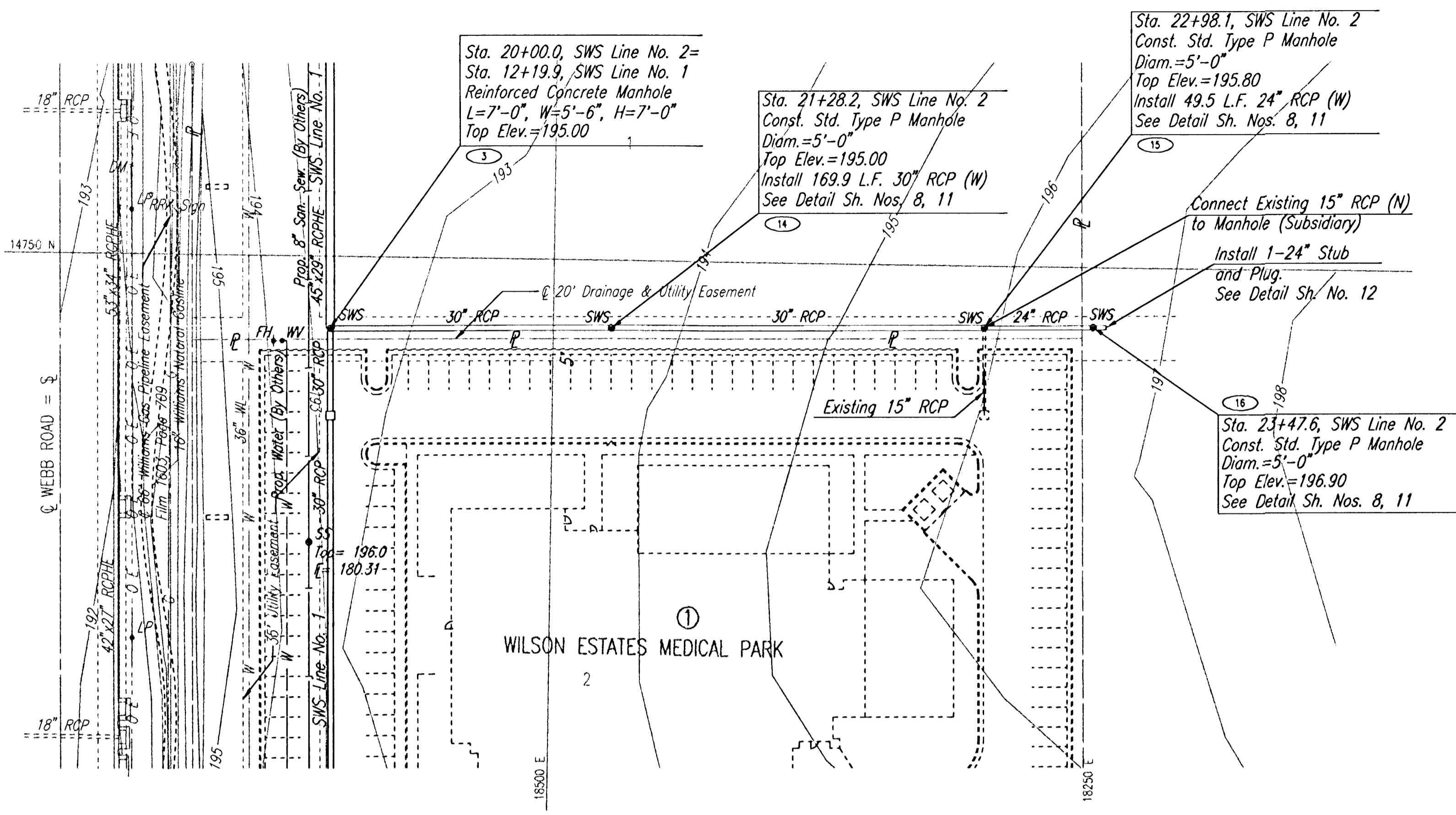
Professional Engineering Consultants, P.A.  
303 S. TOPEKA • WICHITA, KANSAS 67202  
316-262-2691 • FAX 316-262-3003  
Designed By: SPL, DRC Job No. 36-02620-3432 Date: January 2003  
Drawn By: SPL

Line 2 moved 1' S to avoid gas + electric.

SCALE:



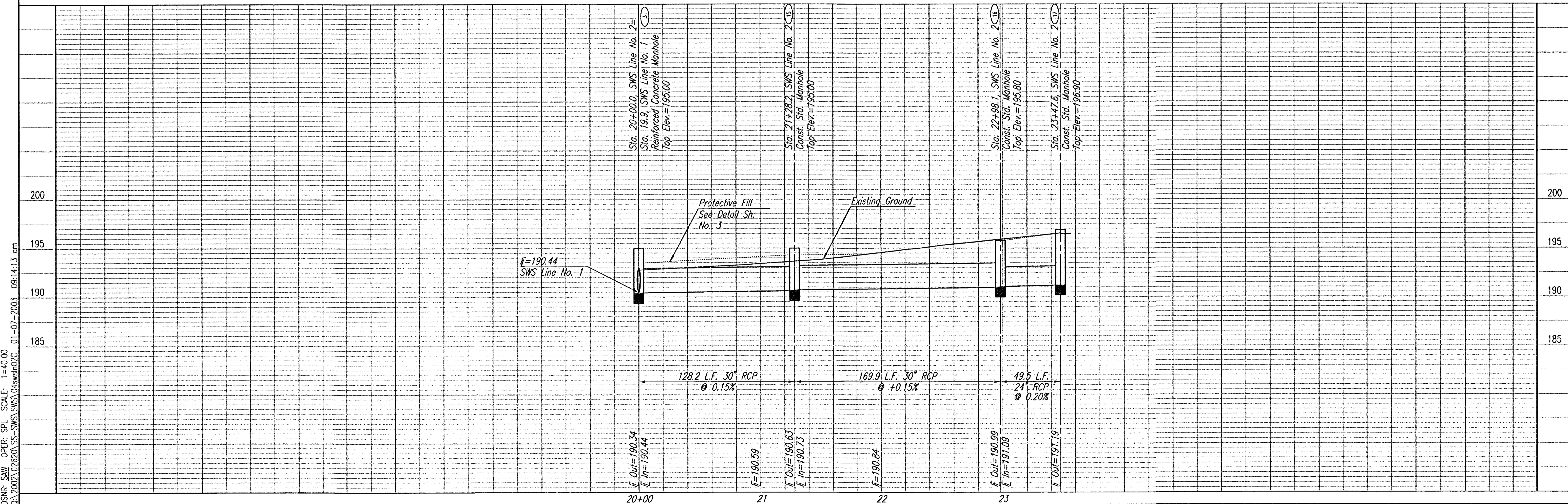
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	CHECKED	



COORDINATE LIST		
POINT	NORTH	EAST
3	14,782.8239	18,601.6450
14	14,780.7893	18,473.4721
15	14,778.0838	18,303.6321
16	14,777.2955	18,254.1487

③ = COORDINATE POINT NO.

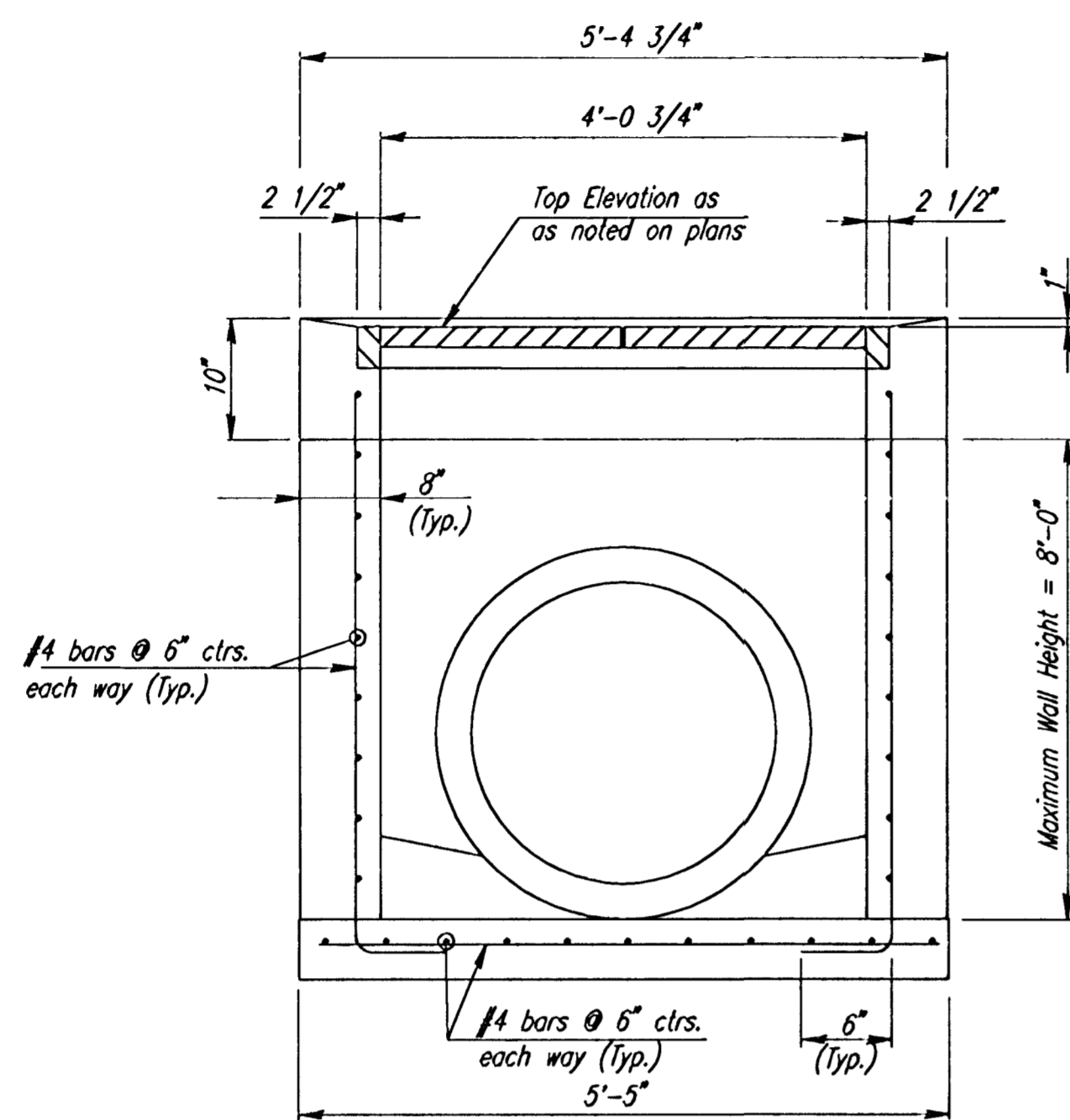
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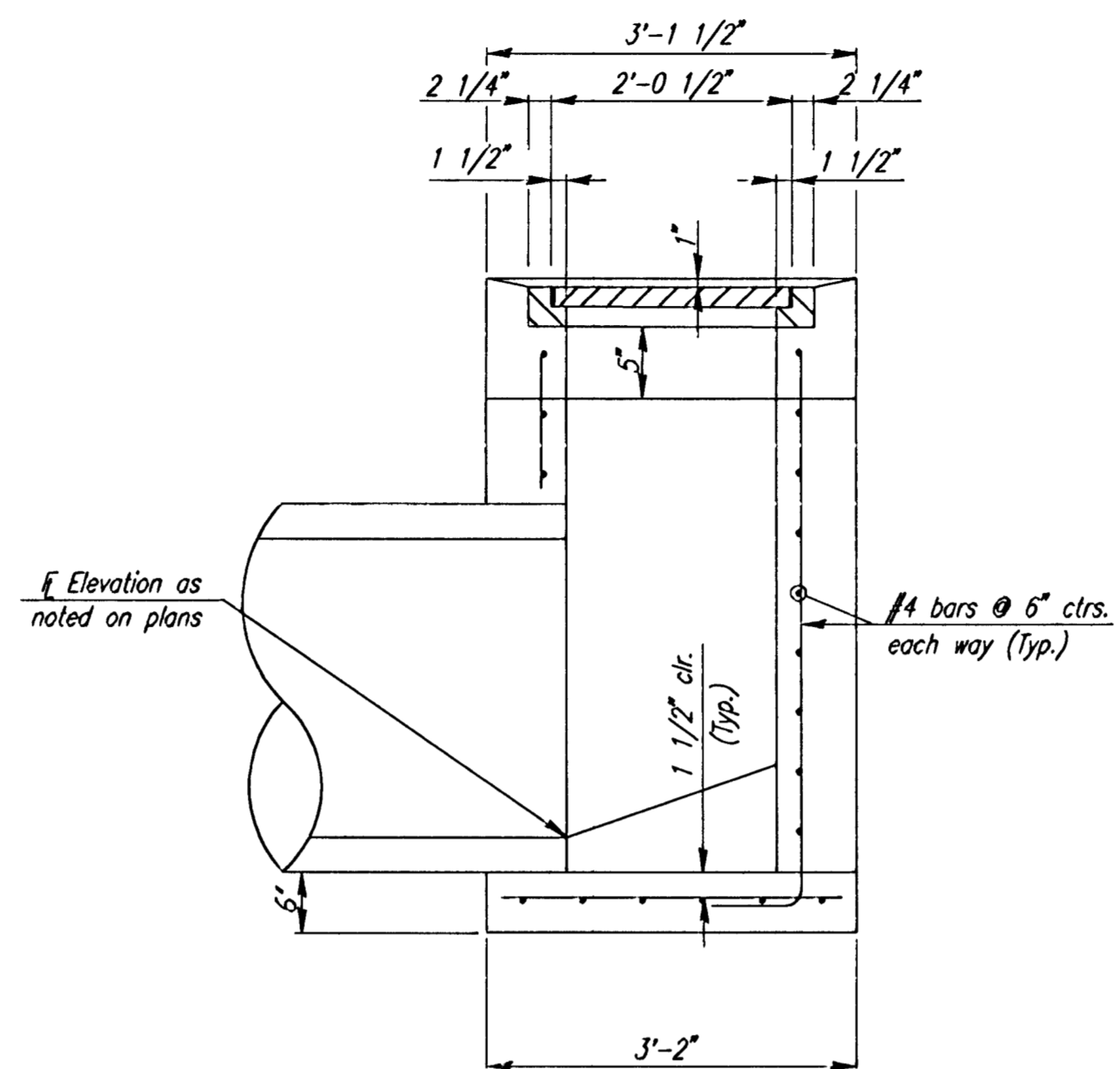
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CITY OF WICHITA, KANSAS  
 NEW CABLE LIGHTING  
 WILSON ESTATES MEDICAL PARK  
**SWS LINE NO. 2**  
 STA. 20+00.0 TO STA. 23+47.6  
 PUBLIC PROJECT NO. 197-468-33564

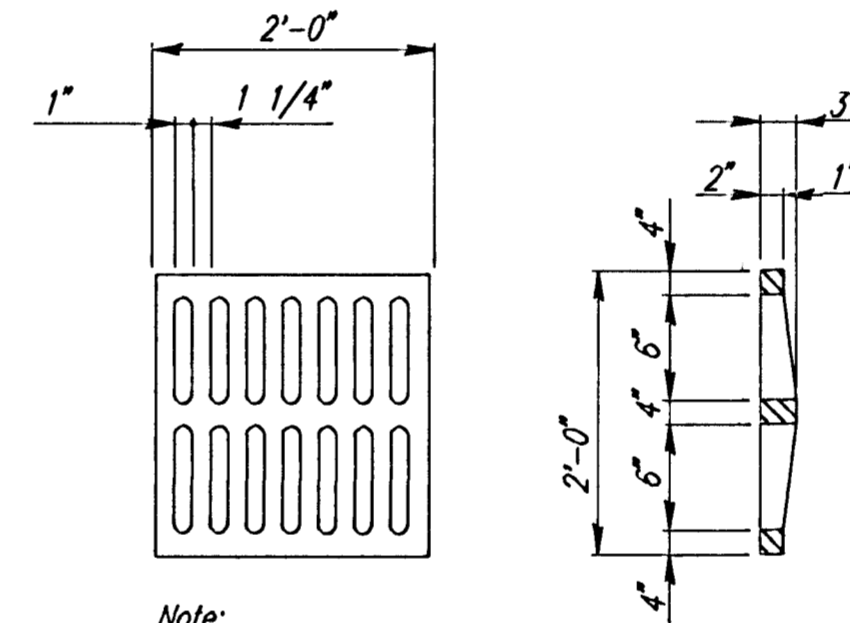
Professional Engineering Consultants, P.A.  
 303 S. TOPICKA • WICHITA, KANSAS 67202  
 316-262-2691 • FAX 316-262-3003  
 Designed By: SPL, DRC  
 Job No. 36-02620-34-32  
 Date: January 2003  
 Drawn By: SPL



SECTION A-A

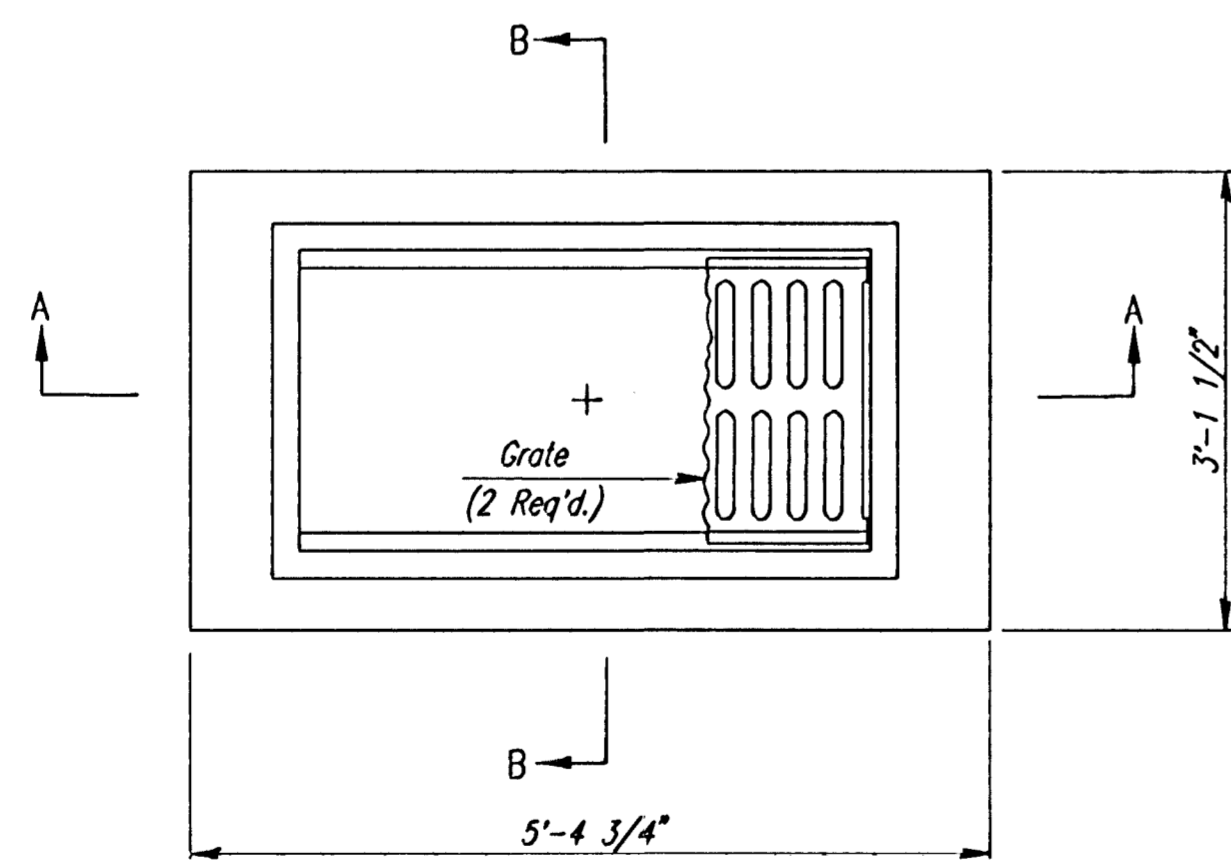


SECTION B-B

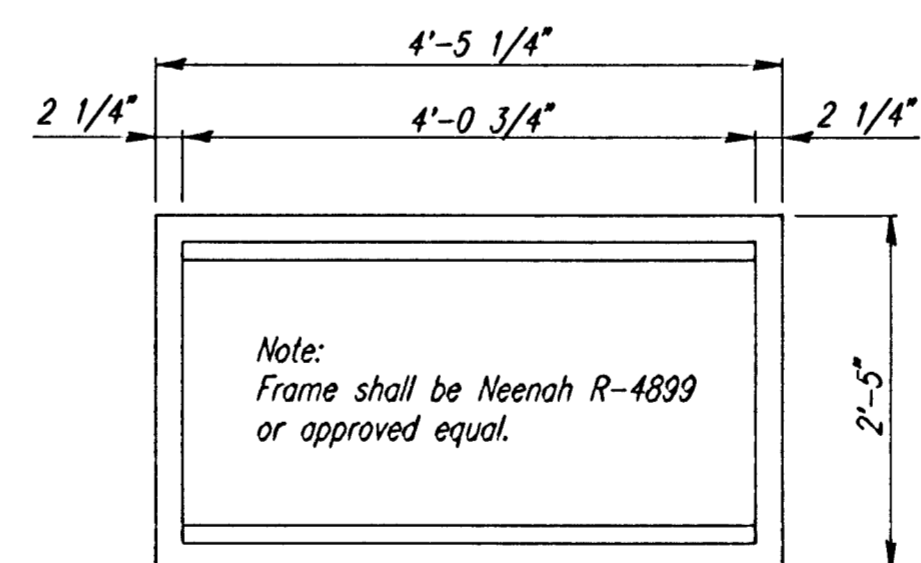


Note:  
Grate shall be Neenah R-4826  
or approved equal.

GRATE DETAIL  
(Wt.=190 lbs.)  
(2 Required)



PLAN



Note:  
Frame shall be Neenah R-4899  
or approved equal.

FRAME DETAIL  
(Wt.=440 lbs.)

Note:  
Frame to mate with 2 Neenah R-4826 Grates  
or approved equal.

STANDARD AREA INLET (2'x4')

GENERAL NOTES-  
AREA INLETS

CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.  
ALL PIPES SHALL BE FLUSH CUT PRIOR TO BEING CAST INTO WALLS.

REINFORCING STEEL SHALL BE GRADE 60, A.S.T.M. A615.  
ALL DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO THE CENTERLINE OF BARS UNLESS OTHERWISE NOTED.

INLET CASTINGS SHALL BE MANUFACTURED USING DUCTILE IRON CONFORMING TO ASTM A536-80 GRADE 65-45-12.  
DIMENSIONS AND WEIGHTS SHOWN ON THE DETAILED DRAWINGS SHALL BE CONSIDERED AS MINIMUM REQUIREMENTS AND ANY DEVIATIONS FROM THE DIMENSIONS SHOWN MUST BE SPECIFICALLY APPROVED. THE FINISHED CASTINGS SHALL BE OF UNIFORM QUALITY, FREE FROM BLOWHOLES, POROSITY, HARD SPOTS, SHRINKAGE DISTORTIONS OR OTHER DEFECTS.

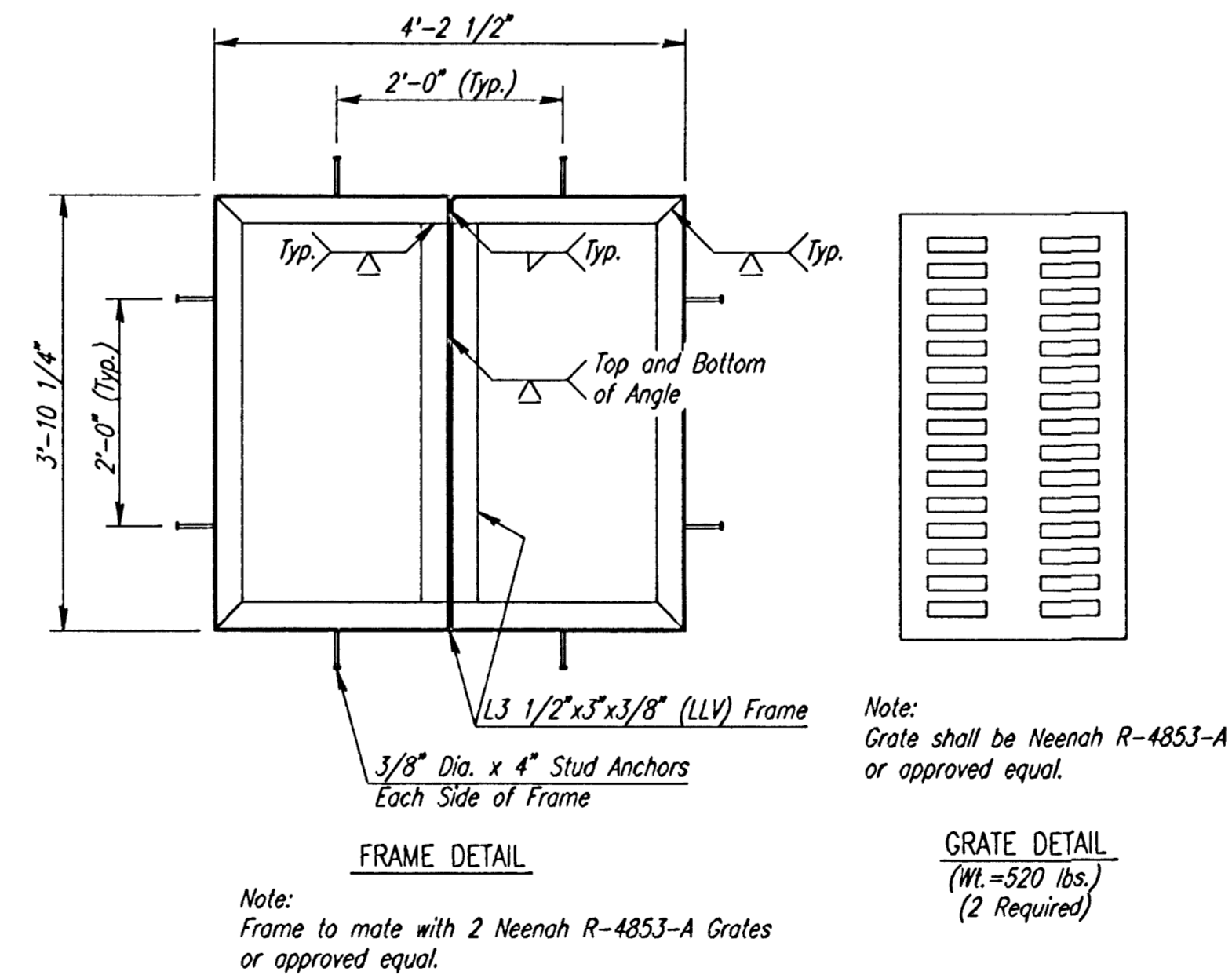
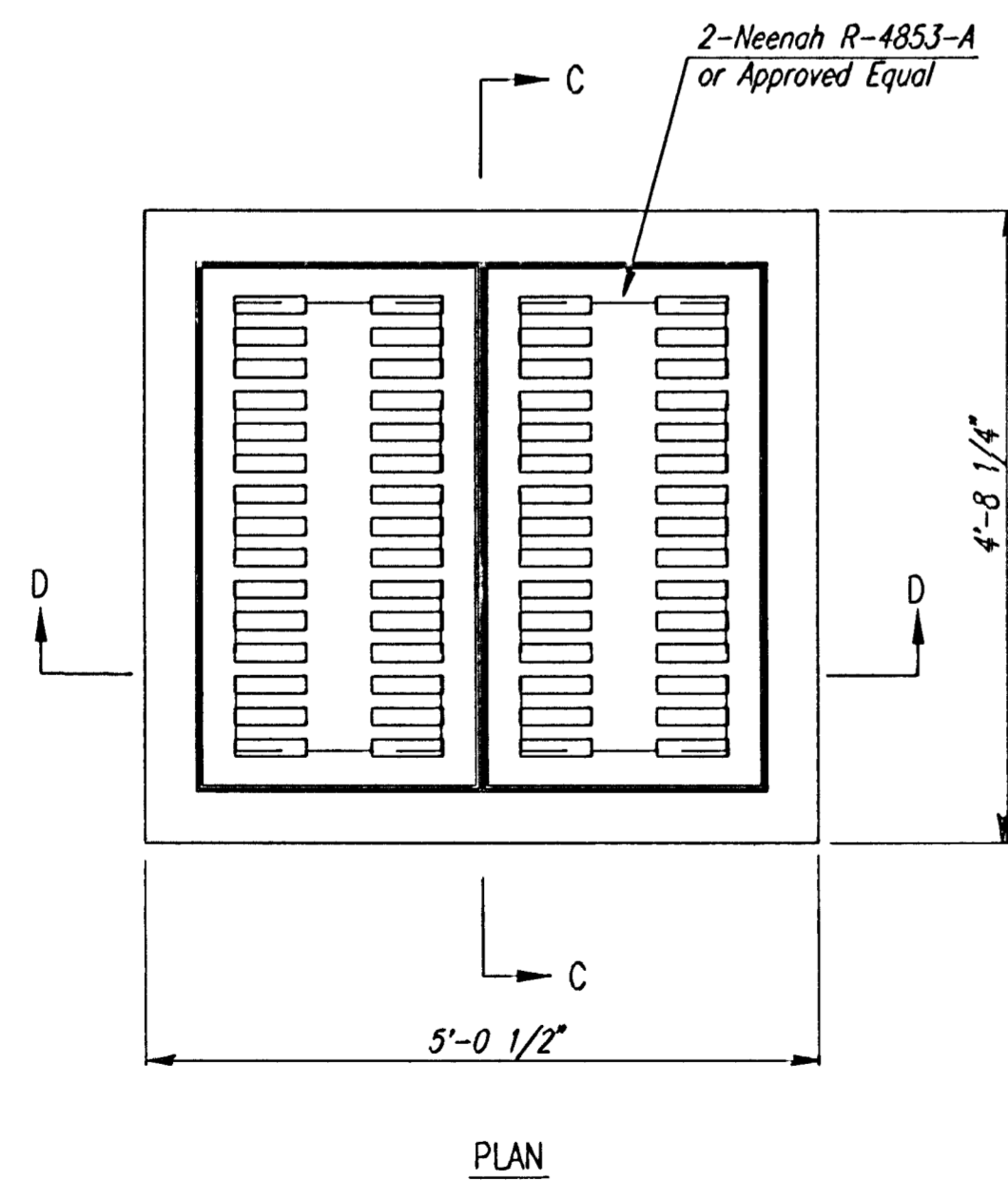
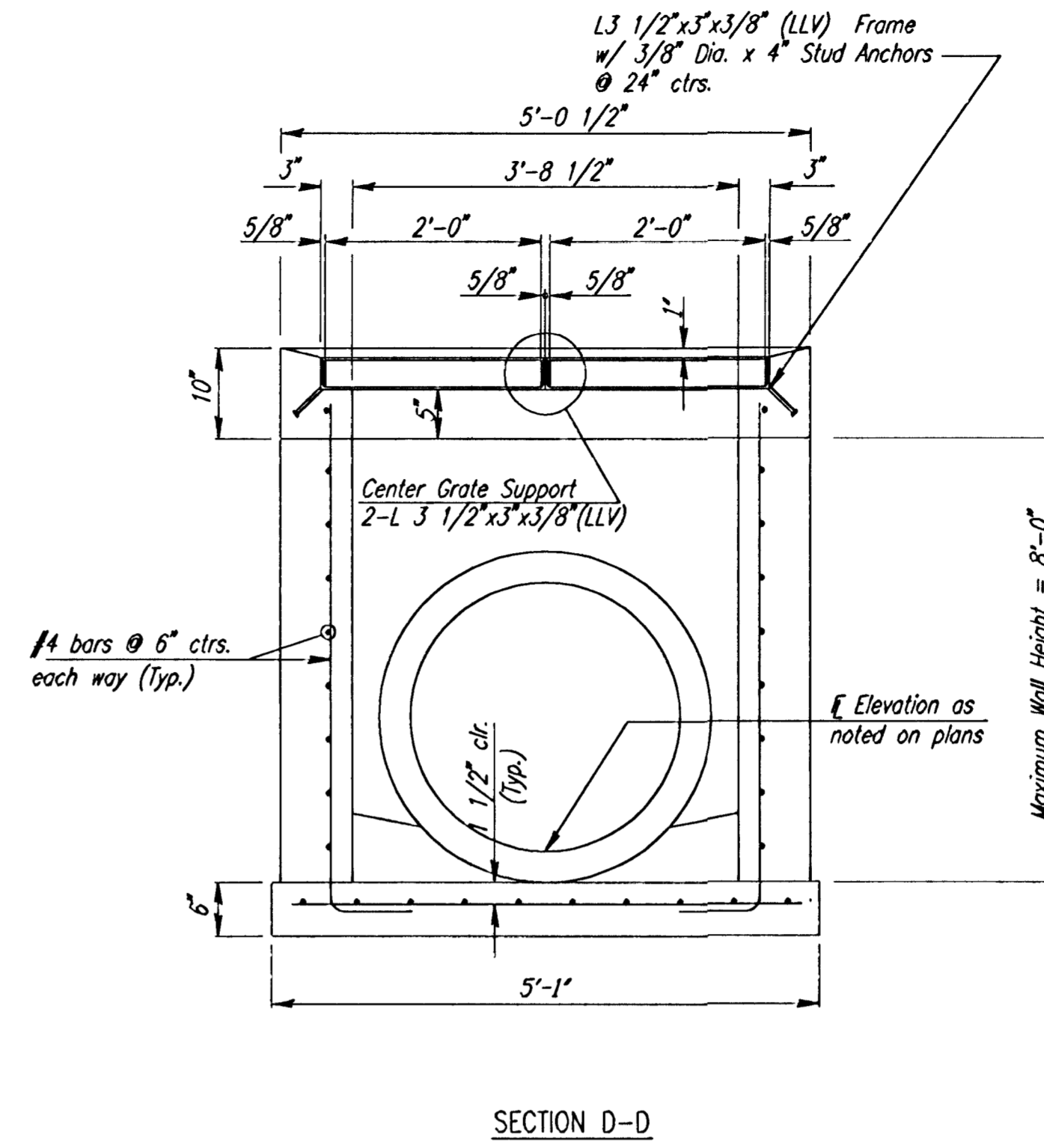
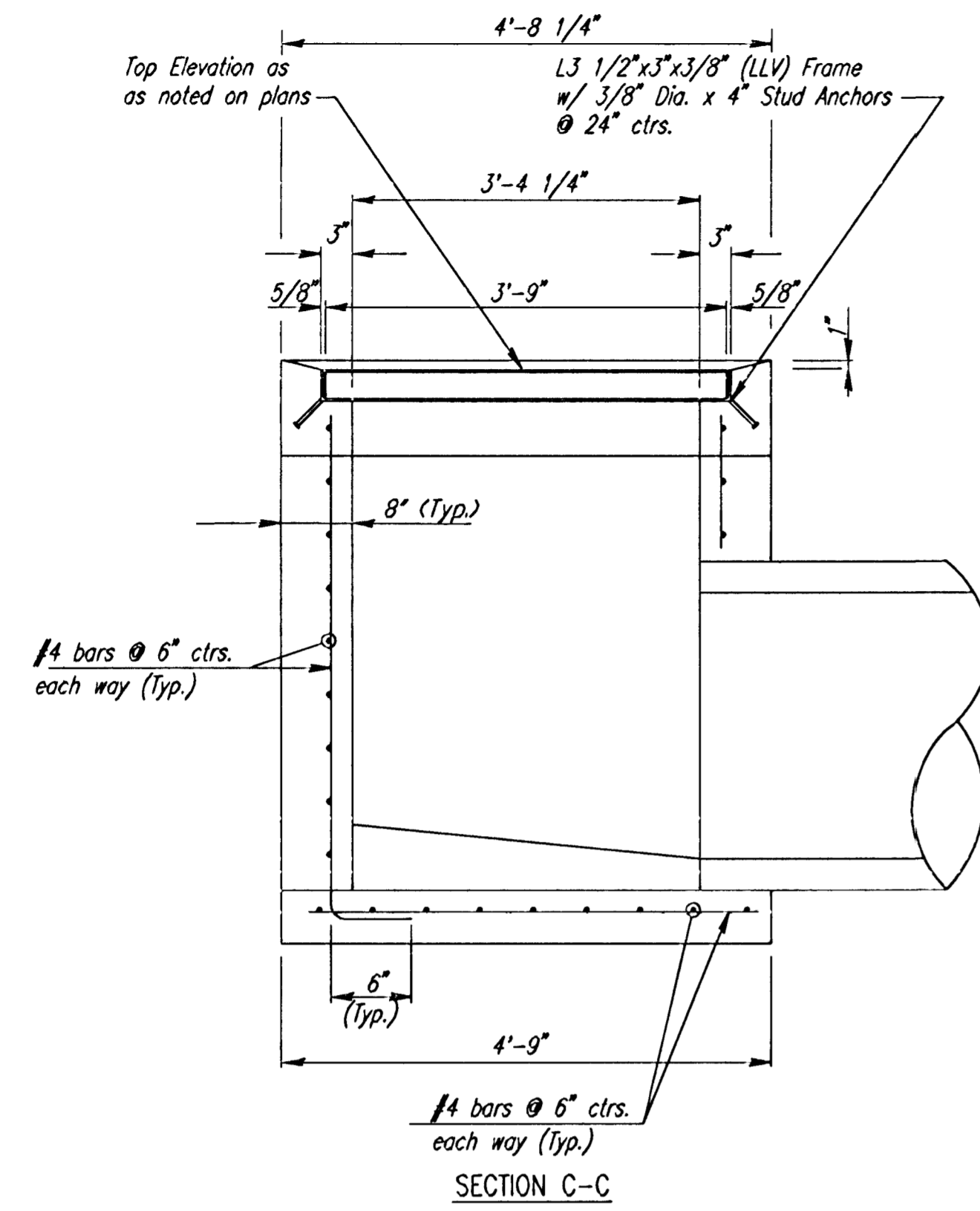
INLET FLOOR SHALL BE SHAPED WITH UNREINFORCED CONCRETE (8 SACK SAND MIX) TO CREATE FLOW CHANNELS AND TO INCREASE HYDRAULIC EFFICIENCY SUCH THAT THE INLET WILL BE SELF CLEANING BETWEEN ALL INLET AND/OR OUTLET PIPES.

PIPES ENTERING EXISTING STRUCTURE SHALL BE CENTERED ON INSIDE FACE OF WALL.

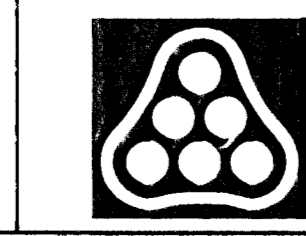
ALL EXPOSED STRUCTURAL STEEL SHALL BE PAINTED WITH A COAT OF INORGANIC ZINC PRIMER AND THEN WITH A TOP COAT OF OR A FIELD COAT OF ORGANIC ZINC, EACH COAT TO BE 3 TO 4 MILS. STRUCTURAL STEEL USED TO FABRICATE THE SPECIAL AREA INLET FRAME SHALL COMPLY WITH A.S.T.M. A36. WELDING SHALL CONFORM TO THE STRUCTURAL WELDING CODE A.W.S. D1.1-88.

AREA INLETS MAY BE PRECAST AT THE CONTRACTOR'S OPTION, WITH APPROVAL OF THE ENGINEER.

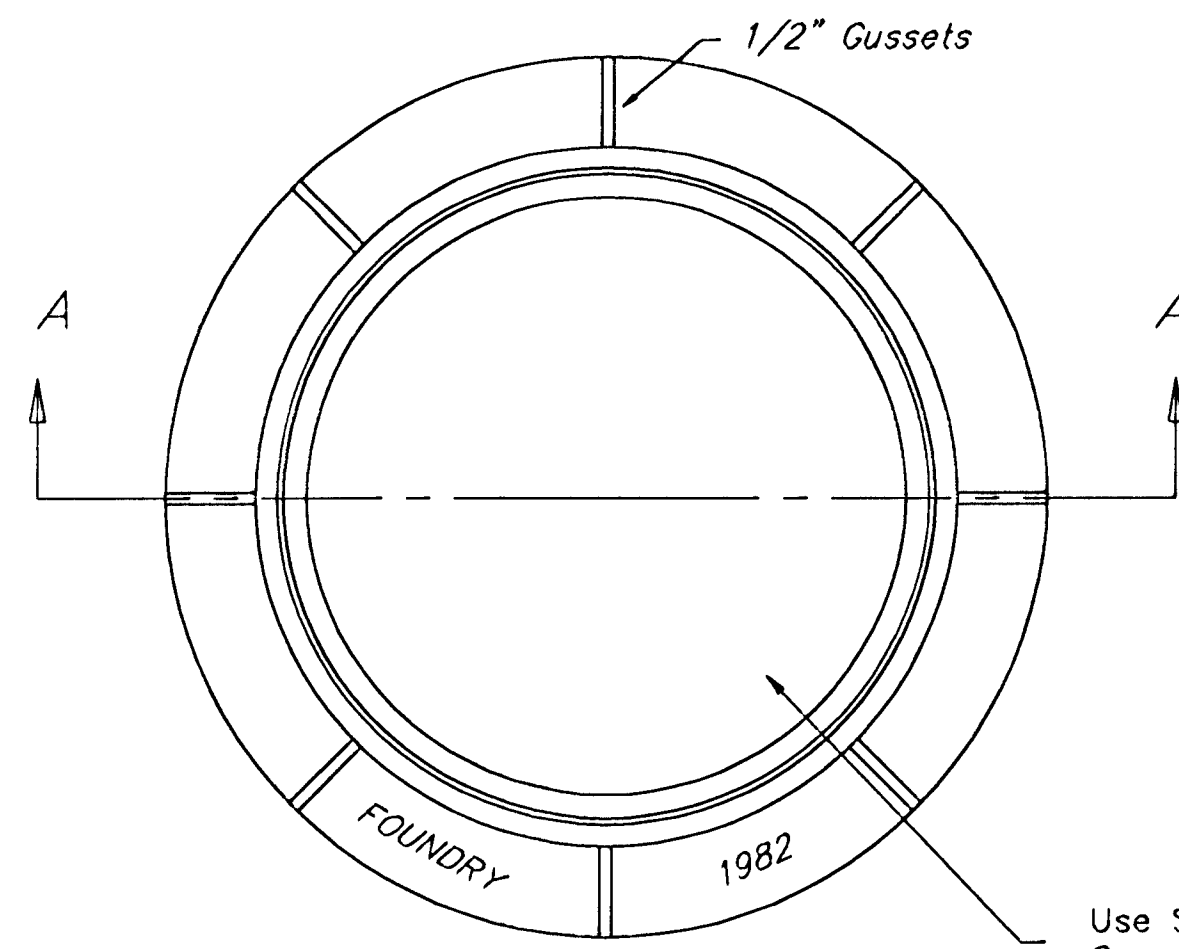
No.	Revision	By	Date
CITY OF WICHITA, KANSAS NEIL D. CABLE, P.E. - CITY ENGINEER WILSON ESTATES MEDICAL PARK <b>STANDARD AREA INLETS (2'x4')</b> PUBLIC PROJECT NO. 197-468-83564 <b>Professional Engineering Consultants, P.A.</b> 303 S. TOPEKA • WICHITA, KANSAS 67202 316-262-2691 • FAX 316-262-3003			
Designed by	Job No.	36-02620-3432	Sht. 5 of 14
Drawn by	Date	January 2003	



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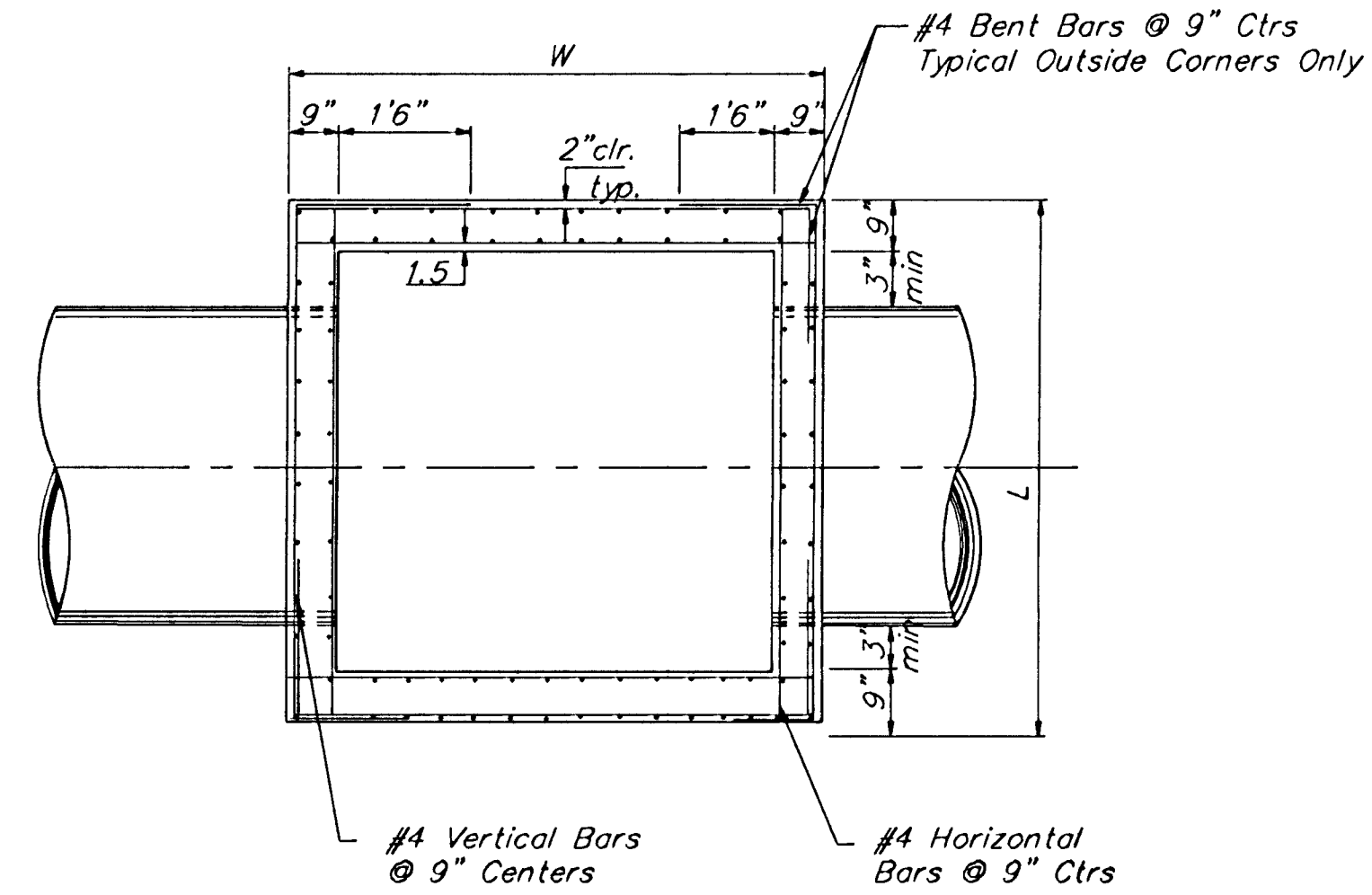


No.	Revision	By	Date
CITY OF WICHITA, KANSAS NEIL D. CABLE, P.E. - CITY ENGINEER WILSON ESTATES MEDICAL PARK <b>STANDARD AREA INLETS (4'x4')</b> PUBLIC PROJECT NO. 197-468-83564 <b>Professional Engineering Consultants, P.A.</b> 303 S. TOPEKA • WICHITA, KANSAS 67202 316-262-2691 • FAX 316-262-3003			
Designed by	Job No. 36-02620-3432	Sht. 6 of 14	
Drawn by	Date January 2003		



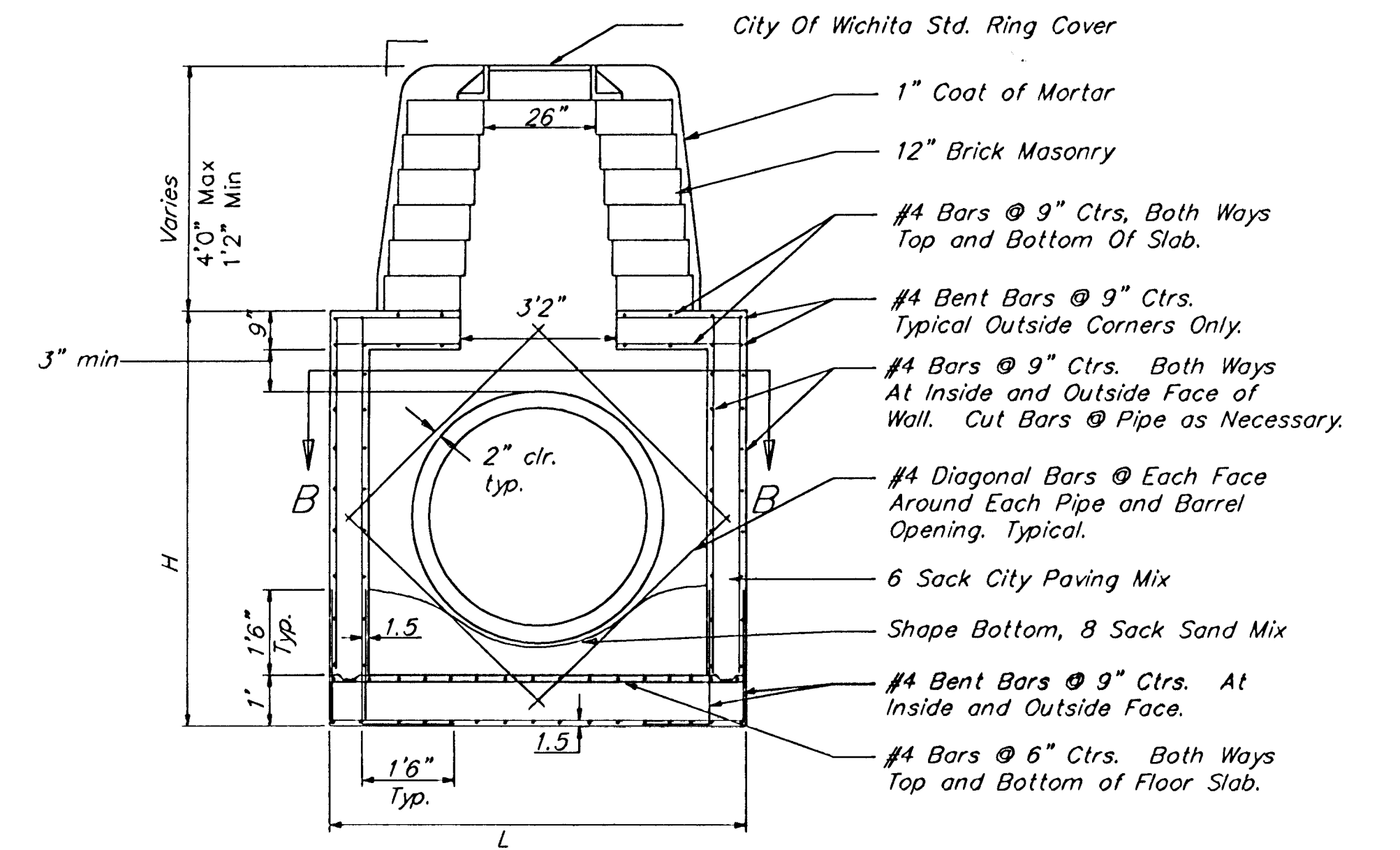
TOP VIEW

Use Standard City Of Wichita Cover (Weight: 180 lbs)

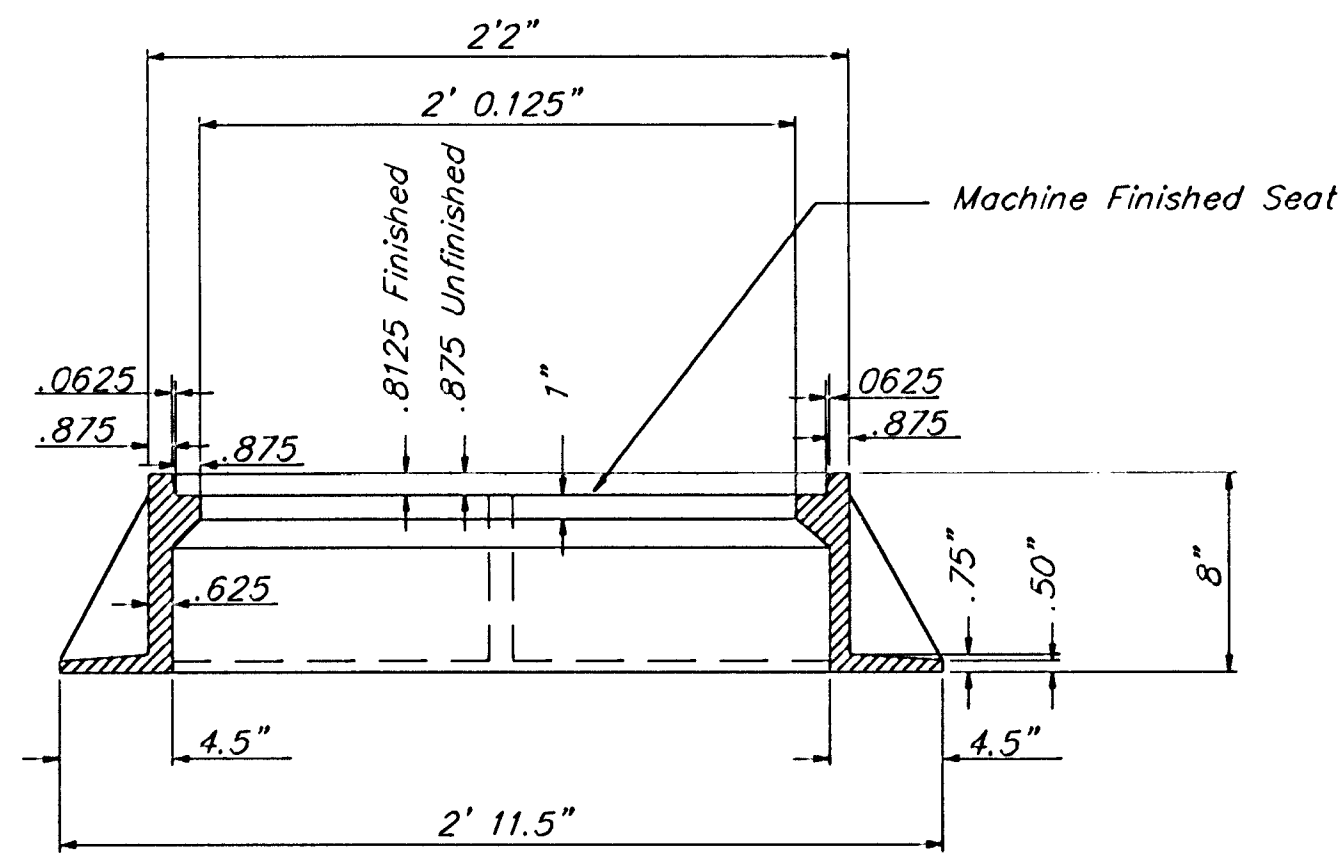


NOTE:  
Bend Bars Not More Than 8" to Clear Pipes, or Cut Bars 2" Clear of Pipe, as Necessary.

SECTION B-B



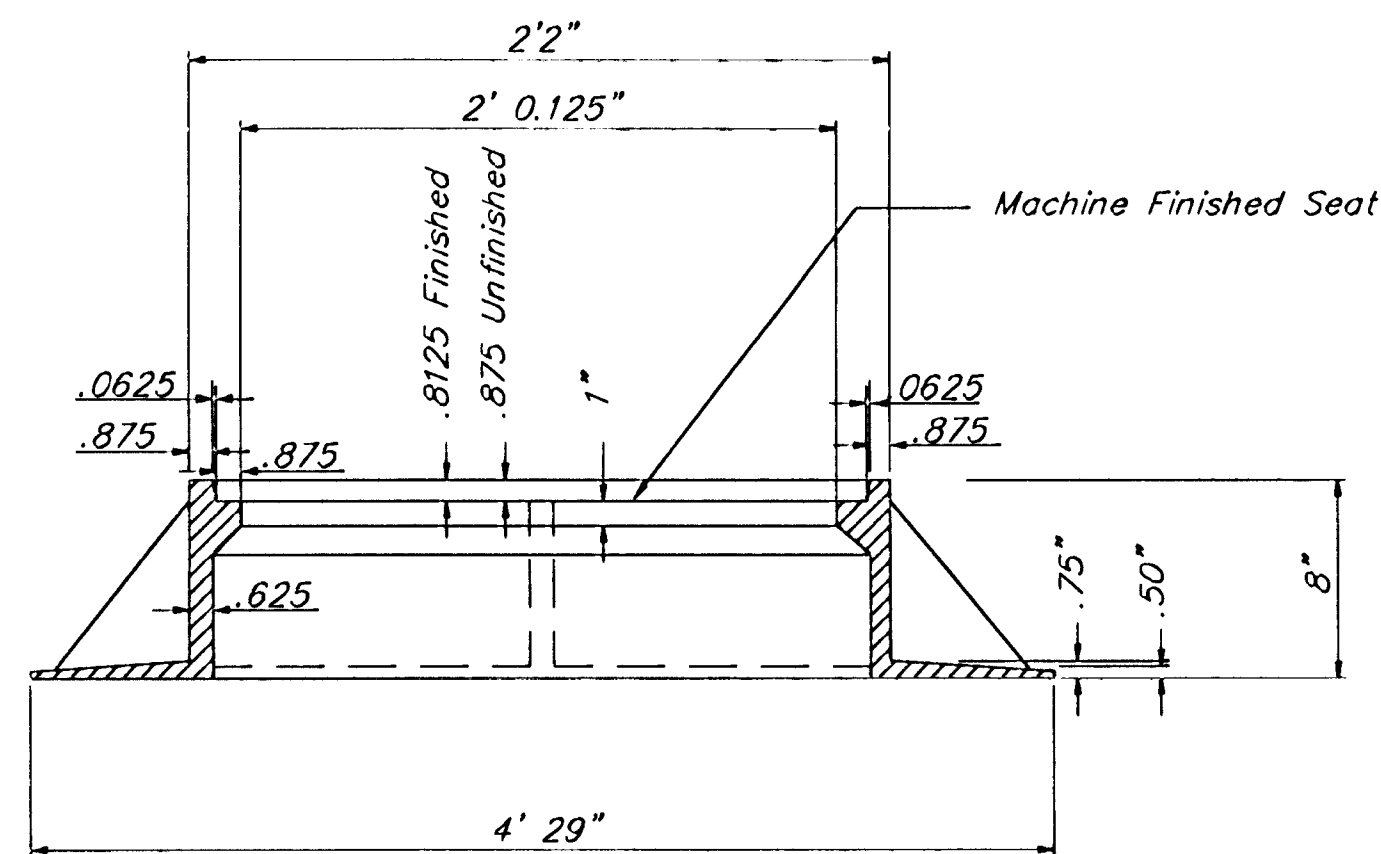
REINFORCED CONCRETE MANHOLE  
STACK 2.33' TO 4'0"



SECTION A-A

MANHOLE FRAME

Weight: 240 Lbs.

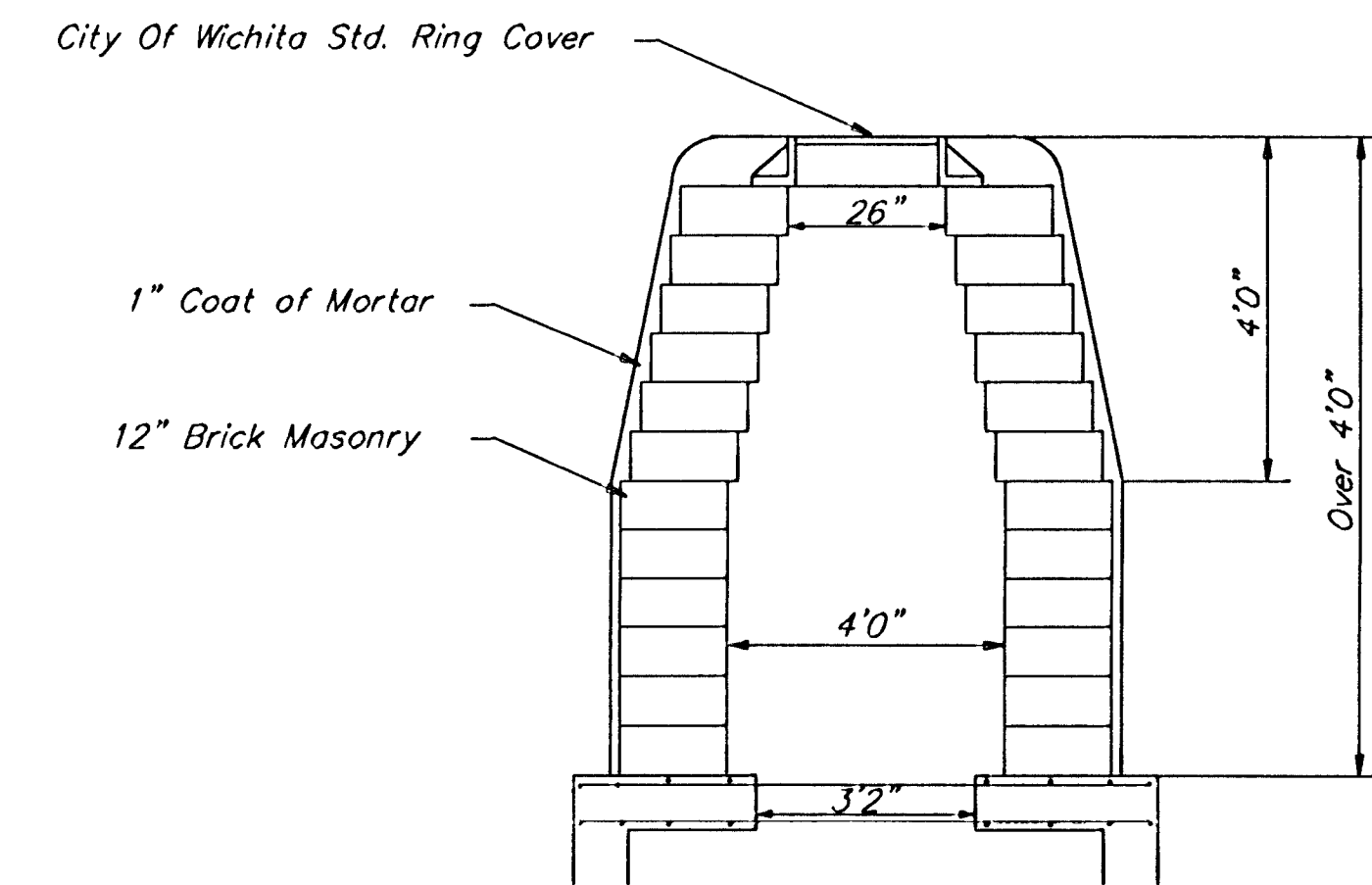


WIDE FLANGE RING

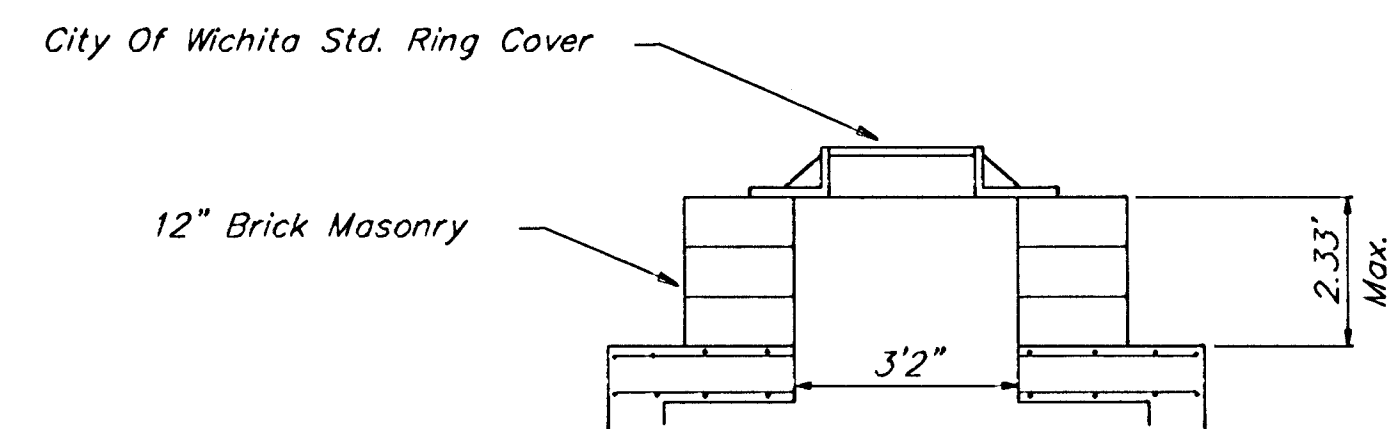
Weight: 705 Lbs.

GENERAL NOTES:

- MORTAR USED IN MASONRY CONSTRUCTION SHALL CONTAIN 8 SACKS OF CEMENT PER CUBIC YARD. CONCRETE USED IN MANHOLE WALLS AND BASES SHALL CONFORM TO THE REQUIREMENTS FOR CONCRETE PAVEMENT CONSTRUCTION AS SPECIFIED IN THE CITY STANDARD PAVING SPECIFICATIONS, USING CITY CONCRETE PAVEMENT MIX WITHOUT AIR ENTRAINING ADMIXTURE. MORTAR SHALL BE PLACED AROUND THE MANHOLE RING AS SHOWN ON THE DRAWINGS WHEN MANHOLES ARE CONSTRUCTED IN UNPAVED AREAS. COMPLETED MANHOLE SHALL BE WITHOUT LEAKS AND WATER TIGHT.
- THE FLOORS OF ALL MANHOLES SHALL BE SHAPED WITH FLOW CHANNELS SUCH THAT THE MANHOLES WILL BE SELF CLEANING. USING 8-SACK SAND MIX CONCRETE. FLOW CHANNELS SHALL BE FORMED TO MATCH THE BOTTOM HALVES OF THE INFLOWING PIPES AND THE OUTFLOWING PIPE. MANHOLE FLOORS SHALL HAVE SLOPES OF 3 INCHES PER FOOT IN THE AREAS OUTSIDE OF THE FLOW CHANNELS SLOPED TOWARD THE FLOW CHANNELS.
- MANHOLE COVER CASTINGS AND MANHOLE FRAME CASTINGS SHALL CONFORM TO THE REQUIREMENTS AS INDICATED IN THE STANDARD SPECIFICATIONS AND AS SHOWN IN THE STANDARD DETAIL DRAWING.
- THE ENDS OF ALL PIPES IN MANHOLES SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF MANHOLE WALL.



MANHOLE STACK OVER 4'0"

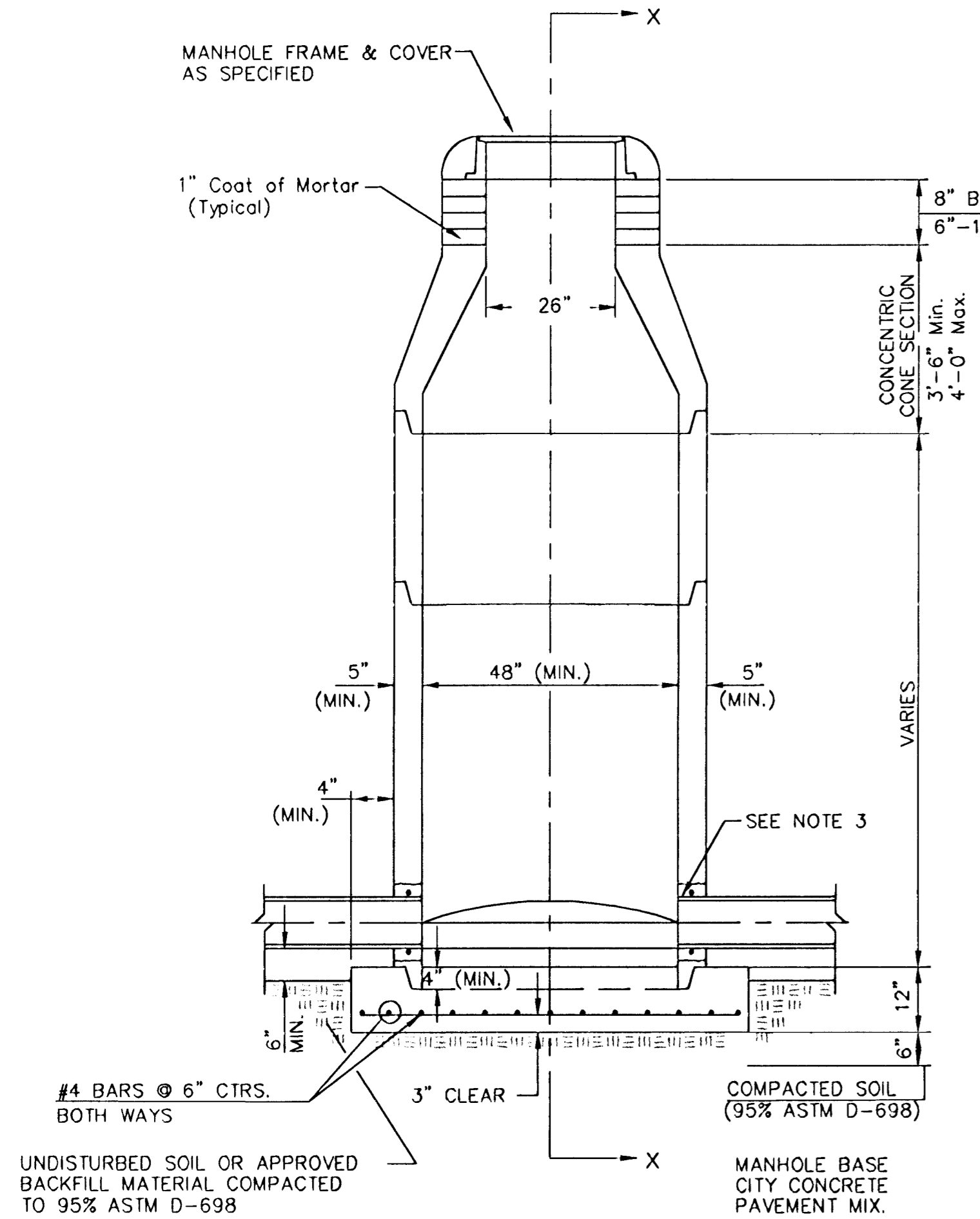


MANHOLE STACK LESS THAN 2.33'

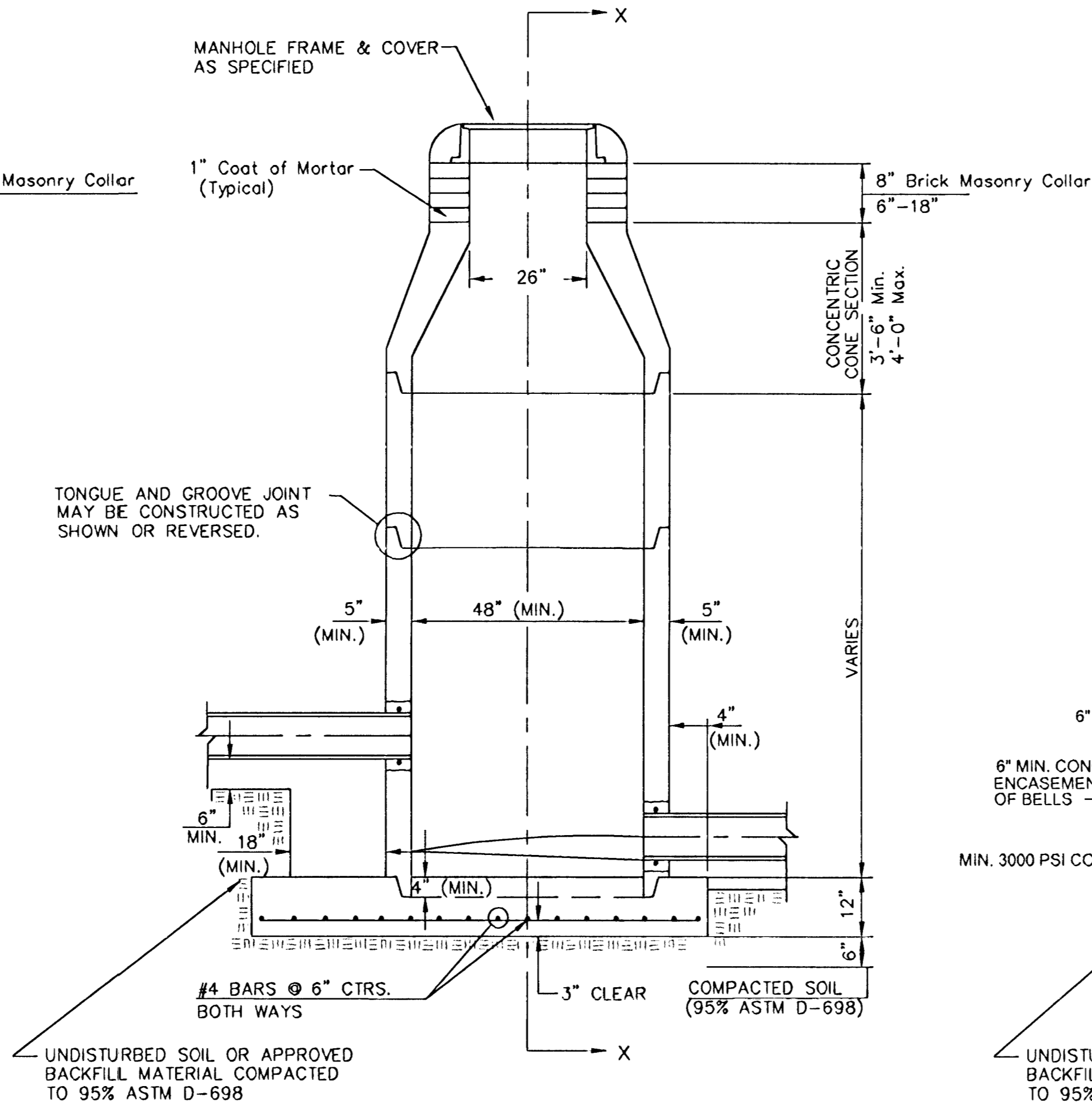
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<p>THE CITY OF WICHITA CITY ENGINEER'S OFFICE CITY HALL - SEVENTH FLOOR 455 NORTH MAIN STREET WICHITA, KANSAS 67202 (316) 268-4501 (316) 268-4114 FAX</p>	<b>REINFORCED CONCRETE MANHOLE</b>	
	NEIL D. CABLE, P.E. - CITY ENGINEER	
	PROJECT NUMBER 197-468-83564	OCA NO. (751323)
	DATE JAN 2003	SHEET 7 OF 14

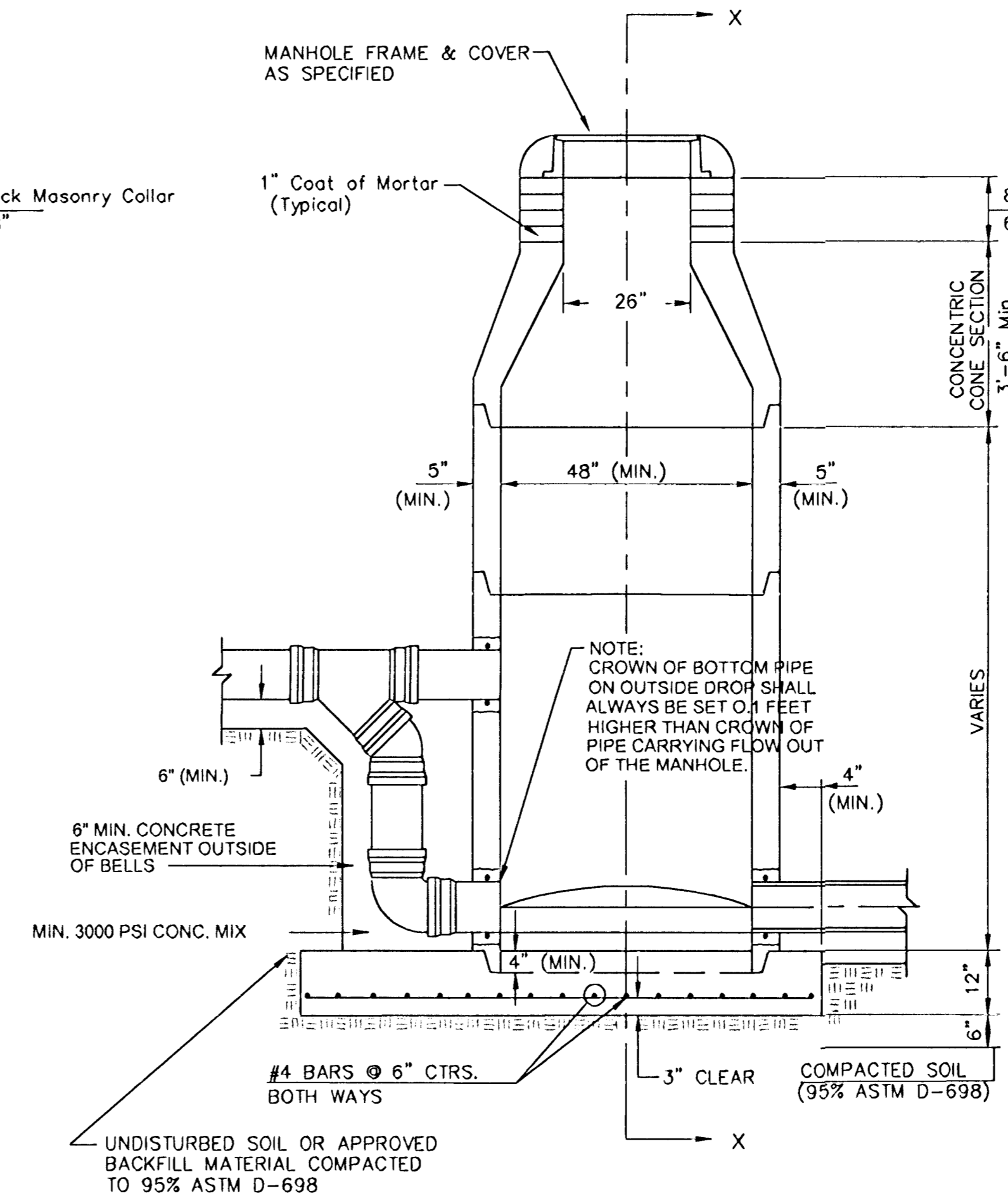
# SEWER APPURTENANCES DETAILS



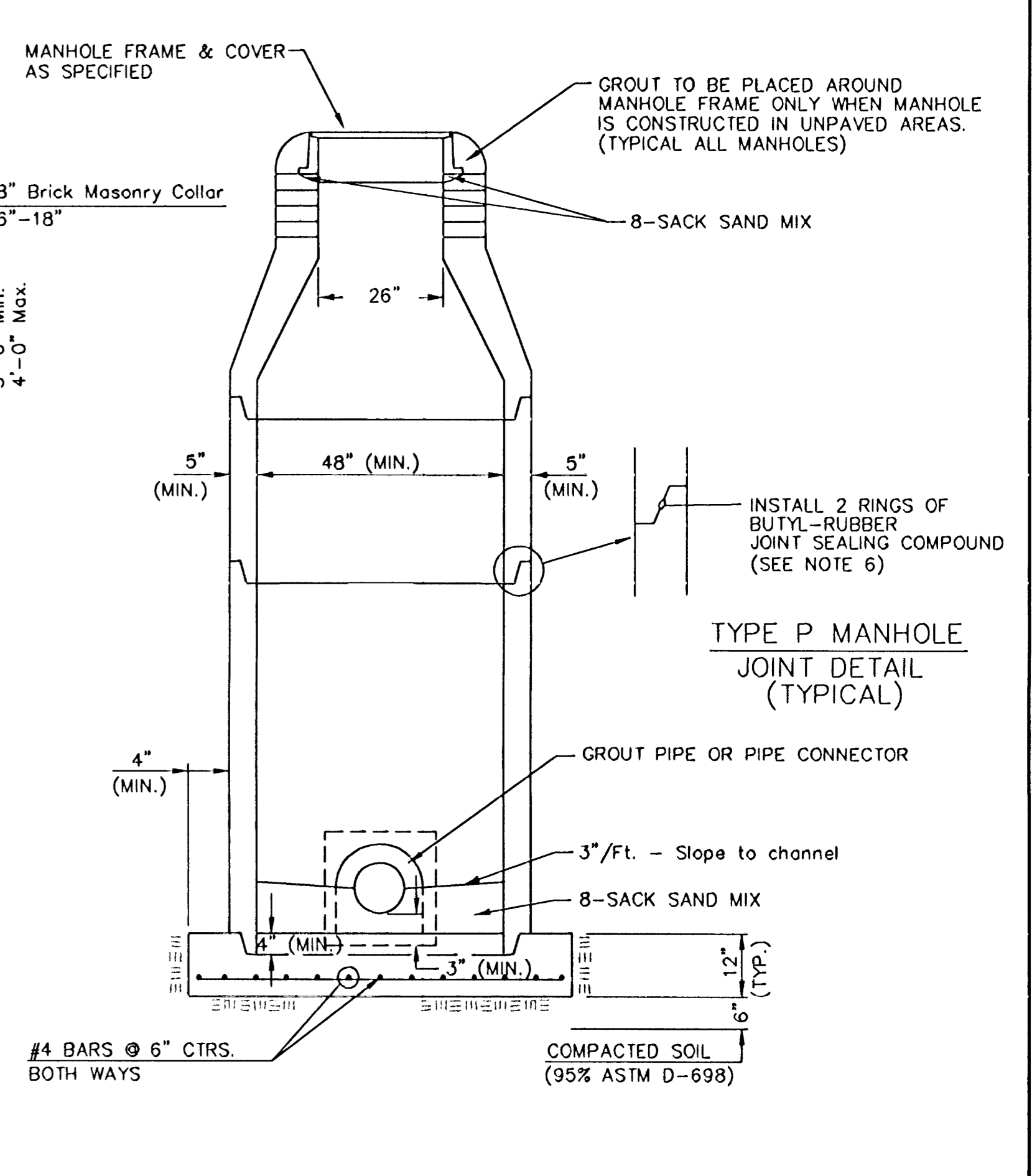
**TYPE P  
STANDARD MANHOLE**



**TYPE P  
INSIDE DROP MANHOLE**



**TYPE P  
OUTSIDE DROP MANHOLE**



**SECTION X  
(TYPICAL)**

**GENERAL NOTES**

**PRECAST MANHOLE NOTES**

- ALL PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO THE LATEST REVISIONS OF A.S.T.M. C478 AS MODIFIED BY THE SPECIFICATIONS.
- NON-SHRINK GROUT SHALL BE NON-METALLIC TYPE.
- APPROVED FLEXIBLE WATERSTOP GASKETS SHALL BE INSTALLED TO JOIN THE SEWER TO THE MANHOLE WALL WHEN A.B.S. COMPOSITE PIPE OR P.V.C. PIPE IS USED. FOR OTHER TYPES OF PIPE, THE SEWER SHALL BE GROUTED IN PLACE WITH NON-SHRINK GROUT. THE SEWER PIPE SHALL BE SUPPORTED WITH CONCRETE ENCASEMENT A MINIMUM OF 3 FEET FROM THE MANHOLE WALL AND TO THE FIRST JOINT FOR V.C.P. SUCH THAT THE JOINT REMAINS FLEXIBLE.
- ALL INSIDE SURFACES OF THE CONCRETE MANHOLE WHICH WOULD BE EXPOSED TO SEWER GAS SHALL BE COATED WITH 2 COATS TMEC-SERIES 66 HI-BUILD EPOXOLINE, DRY THICKNESS OF 8 MILS (MIN.).
- EXTERIOR MANHOLE WALLS SHALL BE COATED WITH 1 COAT MODLARMA-633 BITUMINOUS COATING.
- JOINT SEALING COMPOUND SHALL BE KENT SEAL NO. 2 OR APPROVED EQUAL.
- PRECAST MANHOLES SHALL BE SET AT LEAST 4 INCHES INTO THE MANHOLE BASE.
- TOP OF MANHOLE FLOOR SLAB SHALL BE AT LEAST 3 INCHES BELOW THE FLOW LINE OF THE OUTLET PIPE TO INSURE SUFFICIENT MINIMUM THICKNESS OF SHAPED INVERT.
- LIFTING HOLES SHALL BE FILLED WITH NON-SHRINK GROUT, AND THE INTERIOR SURFACE COATED AS SPECIFIED.
- MORTAR USED IN MASONRY CONSTRUCTION SHALL CONTAIN 8 SACKS OF CEMENT PER CUBIC YARD. CONCRETE USED IN MANHOLE BASES SHALL CONFORM TO THE REQUIREMENTS OF CONCRETE FOR CONCRETE PAVEMENT CONSTRUCTION AS SPECIFIED IN THE CITY STANDARD PAVING SPECIFICATIONS USING CITY CONCRETE PAVEMENT MIX WITHOUT AIR ENTRAINING ADMIXTURE. MORTAR SHALL BE PLACED AROUND THE MANHOLE RING AS SHOWN ON THE DRAWINGS WHEN MANHOLES ARE CONSTRUCTED IN UNPAVED AREAS. MANHOLES CONSTRUCTED WHERE PIPE SIZES ARE SMALLER THAN 24" SHALL HAVE AN INSIDE DIAMETER OF 4". MANHOLES CONSTRUCTED WHERE PIPE SIZES ARE 24" OR LARGER SHALL HAVE AN INSIDE DIAMETER OF 5". COMPLETED MANHOLE SHALL BE WITHOUT LEAKS AND WATER TIGHT.

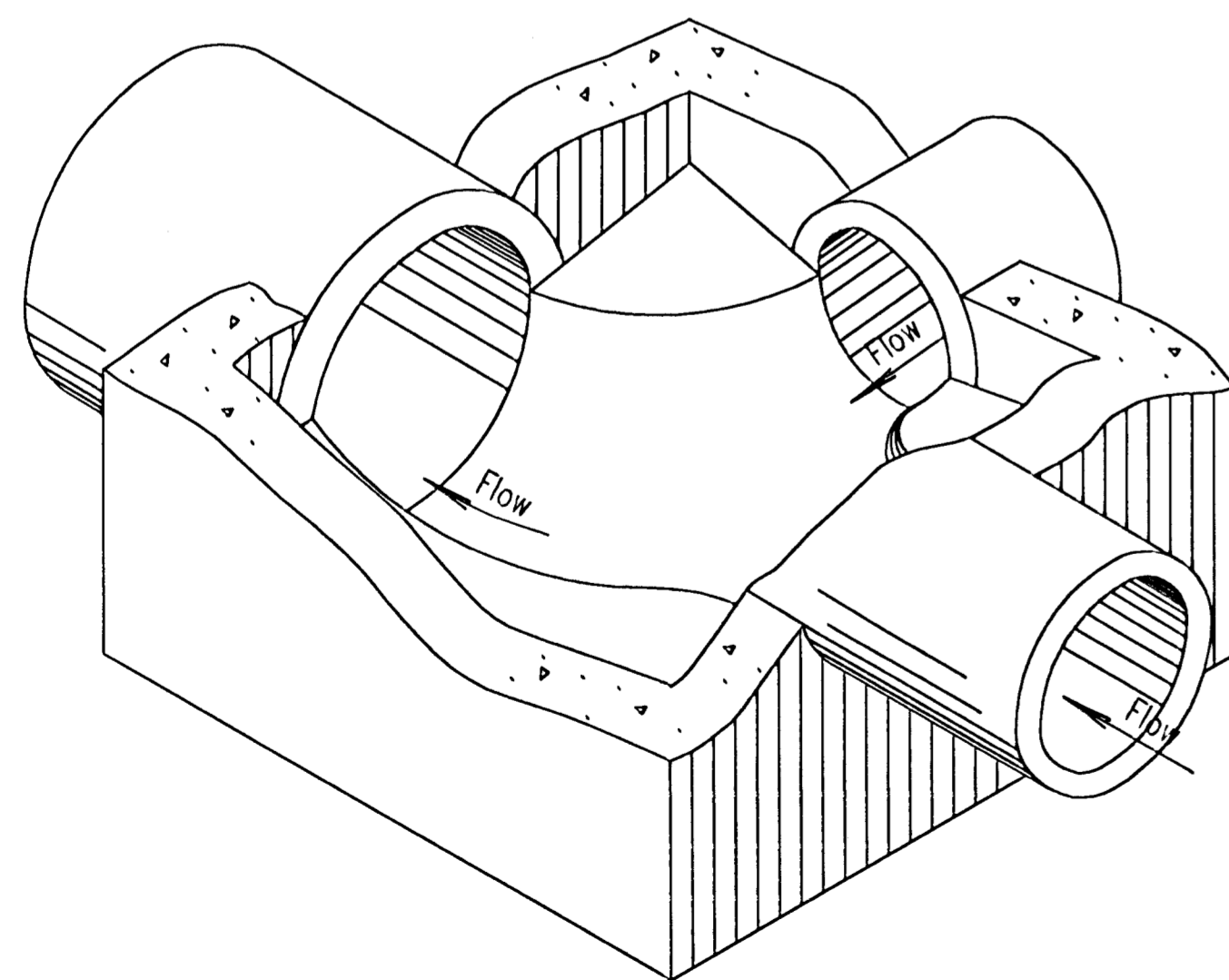
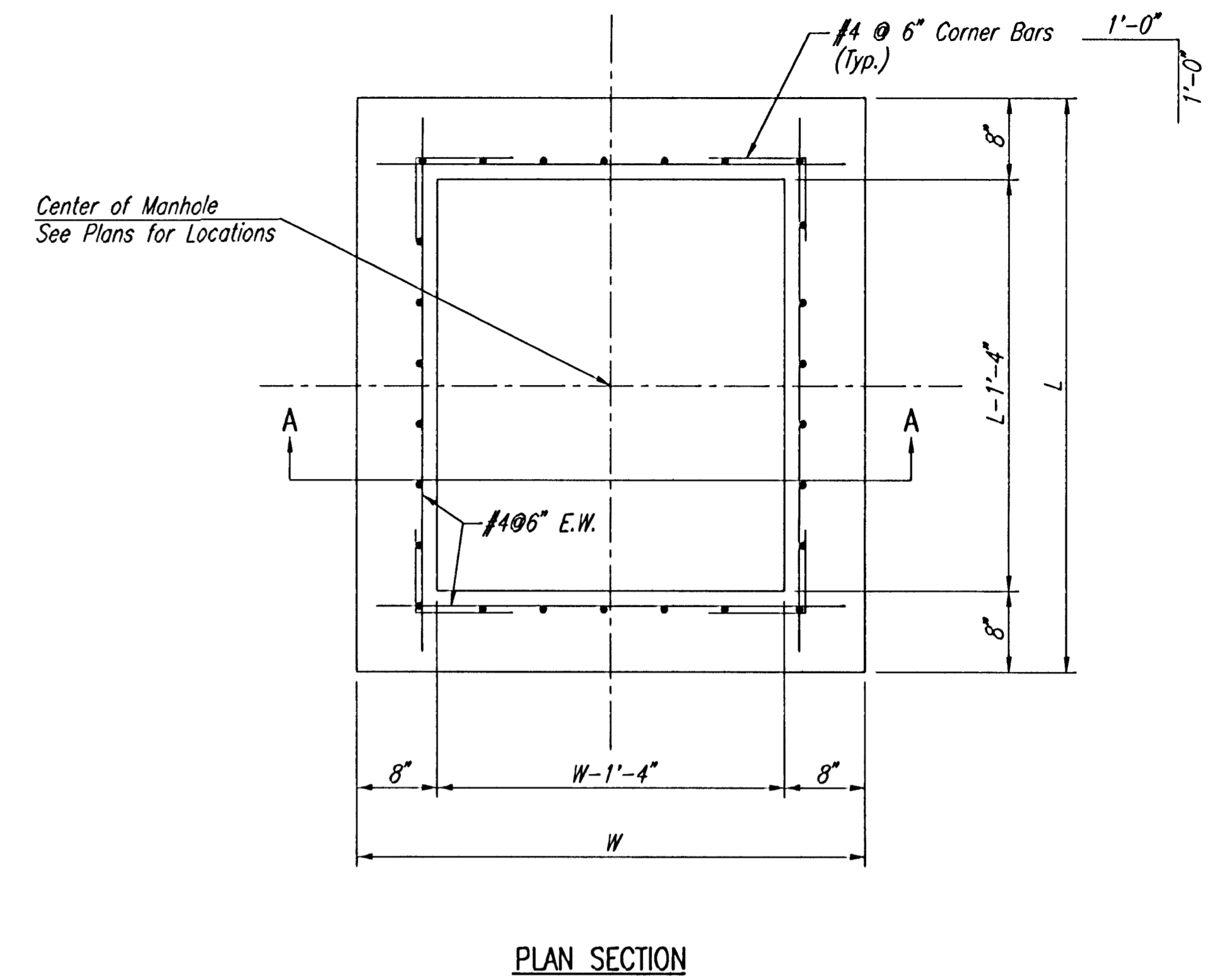
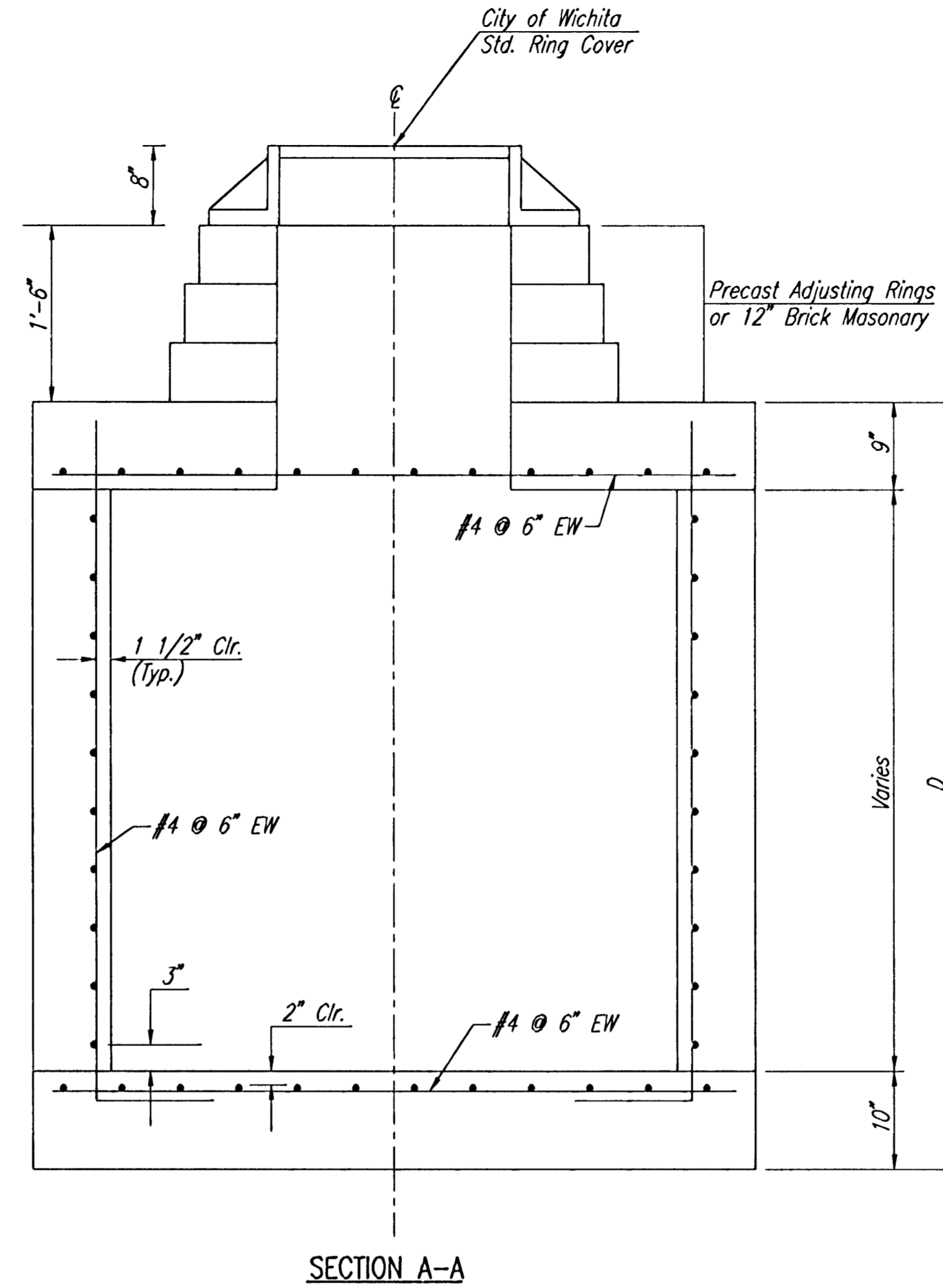
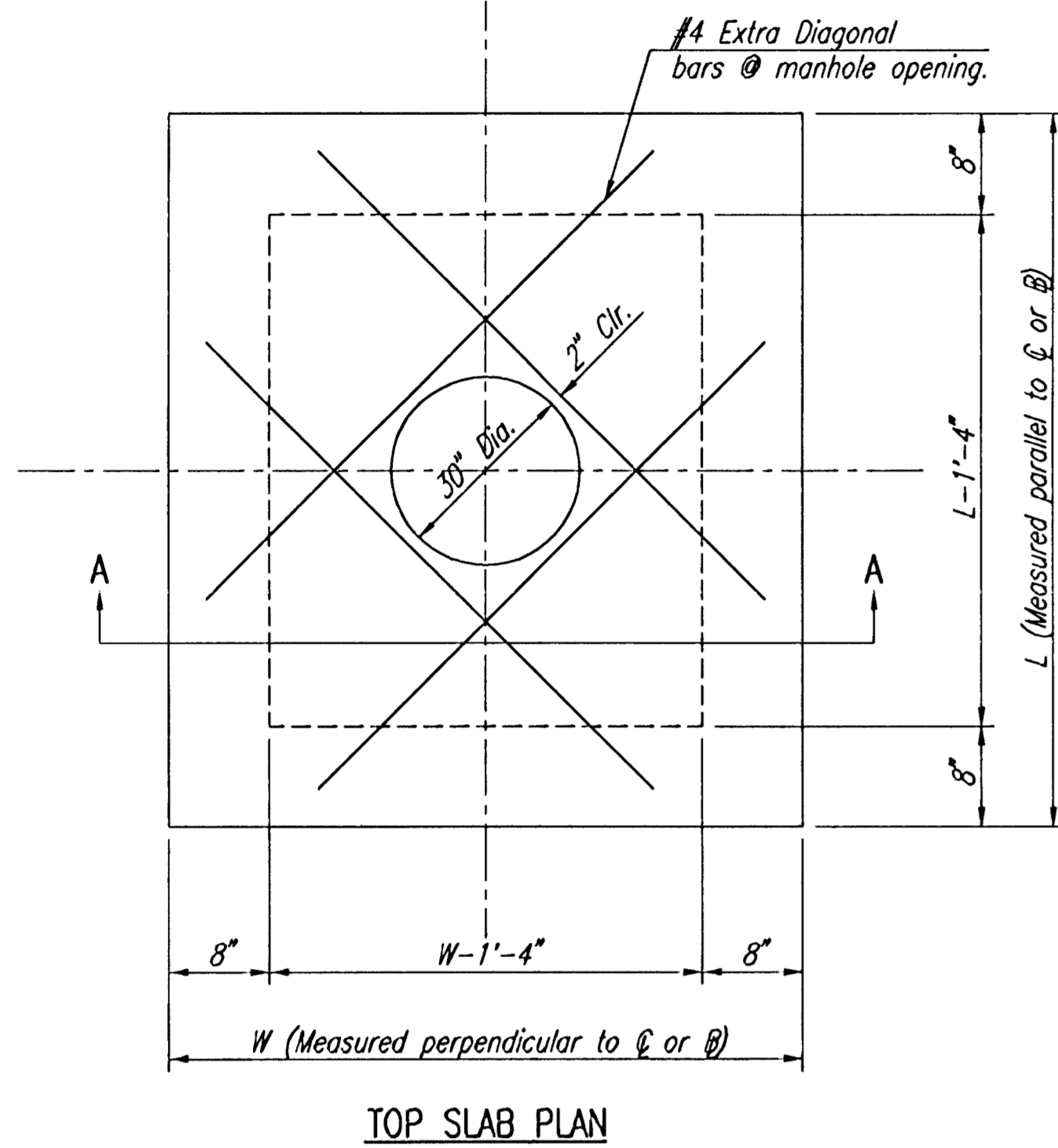
- REINFORCING STEEL SHALL BE INSTALLED IN THE MANHOLE BASES AND SHALL CONSIST OF NO. 4 BARS PLACED ON 6" CENTERS IN BOTH DIRECTIONS. THE MANHOLE BASE REINFORCEMENT SHALL BE PLACED AT LEAST 3" ABOVE THE BOTTOM OF THE MANHOLE BASE. ~~THE COSTS FOR FURNISHING AND INSTALLING REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE MANHOLE.~~
- OPENINGS SHALL BE CUT INTO THE MANHOLE WALL WHEN OUTSIDE DROPS ARE CONSTRUCTED ON EXISTING MANHOLES. SUCH OPENINGS CUT INTO EXISTING MANHOLES SHALL BE AS SMALL AS PRACTICAL TO FACILITATE INSTALLING AND GROUTING THE NEW PIPE IN PLACE. WATERSTOP GASKETS SHALL BE USED WITH P.V.C. AND A.B.S. COMPOSITE PIPE. THE NEW PIPE SHALL BE GROUTED INTO THE OPENING USING AN APPROVED NONSHRINK GROUT FOR THE FULL MANHOLE WALL THICKNESS. ~~THE EXTERIOR OF THE COMPLETED CONNECTION SHALL BE SEALED WITH AN APPROVED BITUMINOUS COATING SUCH THAT THE CONNECTION WILL BE WATER TIGHT. FLOOR OF MANHOLE SHALL BE MODIFIED TO FORM NEW FLOW CHANNEL FOR THE NEW CONNECTION AS INDICATED BY THE DRAWING. THIS WORK, INCLUDING MODIFICATION OF MANHOLE FLOOR, SHALL BE PAID FOR AT THE UNIT PRICE BID FOR OUTSIDE DROP STACK CONSTRUCTED ON EXISTING MANHOLE.~~
- THE FLOORS OF ALL MANHOLES SHALL BE SHAPED WITH FLOW CHANNELS SUCH THAT THE MANHOLES WILL BE SELF CLEANING AND FREE OF AREAS WHERE SOLIDS COULD BE DEPOSITED AS SEWAGE FLOWS THROUGH THE MANHOLE FROM ALL INLET PIPES TO THE OUTLET PIPE. FLOW CHANNELS SHALL BE FORMED TO MATCH THE BOTTOM HALVES OF THE INFLOWING PIPES AND THE OUTFLOWING PIPE AS SHOWN BY THE DRAWINGS EXCEPT FOR INSIDE DROP MANHOLES. FLOW CHANNELS FOR INSIDE DROP MANHOLES SHALL BE CONSTRUCTED AS INDICATED BY THE DRAWING. MANHOLE FLOORS SHALL HAVE SLOPES OF 3 INCHES PER FOOT IN THE AREAS OUTSIDE OF THE FLOW CHANNELS SLOPED TOWARD THE FLOW CHANNELS. PIPES LAID THROUGH MANHOLES SHALL HAVE THE TOP HALF REMOVED TO LEAVE LINES FOR THE INSIDE DIAMETER OF THE MANHOLE. MANHOLE FLOORS SHALL THEN BE SHAPED AROUND THE BOTTOM HALF OF THE PIPE WHICH FORMS THE FLOW CHANNEL.
- PIPES INSTALLED WITHIN THE EXCAVATION MADE FOR THE MANHOLE SHALL BE CRADLED WITH CONCRETE TO THE LIMITS OF THE MANHOLE EXCAVATION. WHEN CLAY PIPE IS USED, THE CRADLE SHALL EXTEND TO THE FIRST JOINT OUTSIDE THE MANHOLE. THE CRADLE SHALL BE TERMINATED AT THE CLAY PIPE JOINT IN A MANNER WHICH WILL MAINTAIN THE FLEXIBILITY OF THE JOINT. ~~COST OF CRADLE WITHIN MANHOLE EXCAVATION OR TO CLAY PIPE JOINTS ADJACENT TO MANHOLE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE MANHOLE.~~

- MANHOLE COVER CASTINGS AND MANHOLE FRAME CASTINGS SHALL CONFORM TO THE REQUIREMENTS AS INDICATED IN THE STANDARD SPECIFICATIONS AND AS SHOWN IN THE STANDARD DETAIL DRAWING.
- THE VERTICAL DROP IN INSIDE DROP MANHOLES SHALL NOT EXCEED 2' FOR INFLOWING PIPES SIZED 12" OR SMALLER AND 2' FOR INFLOWING PIPES LARGER THAN 12". THE CROWNS OF INFLOWING PIPES SHALL NEVER BE SET LOWER THAN THE CROWN OF THE OUTFLOWING PIPE.
- ~~STANDARD MANHOLES AND STANDARD INSIDE DROP MANHOLES SHALL BE BID AS STANDARD MANHOLES FOR THE TYPE AND DIAMETER INDICATED. OUTSIDE DROP MANHOLES SHALL BE BID AS STANDARD OUTSIDE DROP MANHOLES FOR THE TYPE AND DIAMETER INDICATED. ALL MANHOLE DIAMETERS WILL BE 4' UNLESS INDICATED OTHERWISE.~~
- A BRICK MASONRY COLLAR SHALL BE INSTALLED BETWEEN THE CAST IRON FRAME AND THE CONCENTRIC CONE. THE COLLAR WILL HAVE 8" WALLS AND A VERTICAL HEIGHT OF 6" MINIMUM AND 18" MAXIMUM. A 1" COAT OF MORTAR WILL BE PLASTERED ON THE OUTSIDE OF THE COLLAR. THE USE OF PRE-CAST CONCRETE SPACERS FOR MANHOLE TOP ADJUSTMENT IS ALSO ALLOWED.

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<p>THE CITY OF WICHITA</p> <p>CITY ENGINEER'S OFFICE                  CITY HALL - SEVENTH FLOOR                  455 NORTH MAIN STREET                  WICHITA, KANSAS 67202                  (316) 268-4501                  (316) 268-4114 FAX</p>	<b>STANDARD TYPE 'P' MANHOLES</b>	
	M. E. LINDEBAK P.E. - CITY ENGINEER	
	PROJECT NUMBER 197-468-83564	OCA NO. (751323)
DATE JAN 2003	SHEET 8 OF 14	

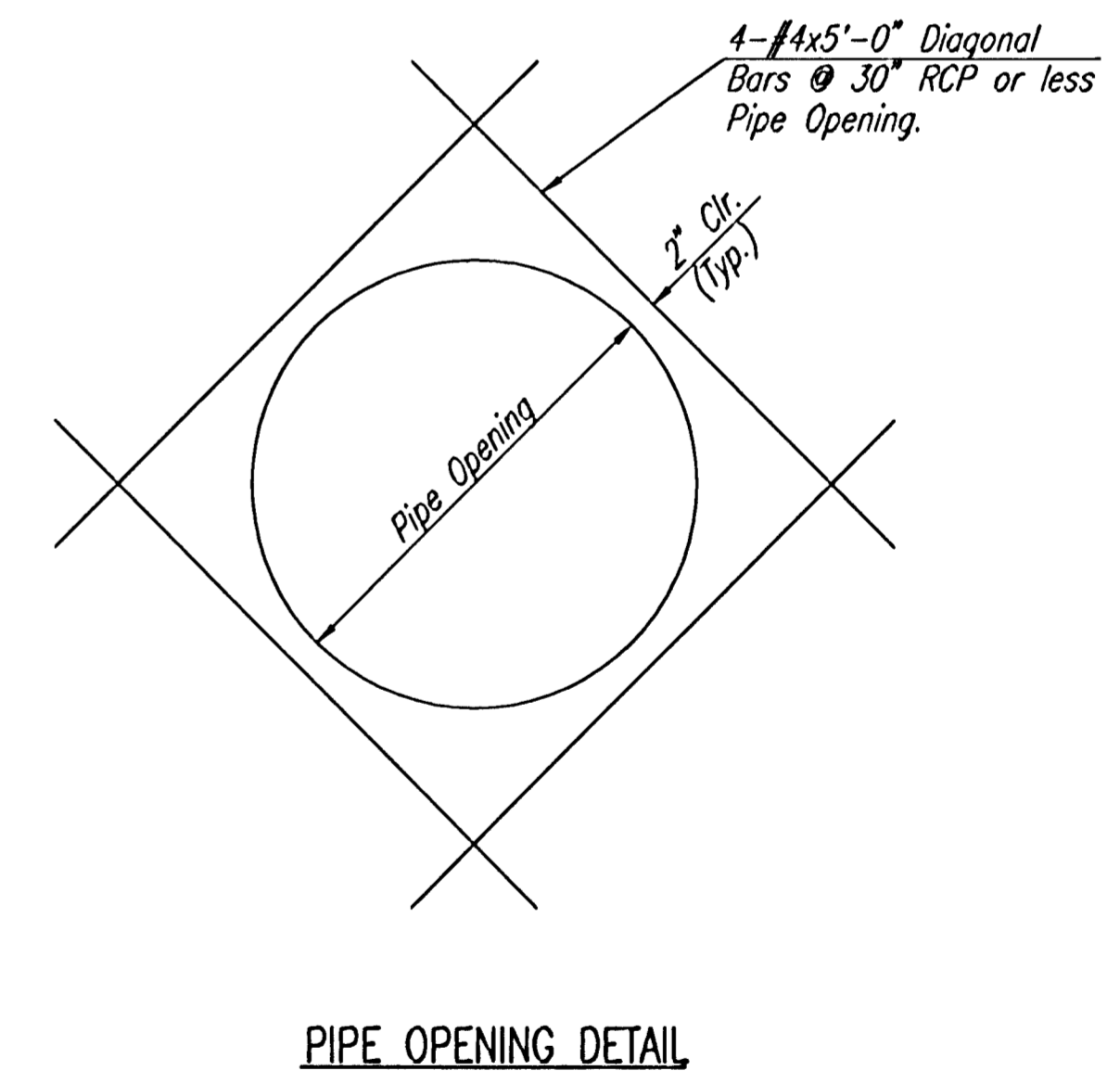
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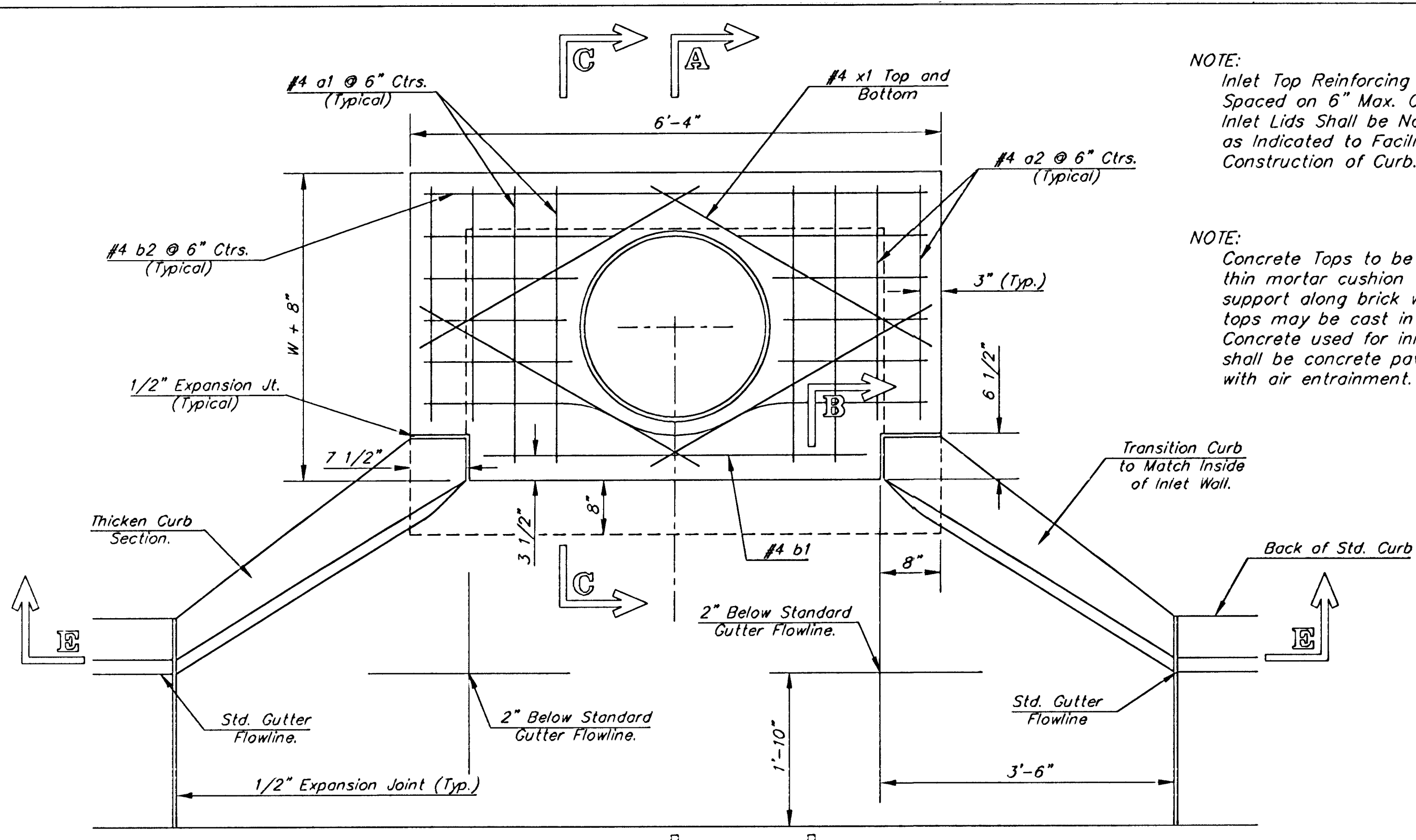
Floor of manhole shall be shaped to increase hydraulic efficiency.

**GENERAL NOTES:**

- CONCRETE USED IN MANHOLE WALLS AND BASES SHALL CONFORM TO THE REQUIREMENTS FOR CONCRETE PAVEMENT CONSTRUCTION AS SPECIFIED IN THE CITY STANDARD PAVING SPECIFICATIONS, USING CITY CONCRETE PAVEMENT MIX WITHOUT AIR ENTRAINING ADMIXTURE. MORTAR SHALL BE PLACED AROUND THE MANHOLE RING AS SHOWN ON THE DRAWINGS WHEN MANHOLES ARE CONSTRUCTED IN UNPAVED AREAS. COMPLETED MANHOLE SHALL BE WITHOUT LEAKS AND WATER TIGHT.
- MANHOLE COVER CASTINGS AND MANHOLE FRAME CASTINGS SHALL CONFORM TO THE REQUIREMENTS AS INDICATED IN THE STANDARD SPECIFICATIONS AND AS SHOWN IN THE STANDARD DETAIL DRAWING.
- THE ENDS OF ALL PIPES IN MANHOLES SHALL BE CUT OFF FLUSH WITH THE INSIDE FACE OF MANHOLE WALL.



No.	Revision	By	Date
CITY OF WICHITA, KANSAS NEIL D. CABLE, P.E. - CITY ENGINEER WILSON ESTATES MEDICAL PARK <b>ADJUSTABLE MANHOLE DETAIL</b> PUBLIC PROJECT NO. 197-468-83564 <b>Professional Engineering Consultants, P.A.</b> 303 S. TOPEKA • WICHITA, KANSAS 67202 316-262-2691 • FAX 316-262-3003			
Designed by	DRC	Job No.	36-02620-3432
Drawn by	SAW	Date	January 2003
			Sht. 9 of 14

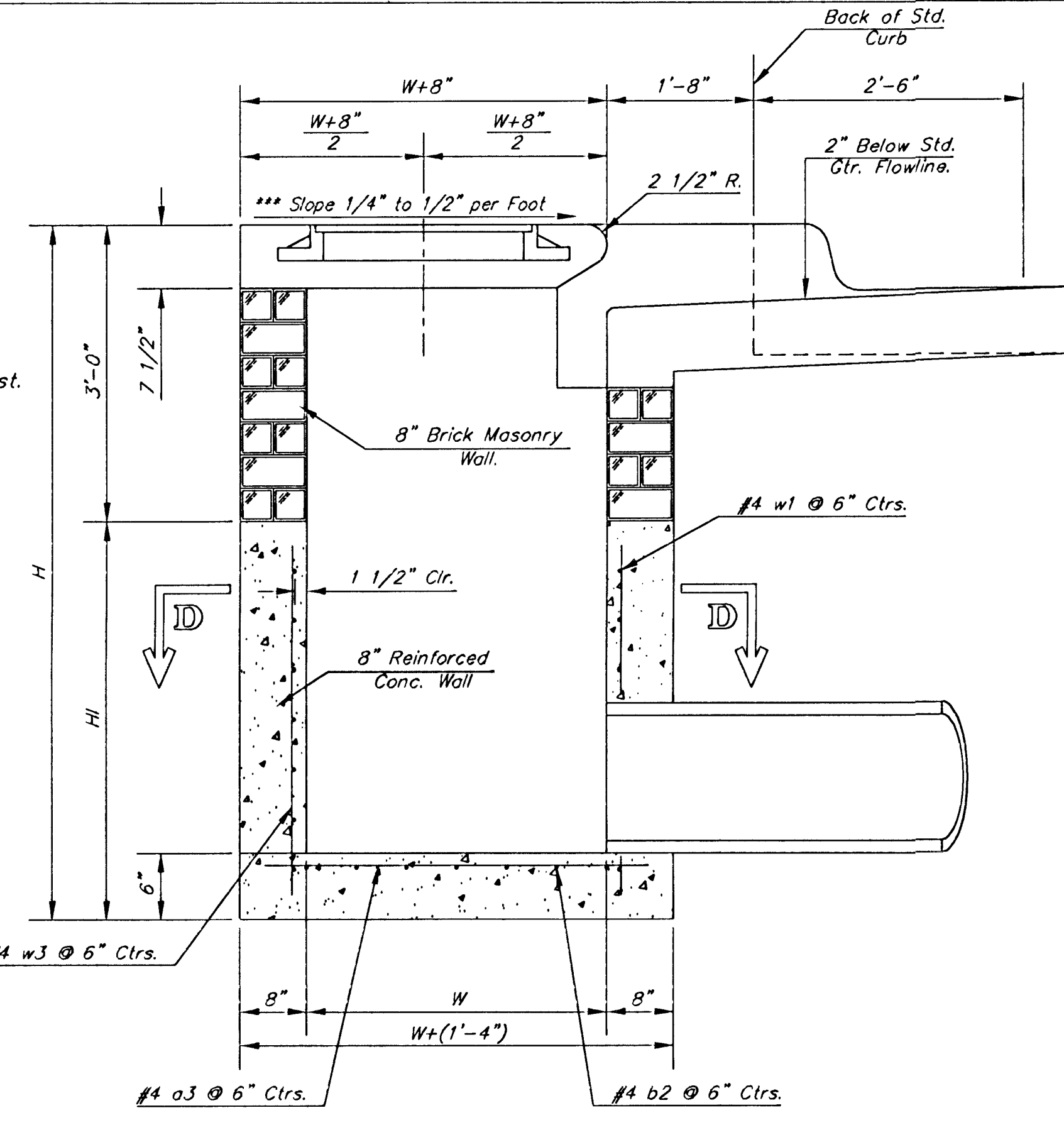


NOTE:  
Inlet Top Reinforcing shall be Spaced on 6" Max. Centers. Inlet Lids Shall be Notched Out as Indicated to Facilitate Construction of Curb.

NOTE:  
Concrete Tops to be installed on thin mortar cushion to insure full support along brick walls. Concrete tops may be cast in place or precast. Concrete used for inlet construction shall be concrete pavement mix with air entrainment.

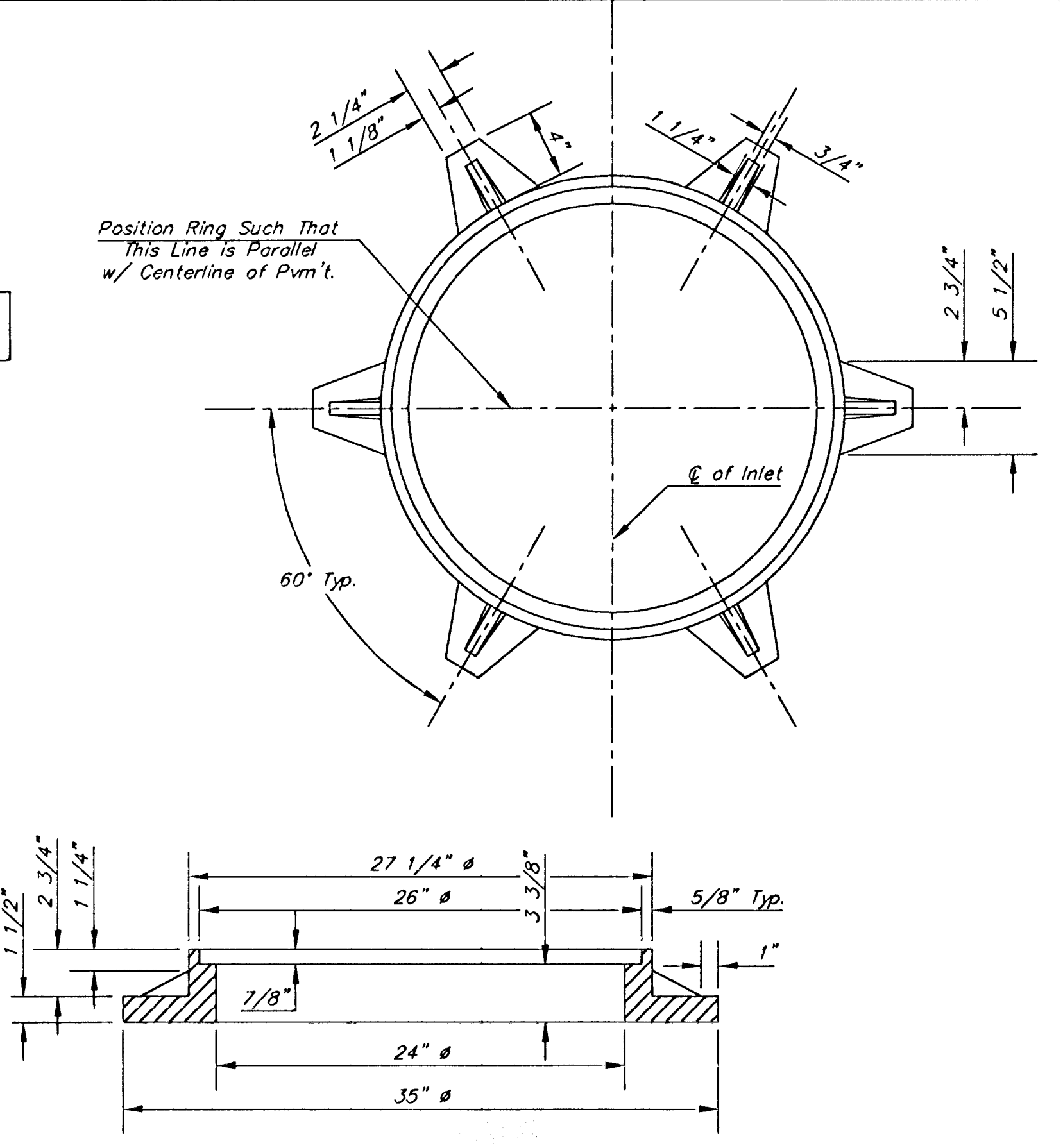
NOTE:  
Expansion Joint Only in Curb Area With Concrete Pavement.

PLAN



SECTION A-A

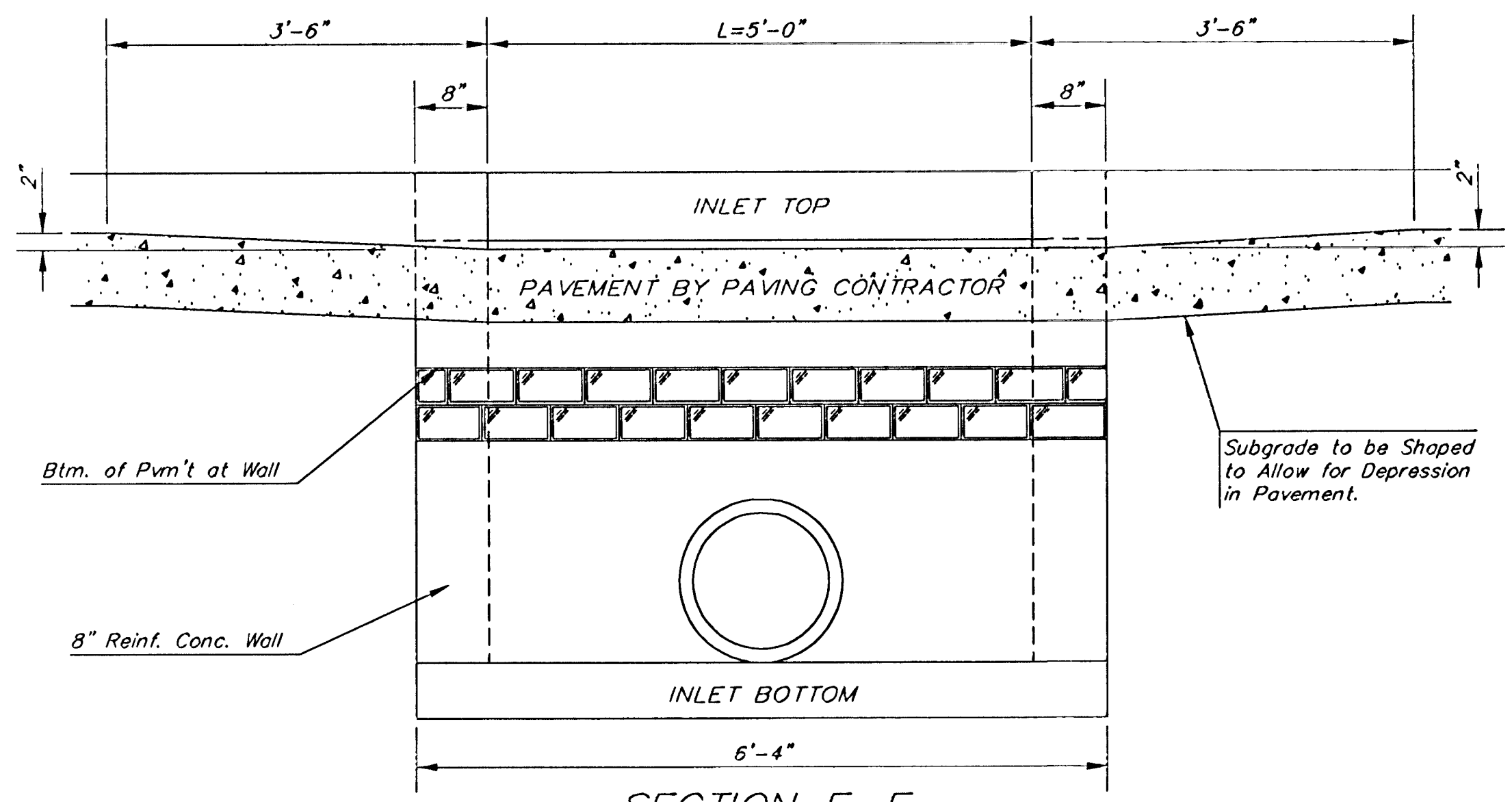
\*\*\*NOTE: Slope of Inlet tops to Match Sidewalk or Parking Slopes within Limits Indicated.



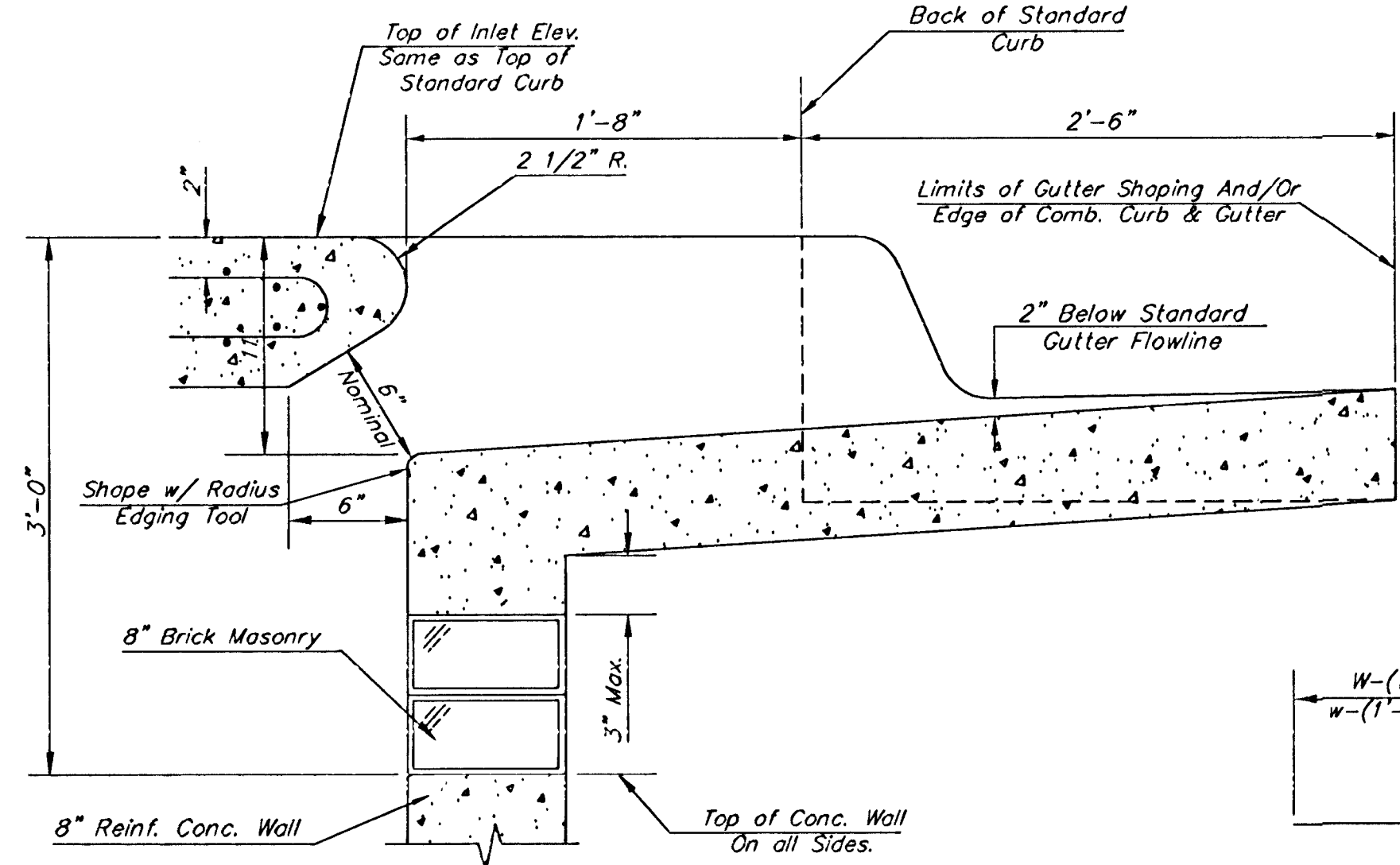
MANHOLE RING AND COVER

Weight = 180 Lbs.

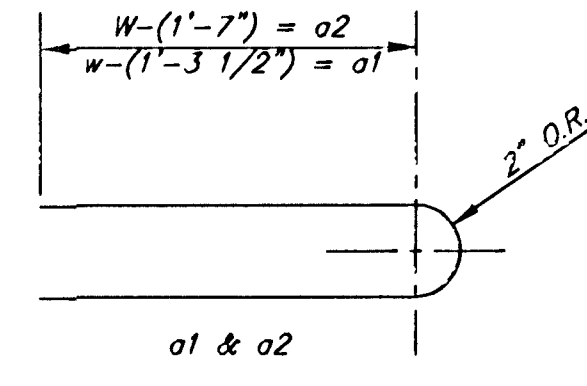
\*See City of Wichita Standard Manhole Ring and Cover Detail Sheet for Cover Details to Be Used With Inlet Frame.



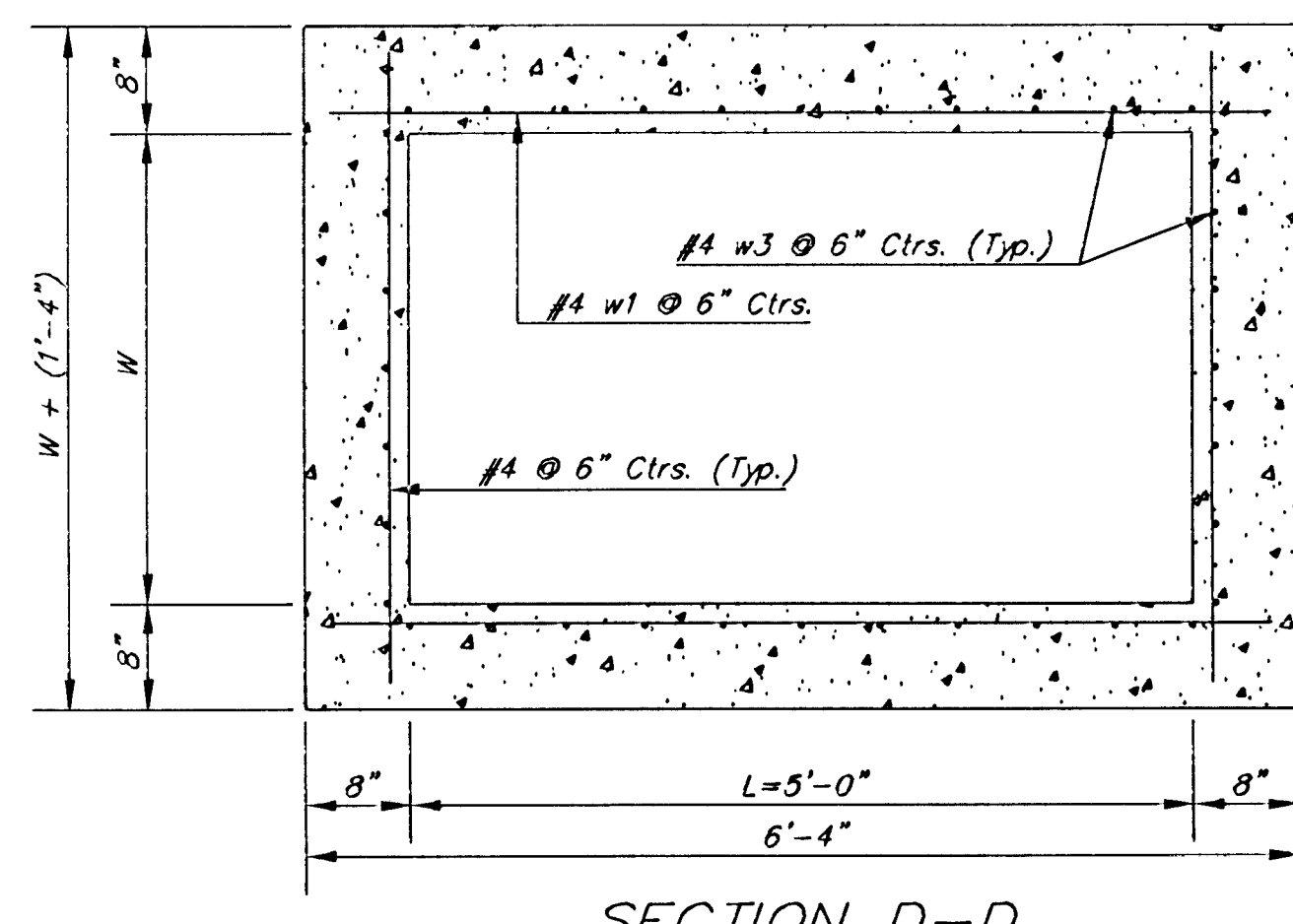
SECTION E-E



SECTION B-B



BENDING DIAGRAM



SECTION D-D

NOTE: Contractor shall have the option of constructing 8" brick masonry walls between the concrete inlet base and top on this inlet when W=5'-0" and H=7'-0" or less.

Additional curb and gutter construction necessary to connect set-back inlet to pavement will be paid for at the unit price bid for each inlet hookup.

Inlet invert shall be shaped with 8 sack sand mix concrete to create flow channels and to increase hydraulic efficiency such that the inlet will be self-cleaning between all inlet and/or outlet pipes.

The ends of all pipes installed in inlets shall be cut off flush with the inside face of the inlet wall

PRECAST SLAB AND FLOOR REINFORCING											
MARK	SIZE	W = 3'-0"		W = 4'-0"		W = 5'-0"		W = 6'-0"		W = 7'-0"	
		NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
a1	#4	6	6'-7"	6	8'-7"	6	10'-7"	6	12'-7"	6	14'-7"
a2	#4	4	6'-0"	4	8'-0"	4	10'-0"	4	12'-0"	4	14'-0"
a3	#4	13	4'-1"	13	5'-1"	13	6'-1"	13	7'-1"	13	8'-1"
b1	#4	1	4'-9"	1	4'-9"	1	4'-9"	1	4'-9"	1	4'-9"
b2	#4	23	6'-1"	29	6'-1"	35	6'-1"	41	6'-1"	47	6'-1"
x1	#4	8	3'-10"	8	4'-2"	8	4'-6"	8	4'-10"	8	5'-2"

WALL REINFORCING											
MARK	SIZE	W = 3'-0"		W = 4'-0"		W = 5'-0"		W = 6'-0"		W = 7'-0"	
		NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
w1	#4	①	6'-1"	①	6'-1"	①	6'-1"	①	6'-1"	①	6'-1"
w2	#4	①	4'-1"	①	5'-1"	①	6'-1"	①	7'-1"	①	8'-1"
w3	#4	32	②	36	②	40	②	44	②	48	②

\* Field Bend or Cut Reinforcing as Required for Clearance.  
 ① 4 (H1 - 12") (H1 - 21") Rounded down to nearest 0.5"  
 ② H1 - 3"

STANDARD CURB INLET PRECAST TOPS			
W	PRE-CAST TOP SIZE	PIPE SIZE	CU. YD. CONC.
3'-0"	3'-8" x 6'-4" x 7 1/2"	21" & SMALLER	0.38±
4'-0"	4'-8" x 6'-4" x 7 1/2"	24" & 30"	0.51±
5'-0"	5'-8" x 6'-4" x 7 1/2"	36" & 42"	0.64±
6'-0"	6'-8" x 6'-4" x 7 1/2"	48" & 54"	0.77±
7'-0"	7'-8" x 6'-4" x 7 1/2"	60" & 66"	0.90±

**THE CITY OF WICHITA**

**STANDARD TYPE 1-A  
CURB INLET  
OPENING = 6" x 5'-0"**

NEIL D. CABLE, P.E. - CITY ENGINEER

PROJECT NUMBER 468-83564	OCA NO. 751323
DATE JAN 2003	SHEET 10 OF 14

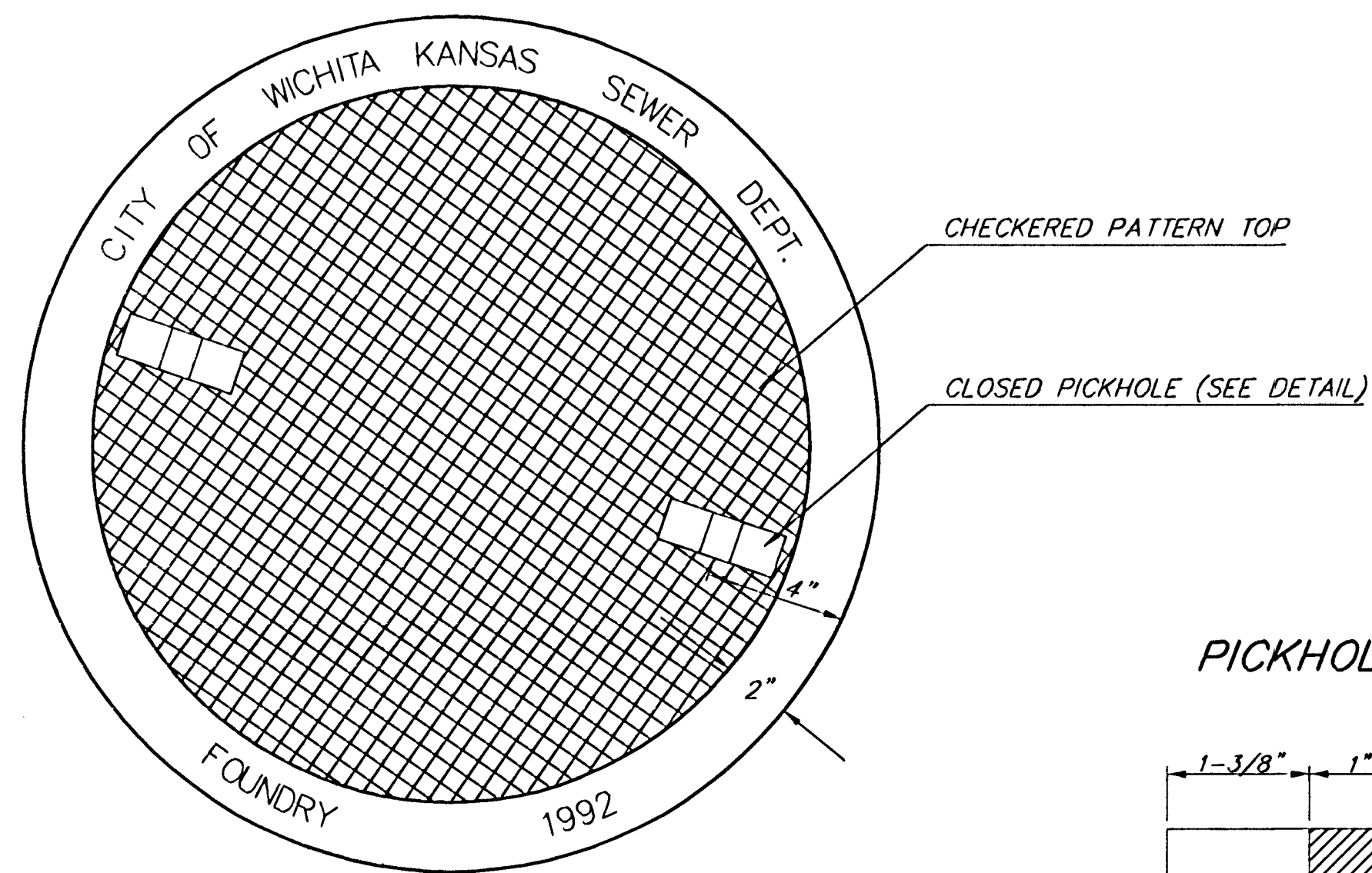
CITY ENGINEER'S OFFICE  
CITY HALL - SEVENTH FLOOR  
459 NORTH MAIN STREET  
WICHITA, KANSAS 67202  
(316) 268-4500  
(316) 268-4114 FAX

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MANHOLE COVER  
Weight = 180 Lbs.

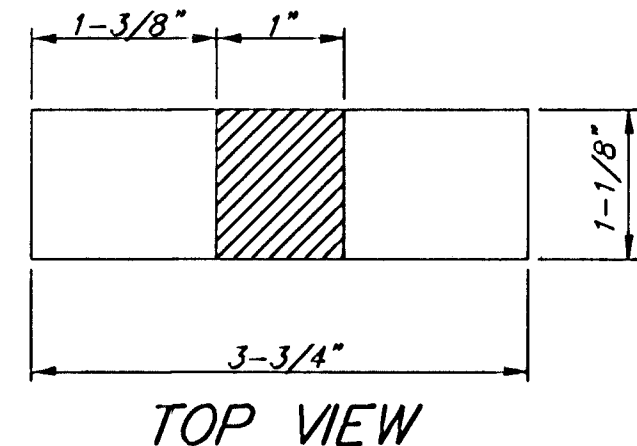
# MANHOLE FRAME AND COVER DETAIL

ADOPTED AS STANDARD DESIGN BY  
CITY OF WICHITA, KANSAS

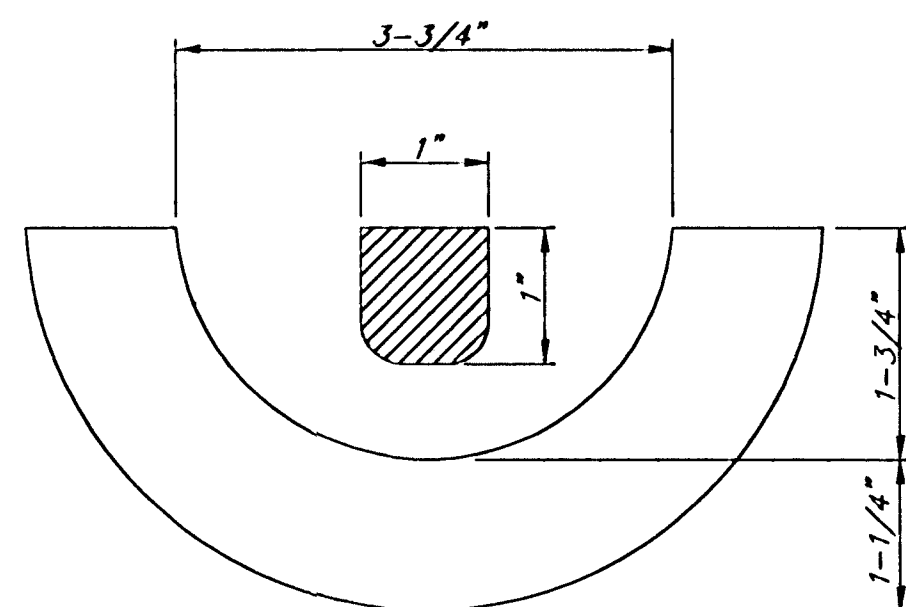


TOP VIEW

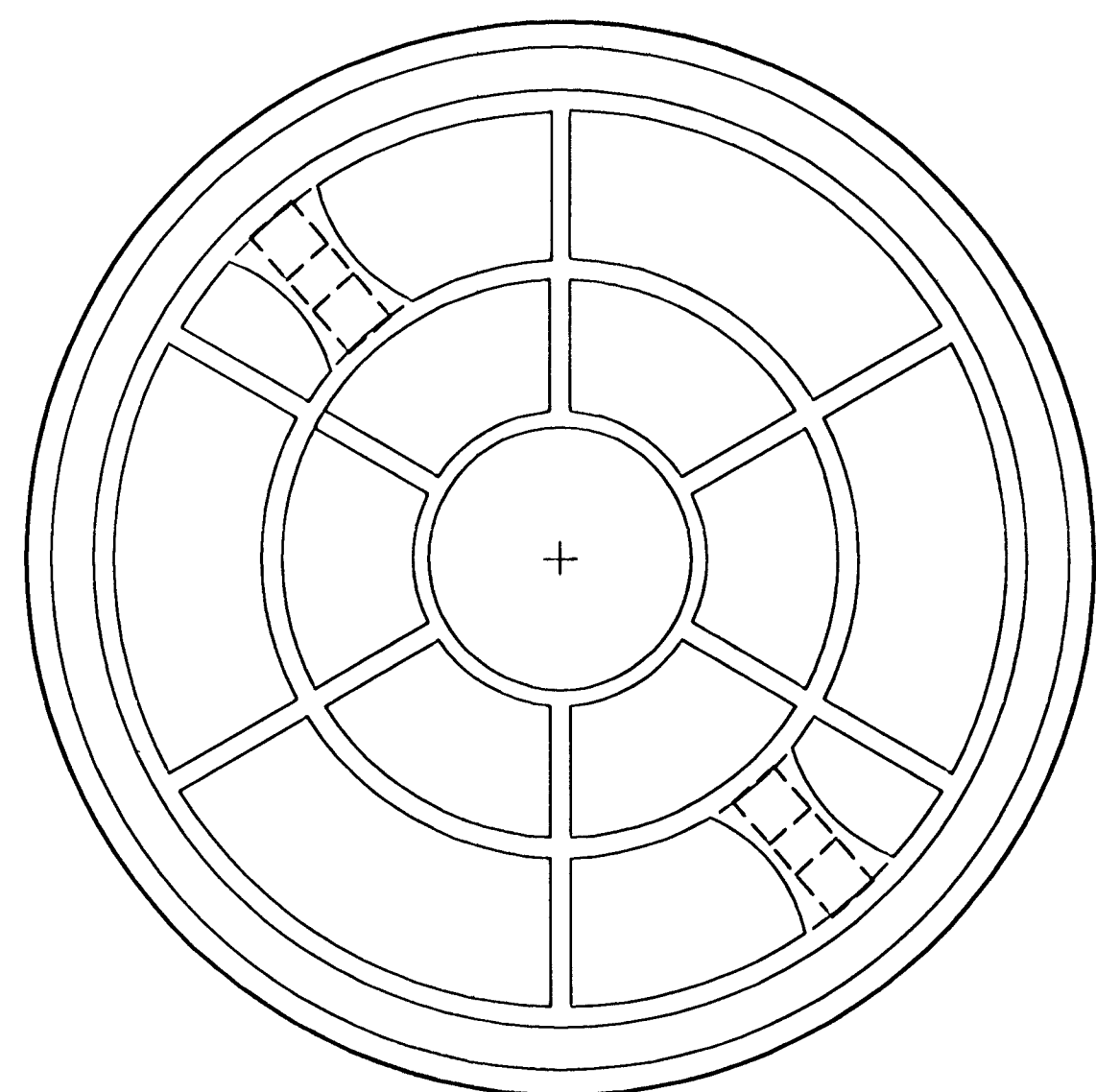
PICKHOLE DETAIL



TOP VIEW

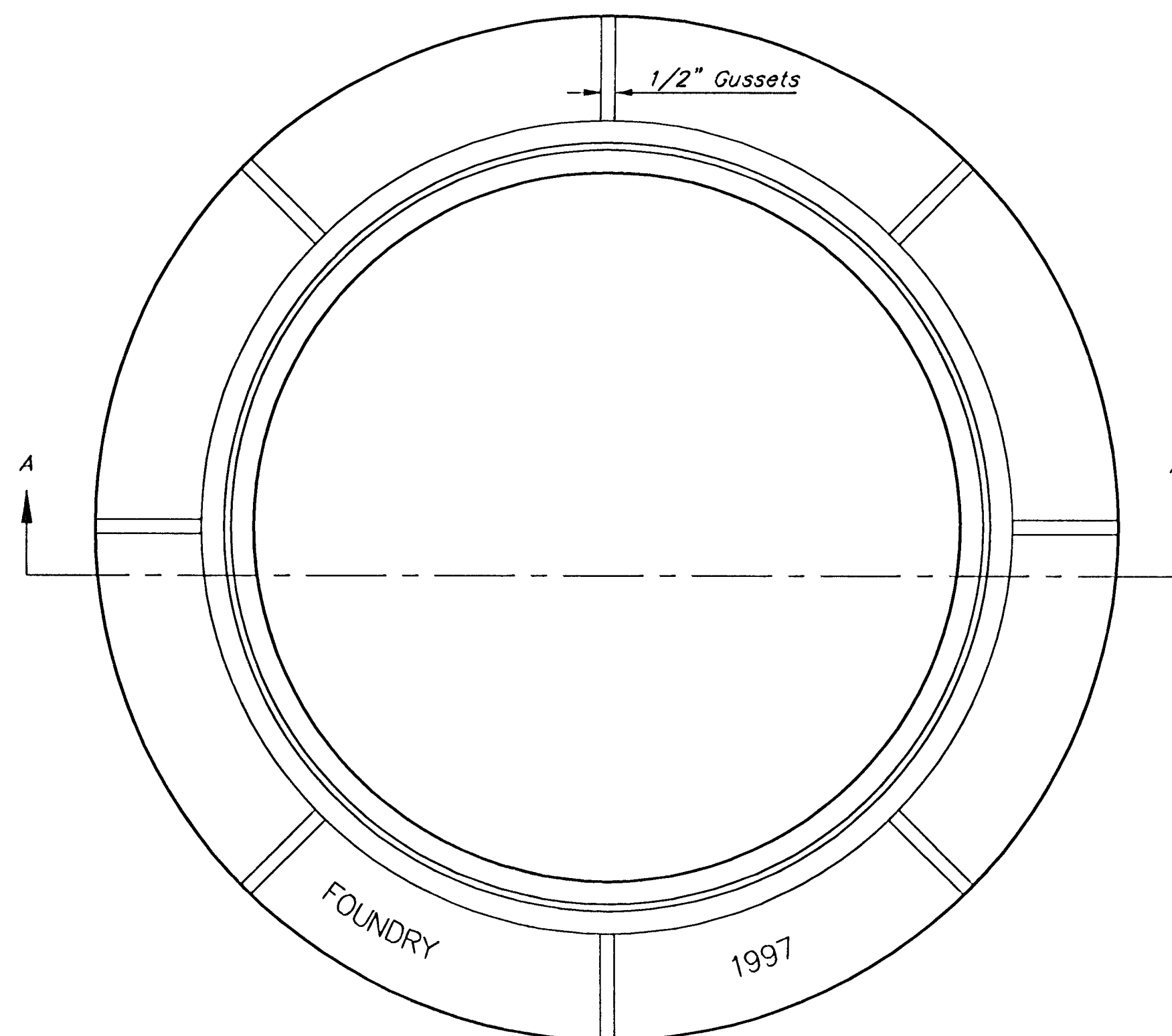


SECTION VIEW

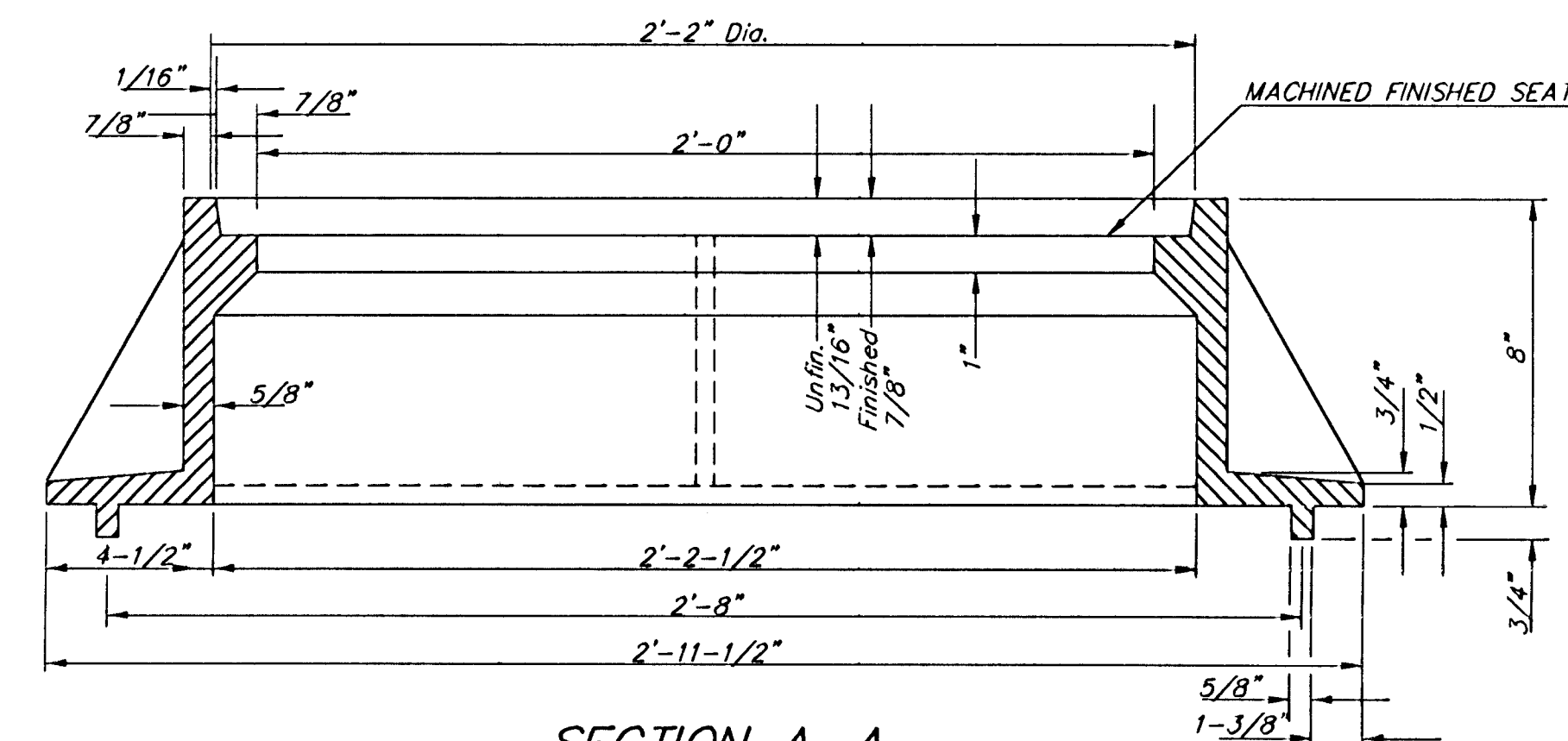


BOTTOM VIEW

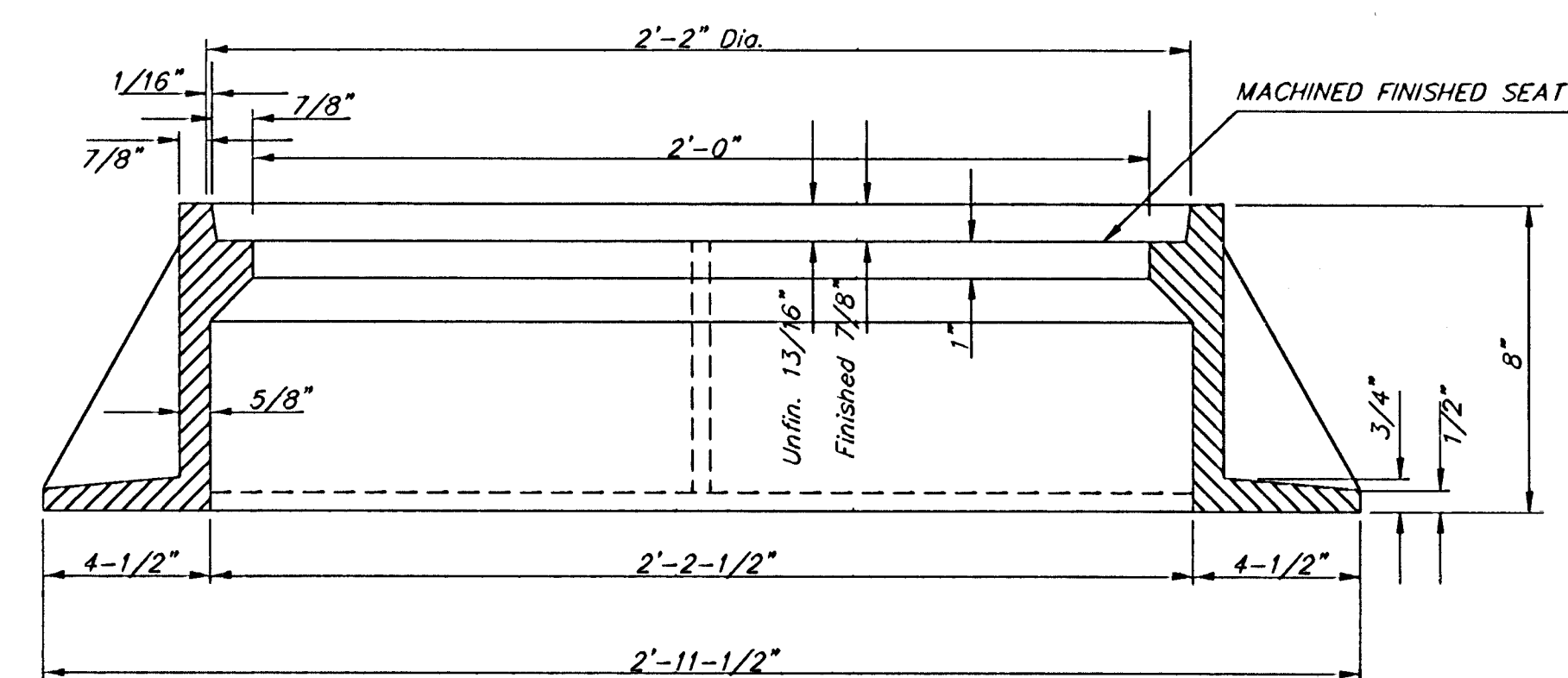
MANHOLE FRAME  
Weight = 240 Lbs.



TOP VIEW



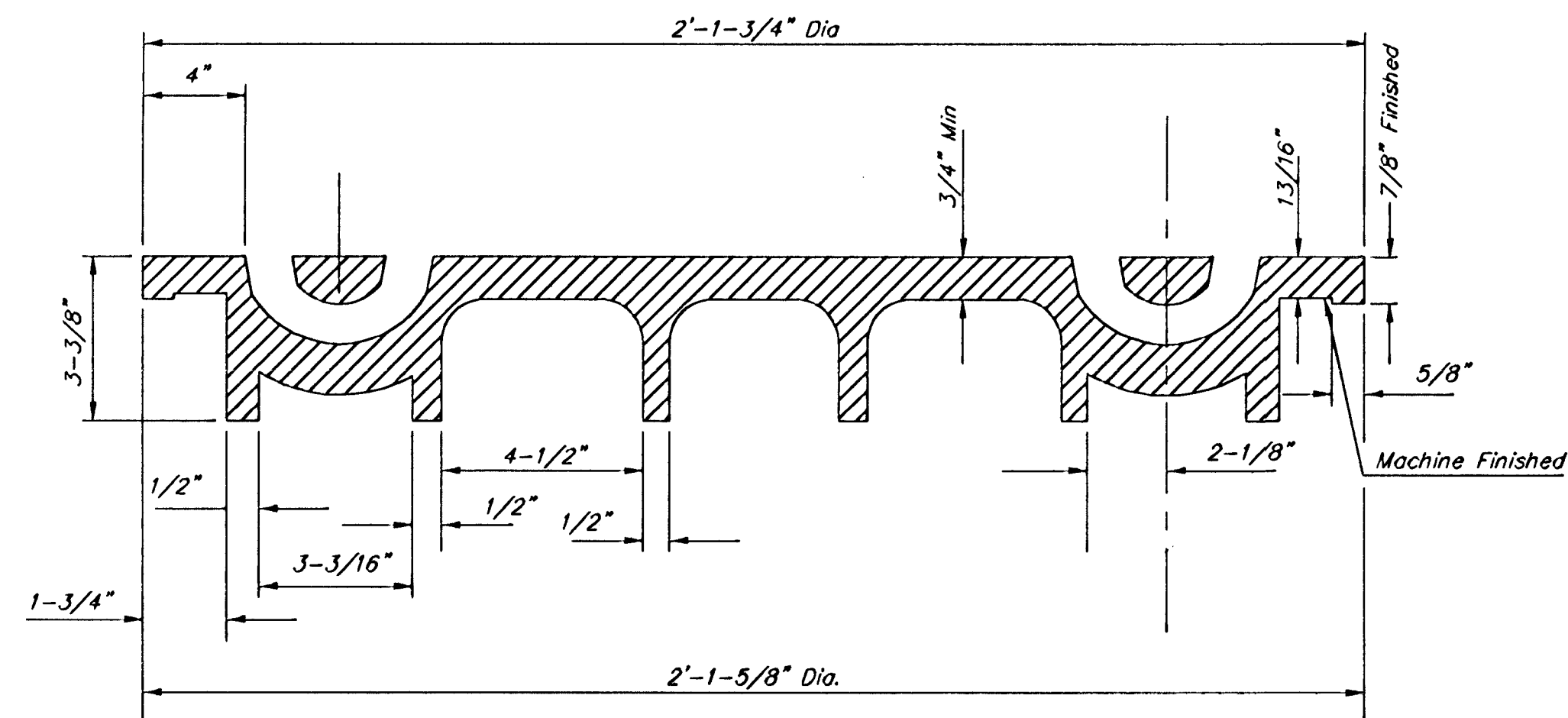
SECTION A-A  
MUD RING



SECTION A-A

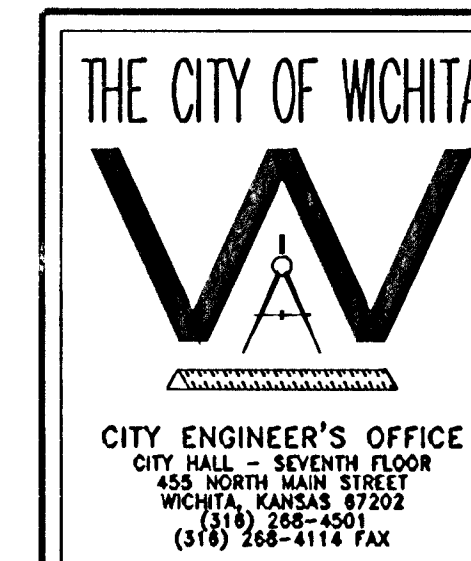
## GENERAL NOTES

- MANHOLE CASTINGS SHALL BE MANUFACTURED USING GOOD QUALITY GRAY IRON CONFORMING TO CLASS 30 OF A.S.T.M. DESIGNATION A-48. DIMENSIONS AND WEIGHTS SHOWN ON THE DETAILED DRAWINGS SHALL BE CONSIDERED AS MINIMUM REQUIREMENTS AND ANY DEVIATIONS FROM THE DIMENSIONS SHOWN MUST BE SPECIFICALLY APPROVED. THE FINISHED CASTINGS SHALL BE OF UNIFORM QUALITY, FREE FROM BLOWHOLES, POROSITY, HARD SPOTS, SHRINKAGE DISTORTIONS OR OTHER DEFECTS.
- MANHOLE CASTINGS SHALL WEIGH A MINIMUM OF 180 POUNDS ON THE SOLID COVER AND 240 POUNDS ON THE MANHOLE RING. THIS IS A TOTAL OF 420 POUNDS ON A RING AND COVER SET. CASTINGS WEIGHING LESS THAN THE MINIMUM SPECIFICATIONS WILL NOT BE ACCEPTED.
- MANHOLE CASTINGS SHALL BE MANUFACTURED SUCH THAT A COVER MANUFACTURED BY ANY ONE FOUNDRY WILL FIT INTERCHANGEABLY INTO A FRAME MANUFACTURED BY ANOTHER FOUNDRY AND STILL MEET ALLOWABLE CLEARANCES AND NON-ROCKING REQUIREMENTS. THIS WILL REQUIRE MANUFACTURING OF THE MATCHING FACES ON THE COVER AND THE FRAME TO CLOSE TOLERANCES.
- THE OUTSIDE CIRCUMFERENCE OF THE VERTICAL FACE OF THE COVER AND THE INSIDE CIRCUMFERENCE OF THE VERTICAL FACE IN THE FRAME RECESS SHALL BE MANUFACTURED TO TOLERANCES SUCH THAT THE CLEARANCE BETWEEN THE COVER AND FRAME WILL NOT EXCEED 1/8" AT ANY POINT AROUND THE CIRCUMFERENCE OF THE COVER. THE SEATING SURFACES BETWEEN THE COVER AND FRAME SHALL BE MACHINED SUCH THAT THESE SEATING SURFACES SHALL MAKE FULL CONTACT FOR THEIR FULL CIRCUMFERENCE TO PRECLUDE THE COVER FROM ROCKING IN THE FRAME.
- THE MANHOLE FRAME AND COVER SHALL BE MARKED WITH LETTERING INDICATING THE NAME OF THE MANUFACTURER AND THE YEAR WHEN THE COVER OR FRAME WAS CAST. THE COVER SHALL BE FURTHER IDENTIFIED WITH REGARDS TO OWNERSHIP USING LETTERS AT LEAST 1 INCH IN HEIGHT. THIS IDENTIFICATION SHALL BE "CITY OF WICHITA SEWER DEPARTMENT". THE WORD DEPARTMENT MAY BE ABBREVIATED. THE TEXTURE OF THE TOP SURFACE OF THE COVER SHALL BE MANUFACTURED IN A CHECKERED PATTERN DESIGN AS INDICATED ON THE DRAWINGS. SMOOTH BLOCKOUTS SHALL BE UTILIZED TO HIGHLIGHT THE LETTERING ON THE COVER SURFACE. THE TOTAL AREA OF SMOOTH SURFACE BLOCKOUT SHALL NOT EXCEED THE AREA AS INDICATED ON THE DRAWING. POSITIONING OF SMOOTH SURFACE BLOCKOUTS AND LETTERING MAY VARY FROM THAT SHOWN ON THE DETAILED DRAWING.



SECTION VIEW

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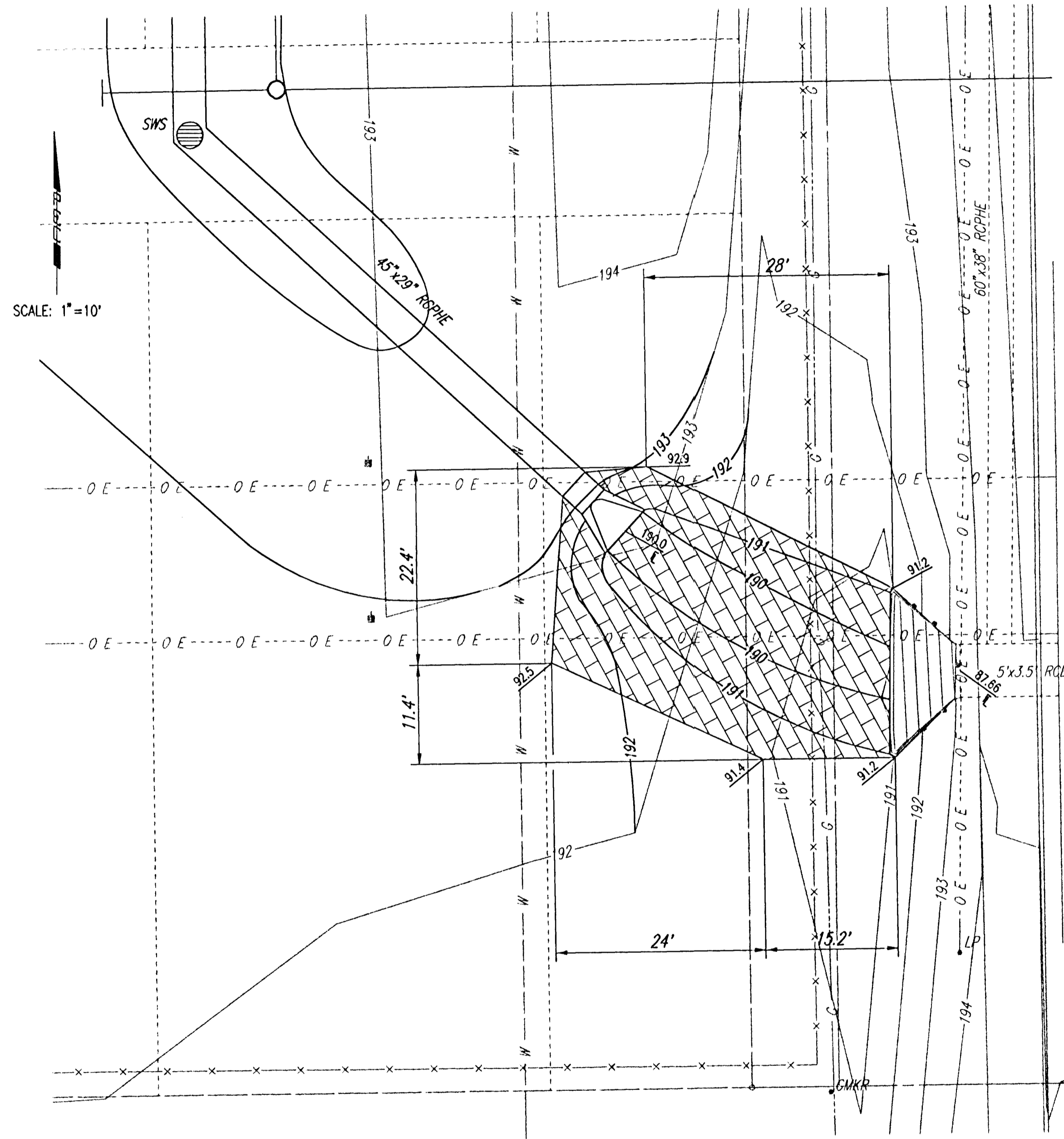


## MANHOLE FRAME AND COVER

NEIL D. CABLE, P.E. - CITY ENGINEER

PROJECT NUMBER: 197-468-83564  
 OCA NO.: (751323)

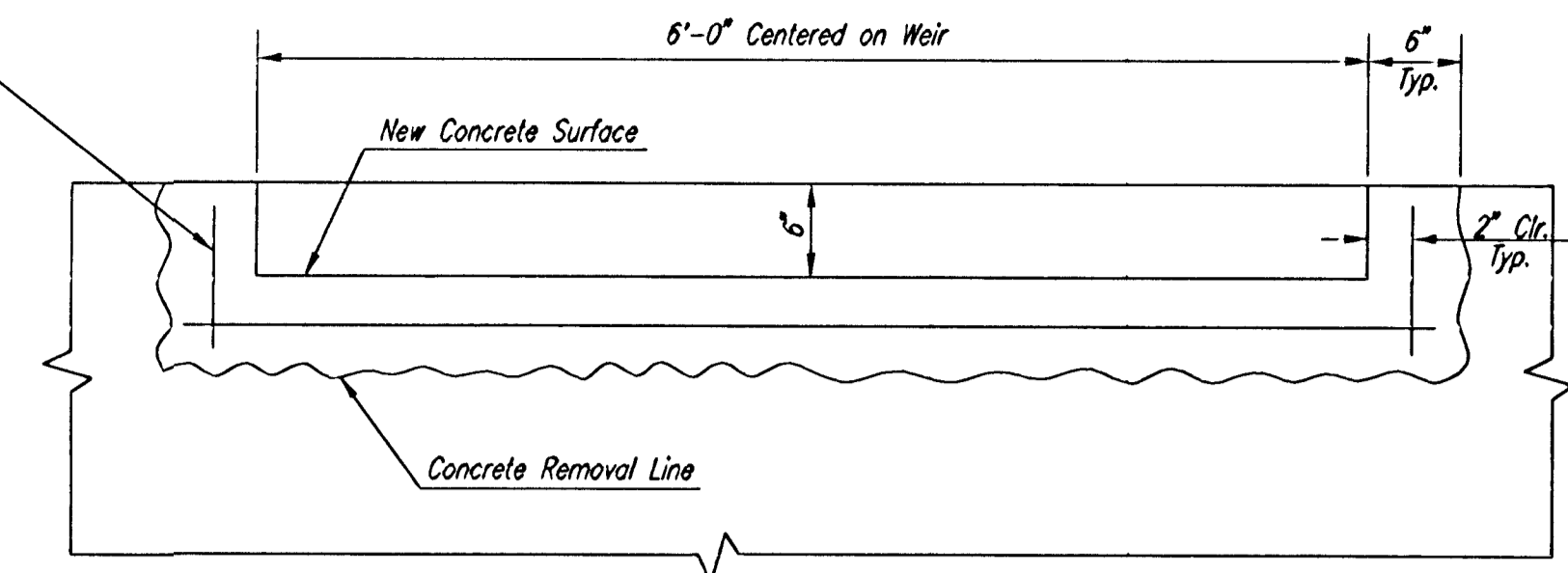
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 SHEET 11 OF 14



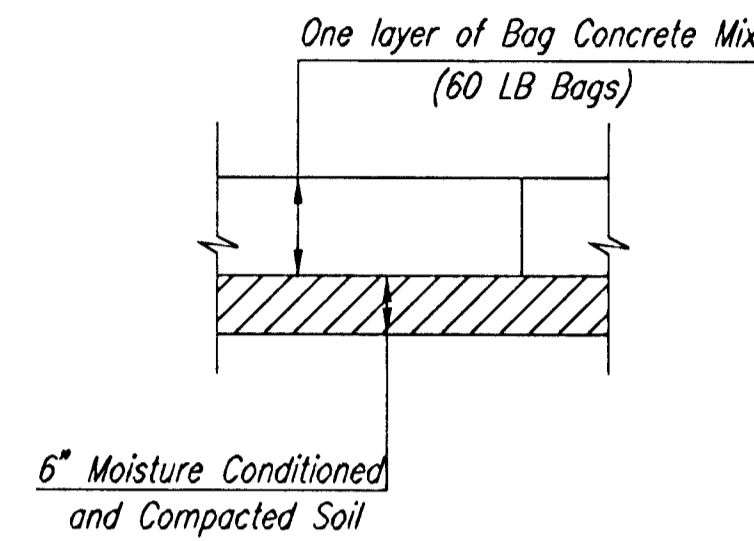
SCALE: 1"=10'

NOTE:  
CONTRACTOR SHALL NOT DISTURB GROUND  
BELOW ELEVATION 190.0 FROM THE CENTER-  
LINE OF THE GAS PIPELINE TO 3 FEET  
EITHER SIDE.

#4 Rebar to be added in the  
same plane as existing rebar



**WEIR NOTCH DETAIL**  
NO SCALE



**TYPICAL BAGRAP SECTION**  
NO SCALE

NOTES

1. THE CONCRETE MIX BAGS SHALL BE FITTED CLOSELY TOGETHER.
2. THE CONTRACTOR SHALL SATURATE BAGRAP IMMEDIATELY FOLLOWING PLACEMENT TO PROMOTE HARDENING.

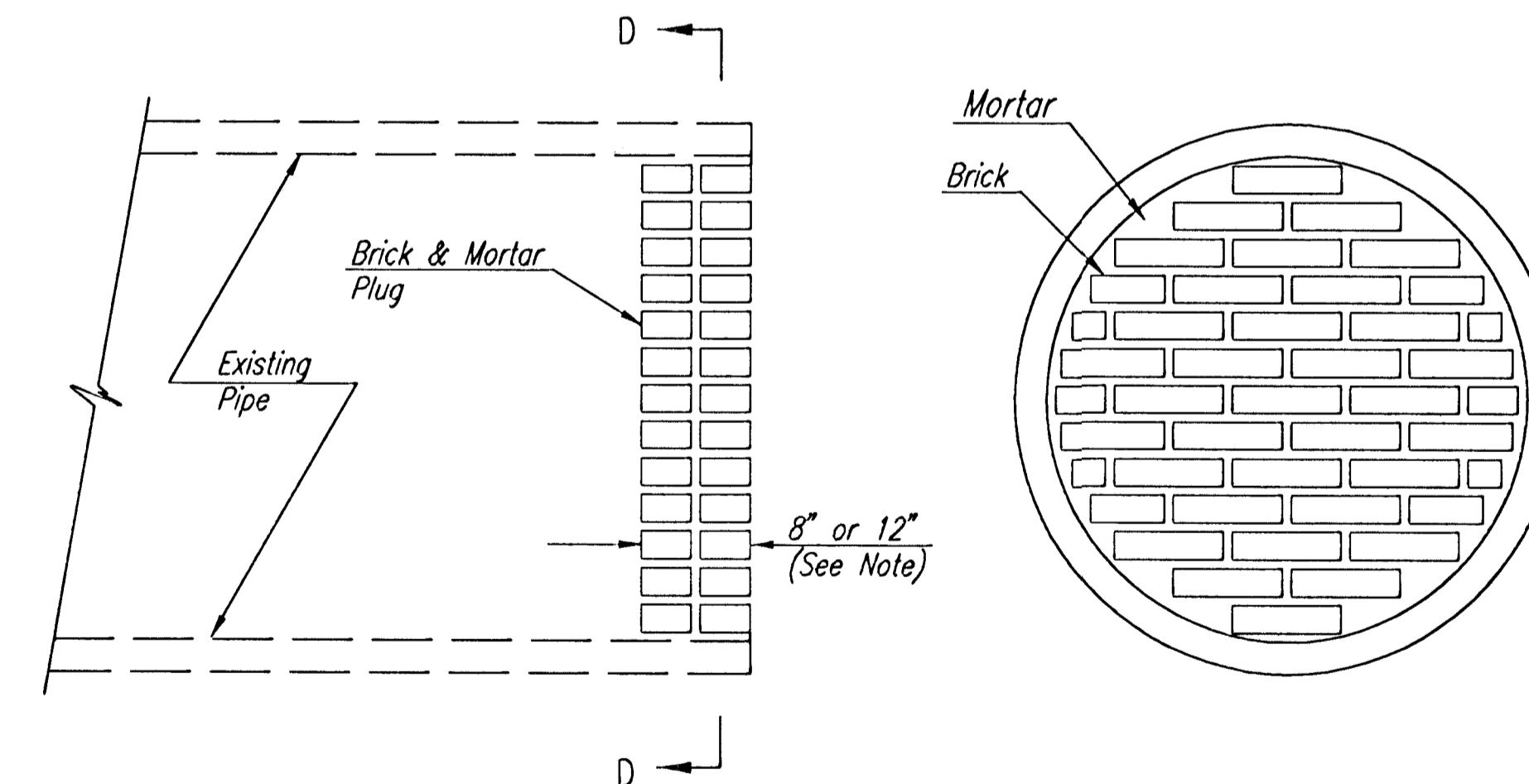
**GENERAL NOTES**

CONCRETE: CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 P.S.I.

REINFORCING STEEL: REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 60. ALL DIMENSIONS RELATIVE TO REINFORCING ARE TO CENTERLINE OF BARS UNLESS OTHERWISE NOTED. THE CONCRETE COVER FOR ALL REINFORCING SHALL BE A MINIMUM OF 1 1/2" UNLESS OTHERWISE NOTED.

REMOVAL: REMOVE EXISTING CONCRETE TO LIMITS SHOWN. EXISTING REINFORCING IN THE REMOVED CONCRETE AREA TO REMAIN. CLEAN REINFORCING BEFORE REPLACING REMOVED CONCRETE UP TO THE NEW CONCRETE SURFACE. ALL EXISTING REINFORCING STEEL SHALL BE CUT TO MAINTAIN A MINIMUM OF 1 1/2" CONCRETE COVER.

BROKEN CONCRETE: WASTE THE BROKEN CONCRETE FROM THE EXISTING WEIR ON SITES PROVIDED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.



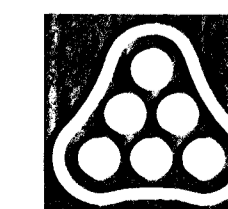
ELEVATION

SECTION D-D

**PIPE PLUGGING DETAIL**

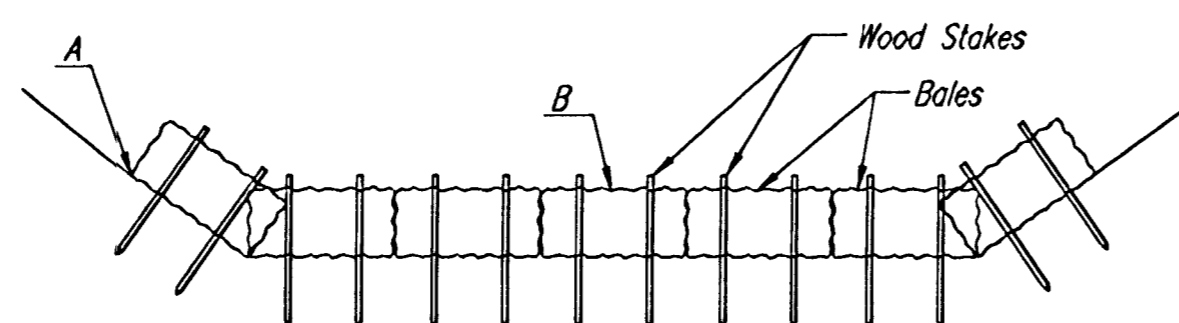
NOTE: PIPE PLUGS SHALL BE CONSTRUCTED OF BRICK MASONRY, WITH CONSTRUCTION REQUIREMENTS AND MATERIALS CONFORMING TO THE SAME REQUIREMENTS AS SPECIFIED FOR MANHOLE CONSTRUCTION ON SH. NO. SU2.9. PIPES HAVING DIAMETERS OF 18" OR SMALLER SHALL BE PLUGGED WITH 8" THICK PLUGS. PIPES HAVING DIAMETERS LARGER THAN 18" SHALL BE PLUGGED WITH 12" THICK PLUGS. THE CONSTRUCTION OF PIPE PLUGS SHALL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY.

DSNR: SAW OPER: SPL SCALE: 1"=10.00  
0:\2002\02620\SS-SWS\SWS\1\cont\dwg\01-07-2003 09:20:42 am



No.	Revision	By	Date
CITY OF WICHITA, KANSAS NEIL D. CABLE, P.E. - CITY ENGINEER WILSON ESTATES MEDICAL PARK <b>OUTLET DETAILS</b> PUBLIC PROJECT NO. 197-468-83564 <b>Professional Engineering Consultants, P.A.</b> 303 S. TOPEKA • WICHITA, KANSAS 67202 316-262-2691 • FAX 316-262-3003			
Designed by	SPL, DRC	Job No.	36-02620-3432
Drawn by	SAW	Date	January 2003
			Sht. 12 of 14

NOTE: Point A must be higher than Point B so that water flows over the bales and not around them.



**STRAW BALE DITCH CHECKS**

**Material Specification:**

Bale ditch checks may be constructed of wheat straw, oat straw, prairie hay, or bromegrass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Optional: The downstream scour apron should be constructed of a double-netted straw erosion-control blanket at least 6' wide. Optional: The metal landscape staples used to anchor the erosion-control blanket should be at least 8" long.

**Placement:**

Bale ditch checks should be placed perpendicular to the flowline of the ditch. The ditch check should extend far enough so that the ground level at the ends of the check is higher than the top of the lowest center bale. This prevents water from flowing around the check.

Checks should not be placed in ditches where high flows are expected. Rock checks should be used instead.

Bales should be placed in ditches with slopes of 6% or less. For slopes steeper than 6%, rock checks should be used.

The following table provides check spacing for a given ditch grade:

Ditch grade (%)	Check Spacing (feet)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

**Proper installation method:**

Excavate a trench perpendicular to the ditch flowline that is 4" deep and a bale's width wide. Extend the trench in a straight line along the entire length of the proposed ditch check. Place the soil on the upslope side of the trench—it will be used later. Optional: On the downstream side of the trench, roll out a length of erosion-control blanket (scour apron) equal to the length of the trench. Place the upstream edge of the erosion-control blanket along the bottom upstream edge of the trench. The erosion control blanket should be anchored in the trench with one row of 8" landscape staples placed on 18" centers. The remainder of the erosion-control blanket (the portion that is not lying in the trench) will serve as the downstream scour apron. This section of the blanket should be anchored to the ground with 8" landscape staples placed around the perimeter of the blanket on 18" centers. The remainder of the blanket should be anchored using two evenly spaced rows of 8" landscape staples on 18" centers placed perpendicular to the flowline of the ditch. Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale along the centerline of the ditch check, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the upstream side of the check and compact it. The compacted soil should be no more than 3" to 4" deep and extend upstream no more than 24".

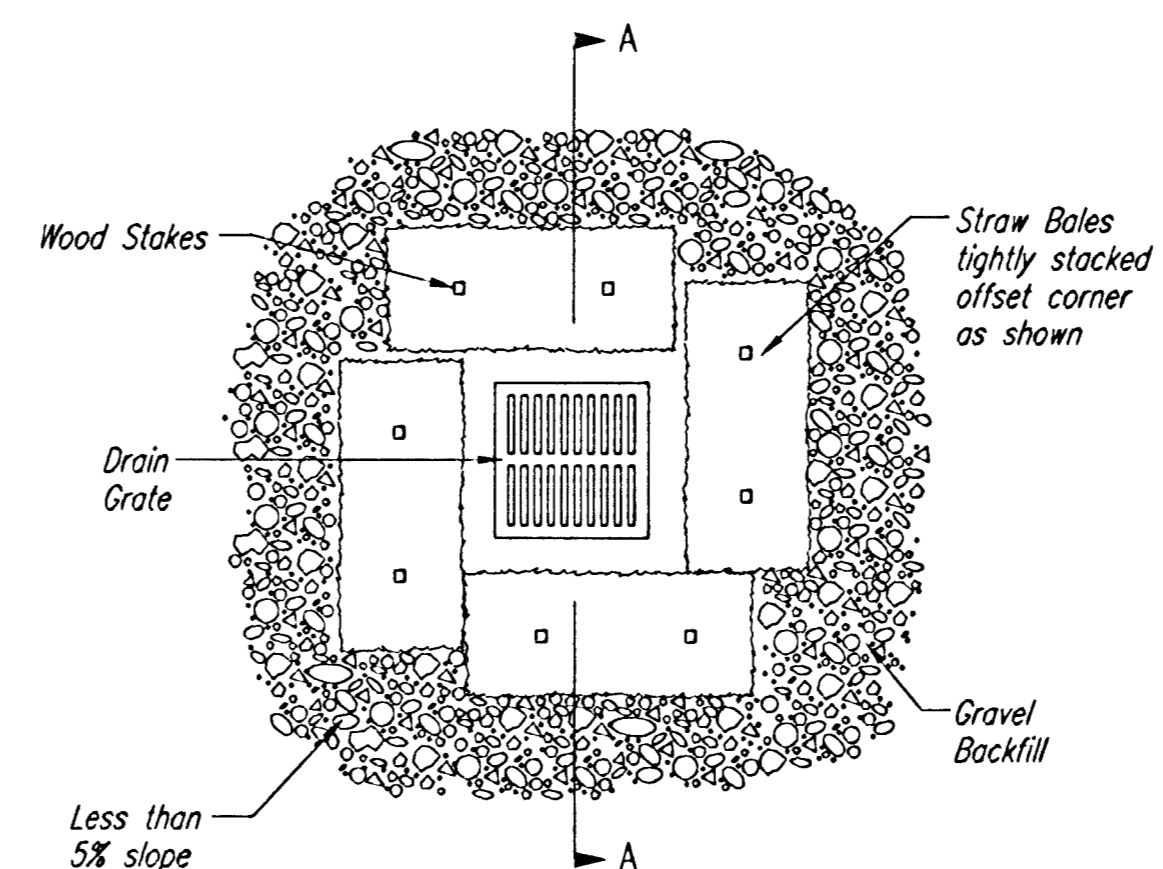
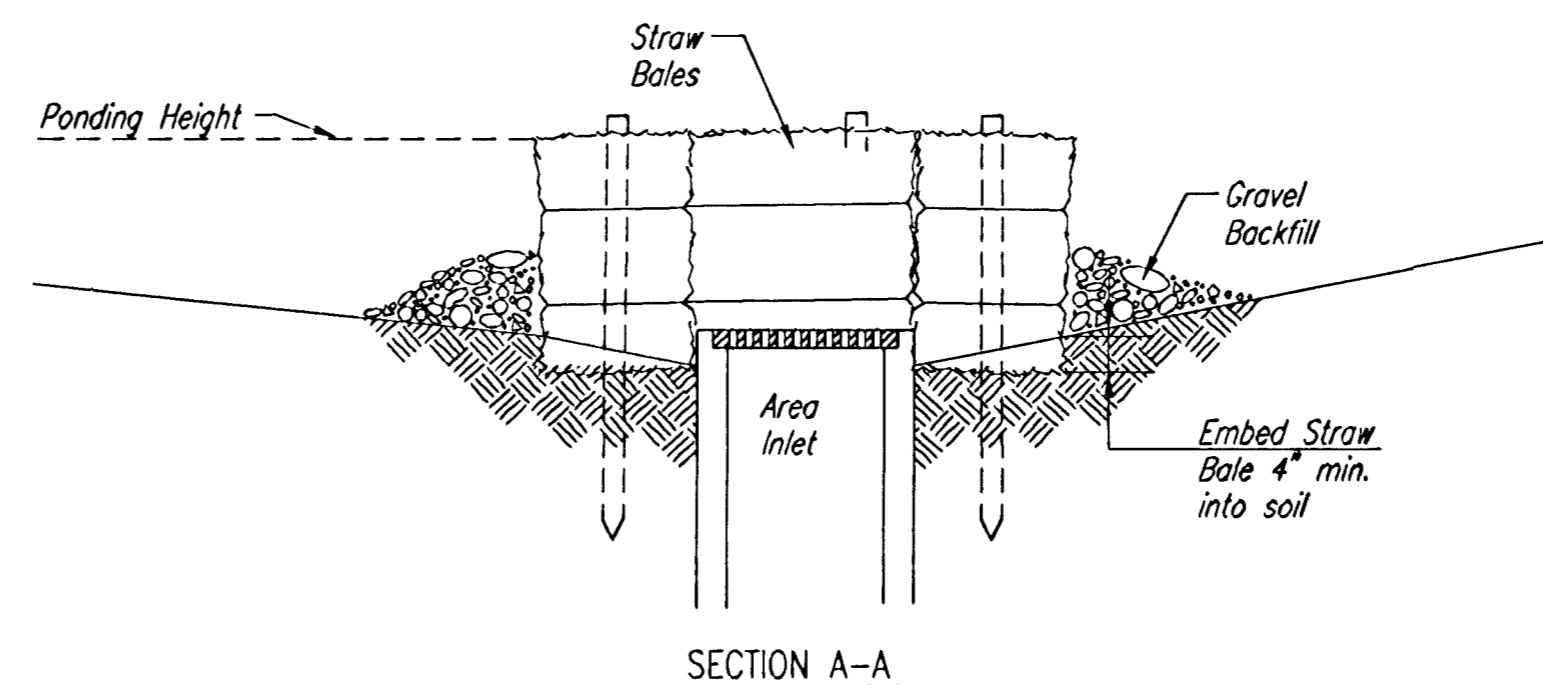
**List of common placement/installation mistakes to avoid:**

- Do not place a bale ditch check directly in front of a culvert outlet. It will not stand up to the concentrated flow.
- Do not place bale ditch checks in ditches that will likely experience high flows. They will not stand up to concentrated flow.
- Follow prescribed ditch-check spacing guidelines. If spacing guidelines are exceeded, erosion will occur between the ditch checks.
- Do not allow water to flow around the ditch check. Make sure that the ditch check is long enough so that the ground level at the ends of the check is higher than the top of the lowest center bale.
- Do not place bale ditch checks in channels with shallow soils underlain by rock. If the check is not anchored sufficiently, it will wash out.
- Bale ditch checks must be dug into the ground. Bales at ground level do not work because they allow water to flow under the check.

**Inspection and Maintenance:**

Bale ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow around the ditch check?
- Does water flow under the ditch check?
- Does water flow through spaces between abutting bales?
- Are any bales and/or scour aprons (optional) dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the ditch check?



**STRAW BALE BARRIERS FOR AREA INLETS (INLET PROTECTION)**

**Material Specification:**

Bale area inlet barriers should be constructed of wheat straw, oat straw, prairie hay, or bromegrass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long.

**Placement:**

Bale area inlet barriers should be placed directly around the perimeter of a drop inlet. When a bale area inlet barrier is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

**Proper installation Method:**

Excavate a trench around the perimeter of the area inlet that is at least 4" deep by a bale's width wide. Place the bales in the trench, making sure that they are butted tightly. Some bales may need to be shortened to fit into the trench around the area inlet. Two stakes should be driven through each bale, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the receiving side of the barrier and compact it. The compacted soil should be no more than 3" to 4" deep. Note: When a bale area inlet barrier is placed in a shallow median ditch, make sure that the top of the barrier is not higher than the paved road. In this configuration, water may spread onto the roadway causing a hazardous condition.

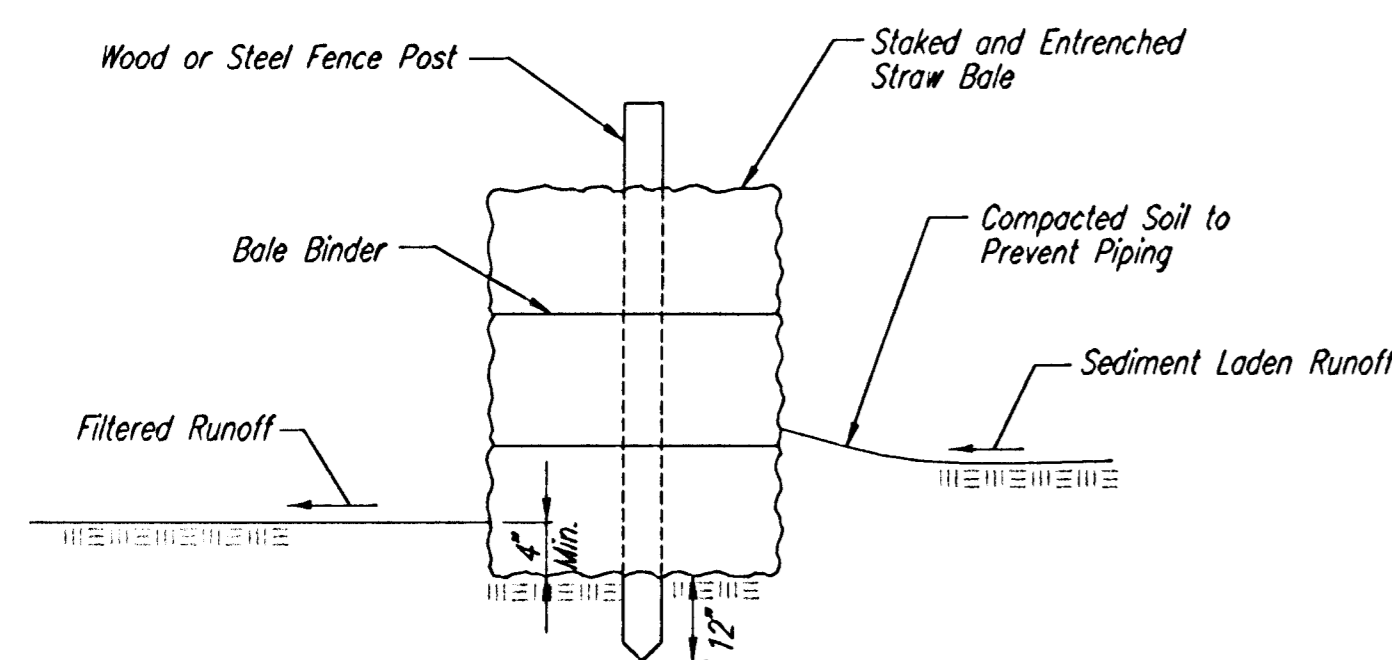
**List of common placement installation mistakes to avoid:**

- Bales should be placed directly against the perimeter of the area inlet. This allows overtopping water to flow directly into the inlet instead of onto nearby soil causing scour.
- Bale area inlet barriers must be dug into the ground. Bales at ground level do not work because they allow water to flow under the barrier.

**Inspection and Maintenance:**

Bale area inlet barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow under the area inlet barrier?
- Does water flow through spaces between abutting bales?
- Are any bales dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the area inlet barrier?



**STRAW BALE BARRIERS**

**Material Specification:**

Bale slope barriers may be constructed of wheat straw, oat straw, prairie hay, or bromegrass hay that is free of weeds declared noxious by the Kansas State Board of Agriculture. The stakes used to anchor the bales should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long.

**Placement:**

A slope barrier should be used at the toe of a slope when a ditch does not exist. The slope barrier should be placed on nearly level ground 5' to 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out sediment.

When practicable, bale slope barriers should be placed along contours to avoid a concentration of flow.

Bale slope barriers can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the slope barrier will not likely follow contours.

**Proper installation method:**

Excavate a trench the length of the planned slope barrier that is 4" deep and a bale's width wide. Make sure that the trench is excavated along a single contour. When practicable, slope barriers should be placed along contours to avoid a concentration of flow. Place the soil on the upslope side of the trench for later use. Place the bales in the trench, making sure that they are butted tightly. Two stakes should be driven through each bale along the centerline of the ditch check, approximately 6" to 8" in from the bale ends. Stakes should be driven at least 12" into the ground. Once all the bales have been installed and anchored, place the excavated soil against the upslope side of the check and compact it. The compacted soil should be no more than 3" to 4" deep.

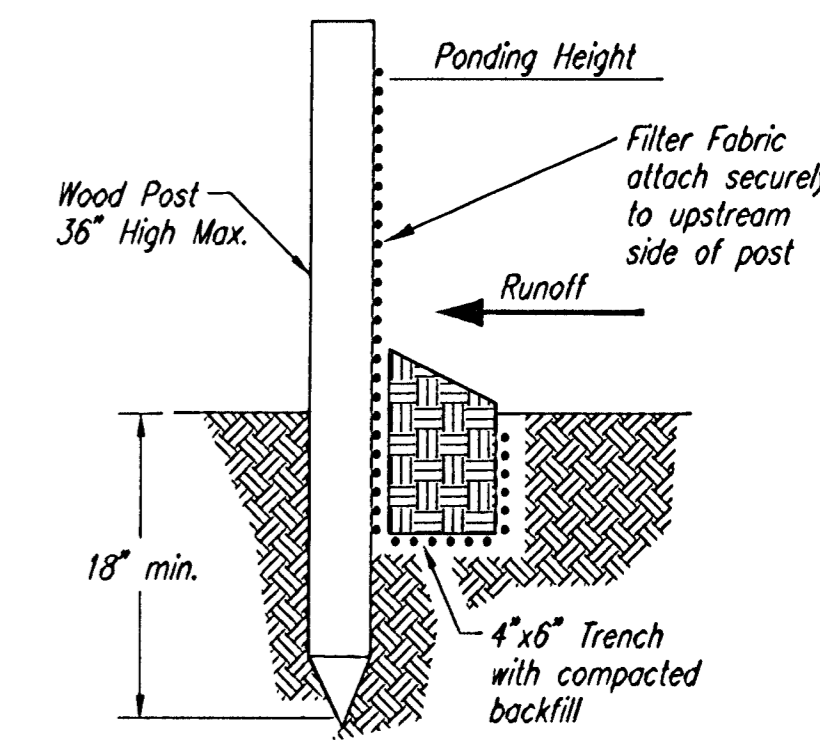
**List of common placement/installation mistakes to avoid:**

- When practical, do not place bale slope barriers across contours. Slope barriers should be placed along contours to avoid a concentration of flow. When the flow concentrates, it overtops the barrier and the silt fence slope barrier quickly deteriorates.
- Do not place silt-fence posts on the upslope side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail.
- Do not place silt fence slope barriers in areas with shallow soils underlain by rock. If the barrier is not sufficiently anchored, it will wash out.
- Silt fence slope barriers must be dug into the ground—silt fence at ground level does not work because water will flow underneath.

**Inspection and Maintenance:**

Bale slope barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Are there any points along the slope barrier where water is concentrating?
- Does water flow under the slope barrier?
- Does water flow through spaces between abutting bales?
- Are any bales dislodged?
- Are bales decomposing due to age and/or water damage?
- Does sediment need to be removed from behind the slope barrier?



**SILT FENCE BARRIERS**

**Material Specification:**

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Silt fence fabric should be attached to the wooden posts with staples, wire, zip ties, or nails.

**Placement:**

A slope barrier should be used at the toe of a slope when a ditch does not exist. The slope barrier should be placed on nearly level ground 5' to 10' away from the toe of a slope. The barrier is placed away from the toe of the slope to provide adequate storage for settling out sediment.

When practicable, silt fence slope barriers should be placed along contours to avoid a concentration of flow.

Silt fence slope barriers can also be placed along right-of-way fence lines to keep sediment from crossing onto adjacent property. When placed in this manner, the slope barrier will not likely follow contours.

**Proper installation method:**

Excavate a trench the length of the planned slope barrier that is 6" deep by 4" wide. Make sure that the trench is excavated along a single contour. When practicable, slope barriers should be placed along contours to avoid a concentration of flow. Place the soil on the upslope side of the trench for later use. Roll out a continuous length of silt fence fabric on the downslope side of the trench. Place the edge of the fabric in the trench starting at the top upslope edge. Line all three sides of the trench with the fabric. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt-fence fabric should remain exposed. Lay the exposed silt fence upslope of the trench to clear an area for driving in the posts. Just downslope of the trench, drive posts into the ground to a depth of at least 18". Place posts no more than 4' apart. Attach the silt fence to the anchored post with staples, wire, zip ties, or nails.

**List of common placement/installation mistakes to avoid:**

- When practicable, do not place silt fence slope barriers across contours. Slope barriers should be placed along contours to avoid a concentration of flow. When the flow concentrates, it overtops the barrier and the silt fence slope barrier quickly deteriorates.
- Do not place silt-fence posts on the upslope side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail.
- Do not place silt fence slope barriers in areas with shallow soils underlain by rock. If the barrier is not sufficiently anchored, it will wash out.
- Silt fence slope barriers must be dug into the ground—silt fence at ground level does not work because water will flow underneath.

**Inspection and Maintenance:**

Silt fence slope barriers should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Are there any points along the slope barrier where water is concentrating?
- Does water flow under the slope barrier?
- Do the silt fences sag excessively?
- Has the silt fence torn or become detached from the posts?
- Does sediment need to be removed from behind the slope barrier?

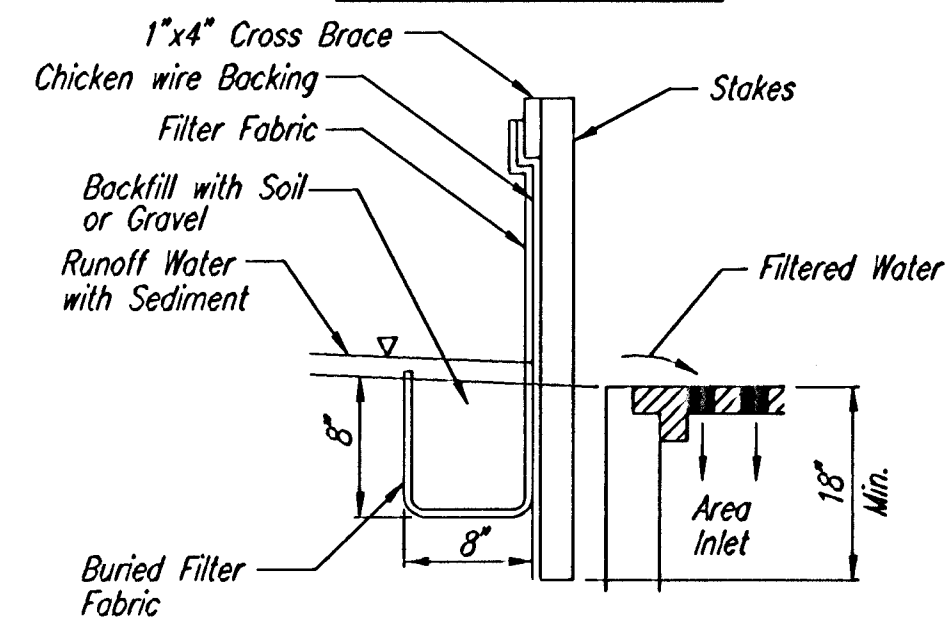
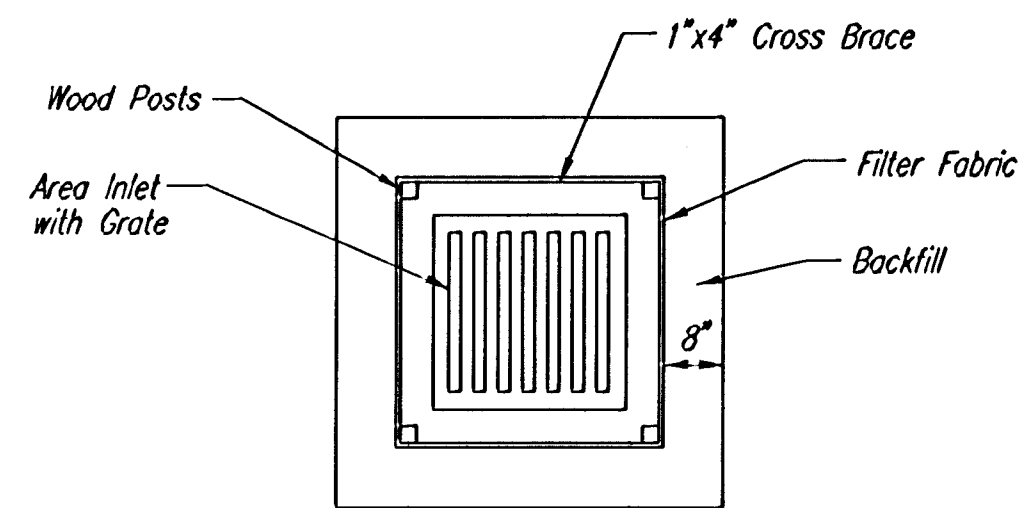


**SOIL EROSION BMP DETAILS**

CHRISTOPHER M. CARRIER, P.E.  
STORM WATER ENGINEER

PROJECT NUMBER: 197-468-83564  
OCA NO.: (751323)

DATE: JAN 2003  
SHEET 13 OF 14



**SILT FENCE BARRIERS FOR AREA INLETS**  
(INLET PROTECTION)

**Material Specification:**

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The wire or polymeric mesh backing used to help support the silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. The material used to frame the tops of the posts should be 1" by 4" boards. Silt fence fabric and support backing should be attached to the wooden posts and frame with staples, wire, zip ties, or nails.

**Placement:**

Place a silt fence drop inlet barrier in a location where it is unlikely to be overtopped. Water should flow through silt fence, not over it. Silt fence barriers for area inlets often fail when repeatedly overtopped. When used as a barrier for area inlets, silt fence fabric and posts must be supported at the top by a wooden frame. When a silt fence barrier for area inlets is located near an inlet that has steep approach slopes, the storage capacity behind the barrier is drastically reduced. Timely removal of sediment must occur for a barrier to operate properly in this location.

**Proper installation method:**

Excavate a trench around the perimeter of the area inlet that is at least 8" deep by 8" wide. Drive posts to a depth of at least 18" around the perimeter of the area inlet. The distance between posts should be 4' or less. If the distance between two adjacent corner posts is more than 4', add another post(s) between them. Connect the tops of all the posts with a wooden frame made of 1" by 4" boards. Use nails or screws for fastening. Attach the wire or polymeric-mesh backing to the outside of the post/frame structure with staples, wire, zip ties, or nails. Roll out a continuous length of silt fence fabric long enough to wrap around the perimeter of the area inlet. Add more length for overlapping the fabric joint. Place the edge of the fabric in the trench, starting at the outside edge of the trench. Line all three sides of the trench with the fabric. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt fence fabric should remain exposed. Attach the silt fence to the outside of the post/frame structure with staples, wire, zip ties, or nails. The joint should be overlapped to the next post.

**Note:** When a silt fence barrier for area inlet is placed in a shallow median ditch, make sure that the top of the barrier is not higher than the paved road. In this configuration, water may spread onto the roadway causing a hazardous condition.

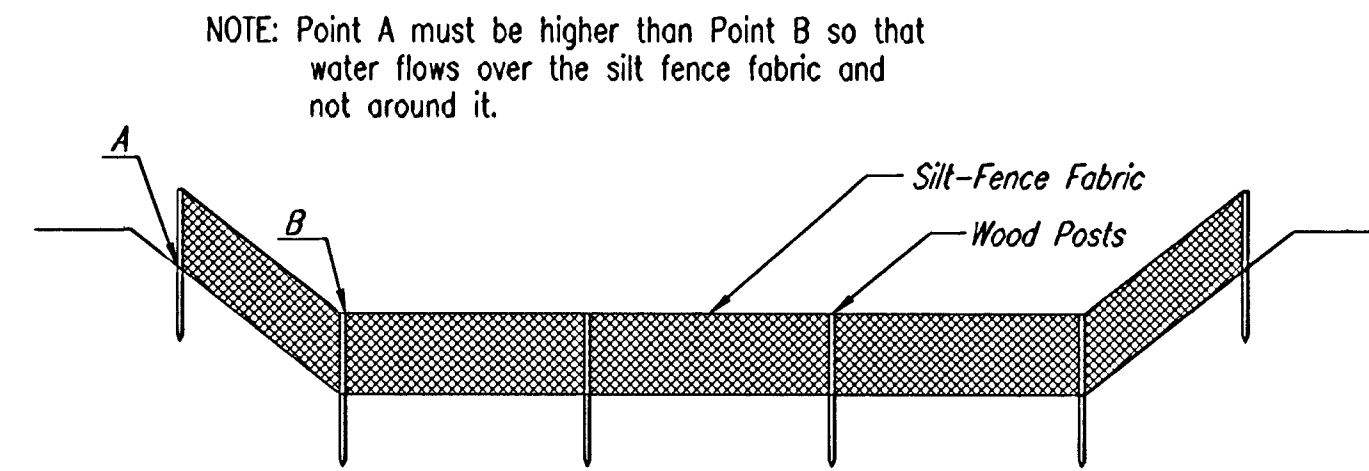
**List of common placement/installation mistakes to avoid:**

Water should flow through a silt fence barrier for area inlet—not over it. Place a silt fence barrier for area inlet in a location where it is unlikely to be overtopped. Silt fence barrier for area inlets often fail when repeatedly overtopped. Do not place posts on the outside of the silt fence barrier for area inlet. In this configuration, the force of the water is not resisted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail. Do not install silt fence barrier for area inlets without framing the top of the posts. The corner posts around area inlets are stressed in two directions whereas a normal silt fence is only stressed in one direction. This added stress requires more support.

**Inspection and Maintenance:**

Silt fence barrier for area inlets should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow under the silt fence?
- Does the silt fence sag excessively?
- Has the silt fence torn or become detached from the posts?
- Does sediment need to be removed from behind the area inlet barrier?



**SILT FENCE DITCH CHECKS**  
(STREAM PROTECTION)

**Material Specification:**

Silt fence fabric should conform to the AASHTO M288 96 silt fence specification. The posts used to support the silt fence fabric should be a hardwood material with the following minimum dimensions: 2" square (nominal) by 4' long. Silt fence fabric should be attached to the wooden posts with staples, wire, zip ties, or nails.

**Placement:**

Place silt fence in ditches where it is unlikely that it will be overtopped. Water should flow through a silt fence ditch check, not over it. Silt fence ditch checks often fail when overtopped. Silt fence ditch checks should be placed perpendicular to the flowline of the ditch. The silt fence should extend far enough so that the ground level at the ends of the fence is higher than the top of the low point of the fence. This prevents water from flowing around the check. Checks should not be placed in ditches where high flows are expected. Rock checks should be used instead. Silt fence should be placed in ditches with slopes of 6% or less. For slopes steeper than 6%, rock checks should be used.

The following table provides check spacing for a given ditch grade:

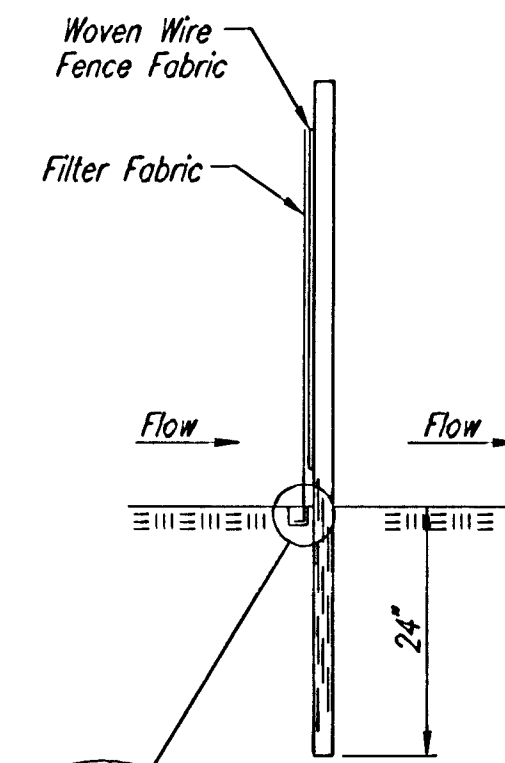
Ditch Check Ditch grade (%)	Spacing Check Spacing (feet)
0.5	200
1.0	200
2.0	100
3.0	65
4.0	50
5.0	40
6.0	30

**Proper installation method:**

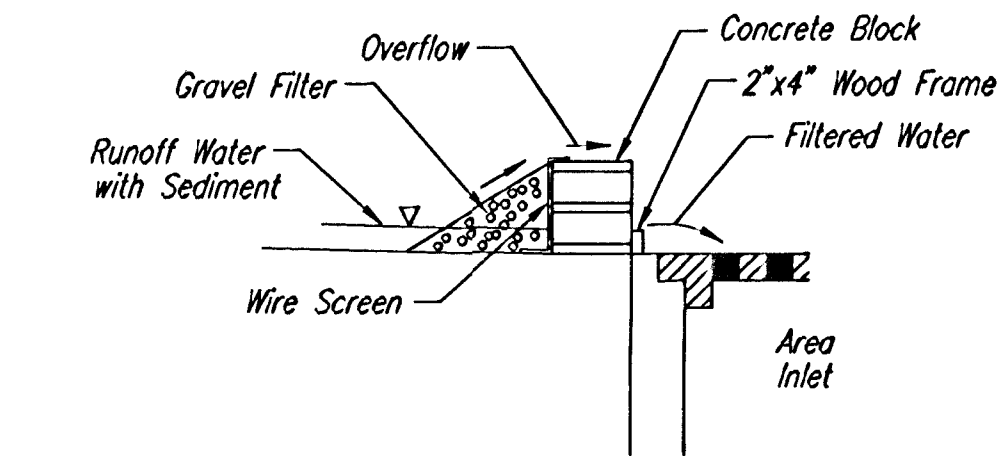
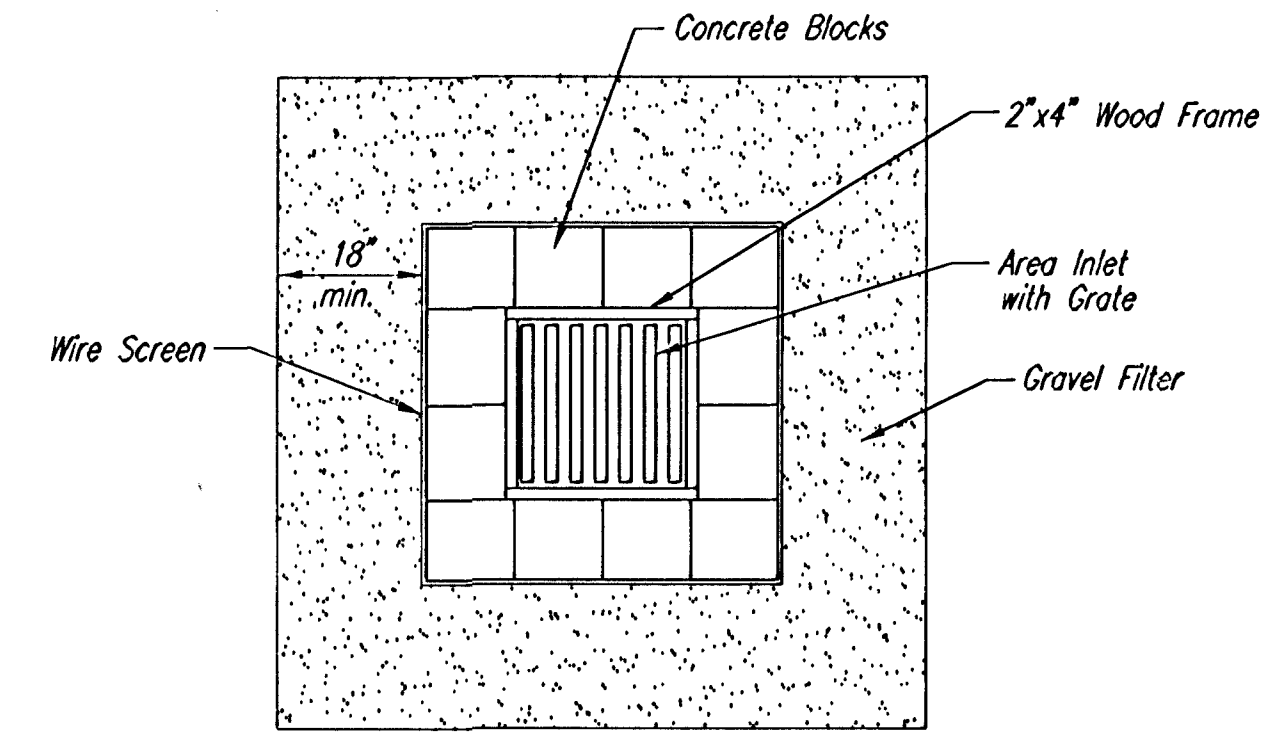
Excavate a trench perpendicular to the ditch flowline that is at least 12" deep by 6" wide. Extend the trench in a straight line along the entire length of the proposed ditch check. Place the soil on the upstream side of the trench for later use. Roll out a continuous length of silt fence fabric on the downstream side of the trench. Place the edge of the fabric in the trench starting at the top upstream edge of the trench. Line two sides of the trench with the fabric as shown on detail. Backfill over the fabric in the trench with the excavated soil and compact. After filling the trench, approximately 24" to 36" of silt fence fabric should remain exposed. Lay the exposed silt fence on the upstream side of the trench to clear an area for driving in the posts. Just downstream of the trench, drive posts into the ground to a depth of at least 24". Place posts no more than 4' apart. Attach the silt fence to the anchored post with staples, wire, zip ties, or nails.

**List of common placement/installation mistakes to avoid:**

Water should flow through a silt fence ditch check—not over it. Place silt fence in ditches where it is unlikely that it will be overtopped. Silt fence installations quickly deteriorate when water overtops them. Do not place silt fence posts on the upstream side of the silt fence fabric. In this configuration, the force of the water is not restricted by the posts, but only by the staples (wire, zip ties, nails, etc.). The silt fence will rip and fail. Do not place a silt fence ditch check directly in front of a culvert outlet. It will not stand up to the concentrated flow. Do not place silt fence ditch checks in ditches that will likely experience high flows. They will not stand up to concentrated flow. Follow prescribed ditch check spacing guidelines. If spacing guidelines are exceeded, erosion will occur between the ditch checks. Do not allow water to flow around the ditch check. Make sure that the ditch check is long enough so that the ground level at the ends of the fence is higher than the low point on the top of the fence. Do not place silt fence ditch checks in channels with shallow soils underlain by rock. If the check is not anchored sufficiently, it will wash out.



**ANCHOR TRENCH DETAIL**



**CONCRETE BLOCK FILTER FOR AREA DRAIN**  
(INLET PROTECTION)

Gravel barriers provide little filtering of large inflow waters. However, when installed correctly and maintained, they can effectively treat low runoff flows.

Placement of gravel filters around area drains must be completed in a manner that will not cause local flooding.

Gravel filters can be used if the immediate and adjacent area to the area drain consists of soil or pavement.

Only gravel filters are to be installed on top of the pavement.

**Instructions for Installing:**

- STEP 1: Place concrete blocks around the grate. The blocks can be stacked one or two high and should be supported by a 2"x4" board.
- STEP 2: Wrap 1/2" mesh wire screen around the concrete blocks.
- STEP 3: Place 1" to 1-1/2" diameter rock around the blocks and wire screen. Be sure the rock extends down from the top of the concrete block.
- STEP 4: To prevent damage to vehicles, signs warning drivers about the structures may be necessary.

An alternative method is use of gravel bags that are supported to prevent collapsing.

Use of rock having diameters smaller than 1" may result in clogging of pores and reduce the amount of water flowing into an inlet.

**Maintenance:**

All gravel filters installed around area drains should be inspected and repaired after each runoff event. Sediment should be removed when material is within 3" of the top of any block. Periodically, the gravel should be raked to increase infiltration and filtering of runoff waters. Accumulated sediment is to be removed immediately from roads and streets after every runoff event.

**Inspection and Maintenance:**

Silt fence ditch checks should be inspected every 7 days and within 24 hours of a rainfall of 1/2" or more. The following is a list of questions that should be addressed during each inspection:

- Does water flow around the ditch check?
- Does water flow under the ditch check?
- Does the silt fence sag excessively?
- Has the silt fence torn or become detached from the posts?
- Does sediment need to be removed from behind the ditch check?



**SOIL EROSION BMP DETAILS**

CHRISTOPHER M. CARRIER, P.E.  
STORM WATER ENGINEER

PROJECT NUMBER: 197-468-83564  
DCA NO.: (751323)

DATE: JAN 2003  
SHEET 14 OF 14