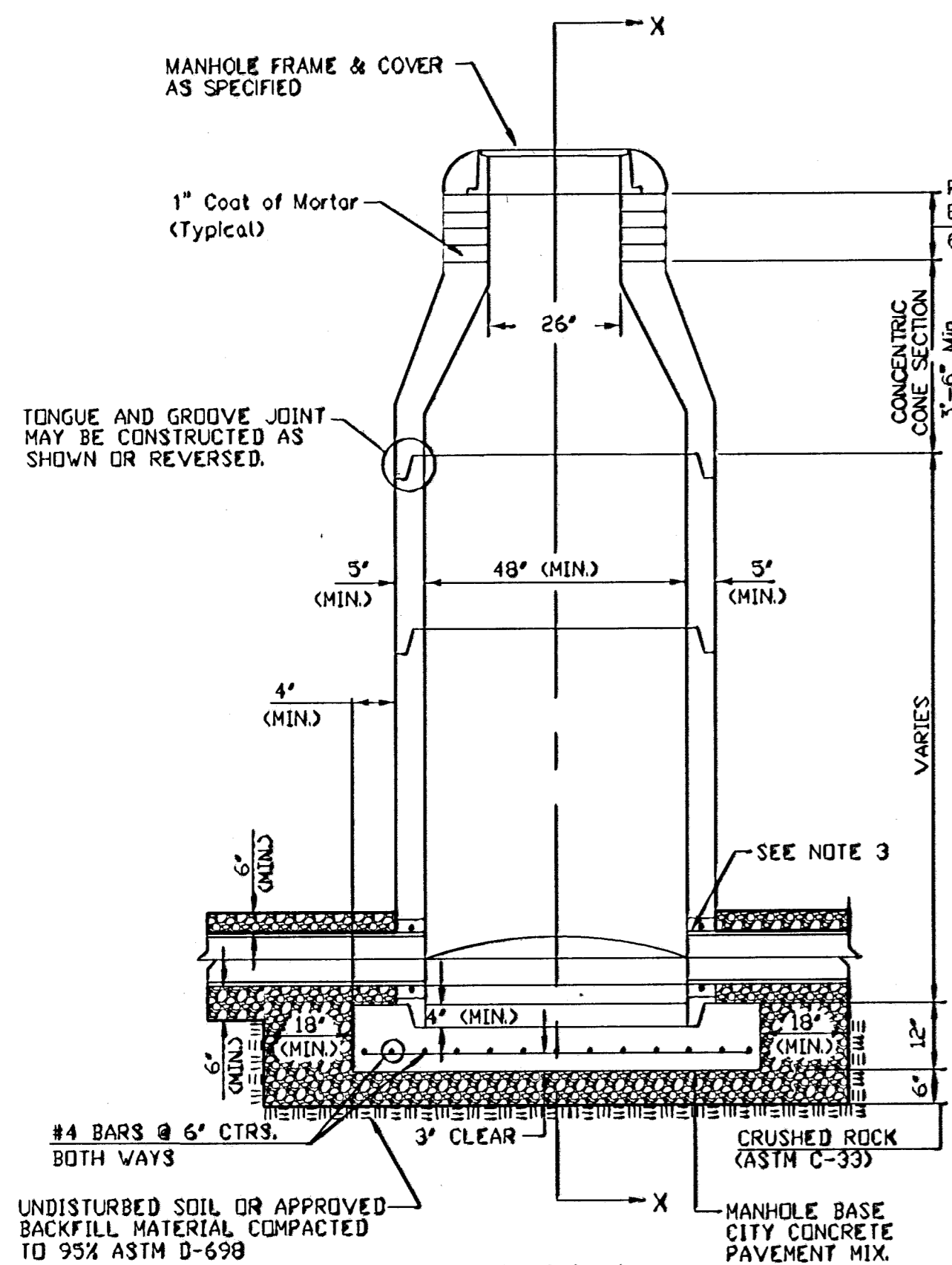
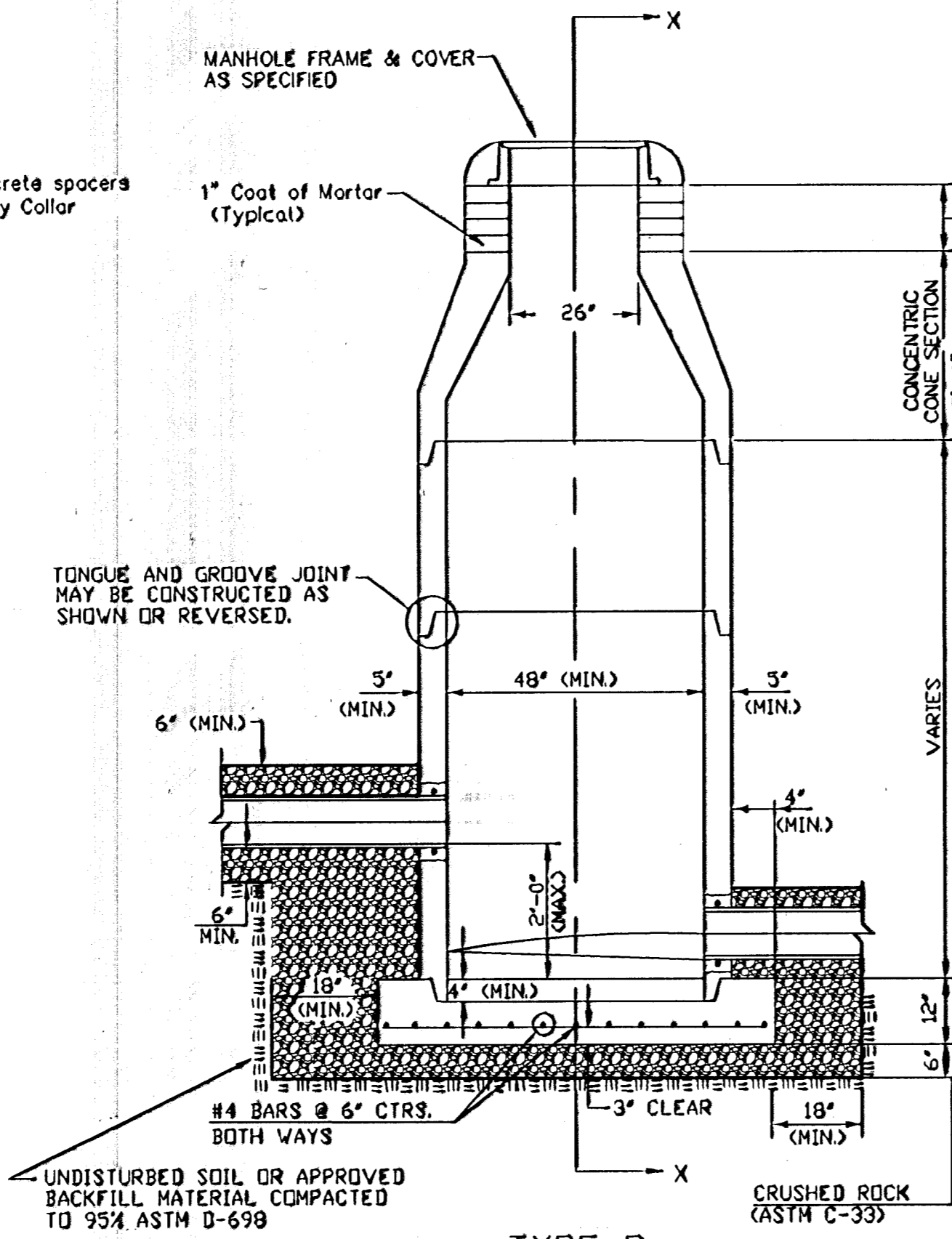


SEWER APPURTENANCES DETAILS

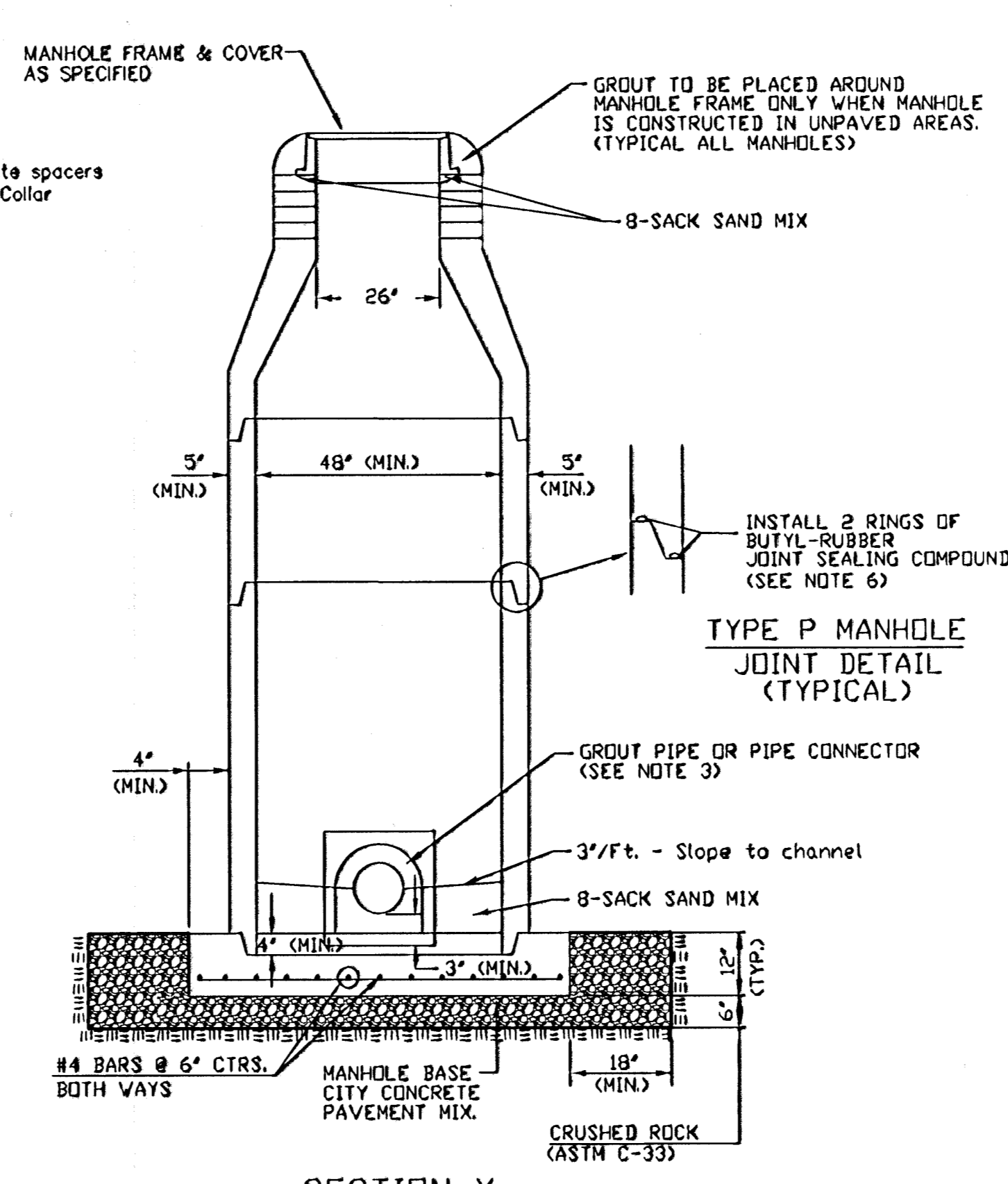
ADOPTED AS STANDARD DESIGN BY CITY OF WICHITA, KS AUGUST 2007



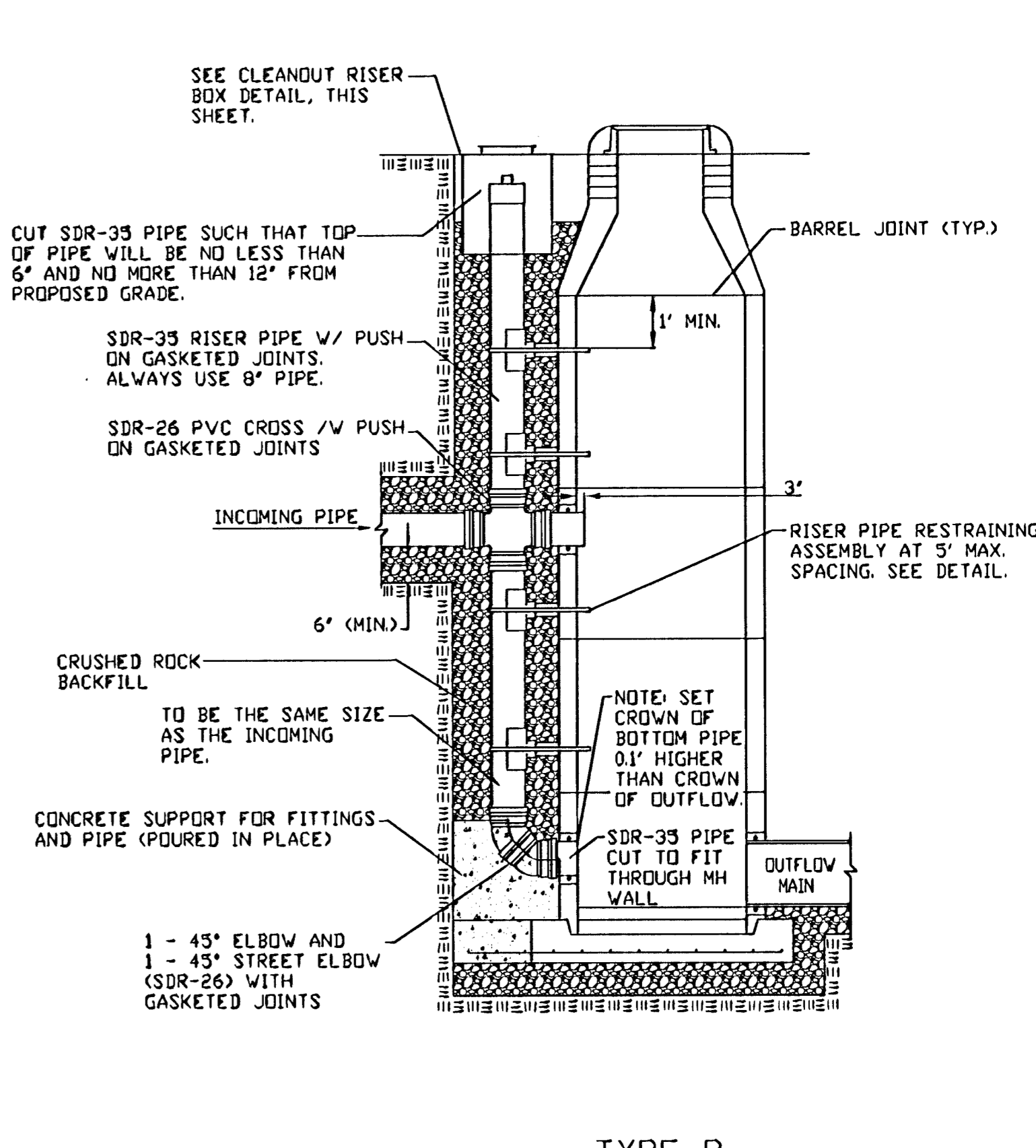
**TYPE P
STANDARD MANHOLE**
Not to Scale



**TYPE P
INSIDE DROP MANHOLE**
Not to Scale



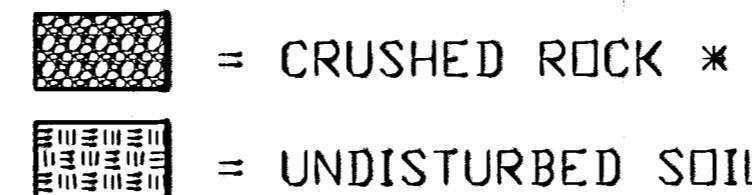
**SECTION X
(TYPICAL)**
Not to Scale



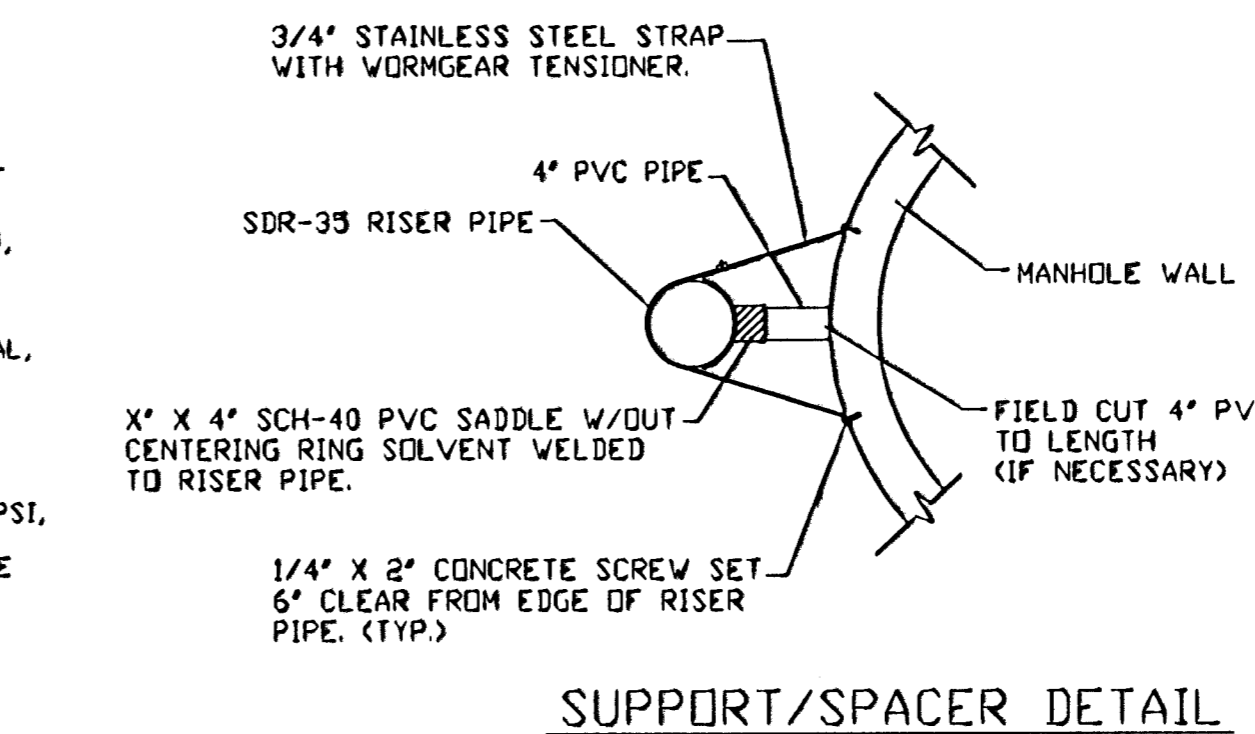
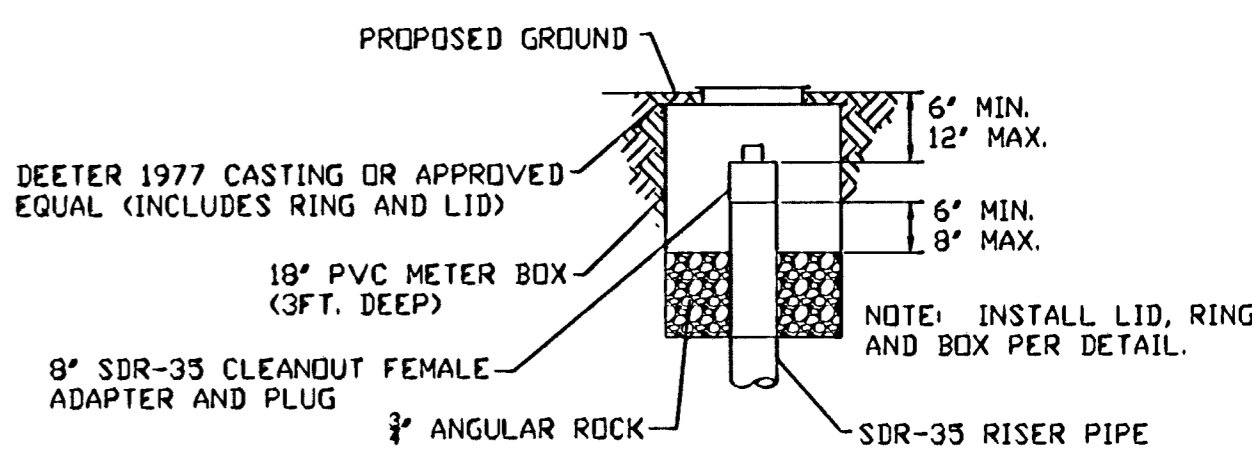
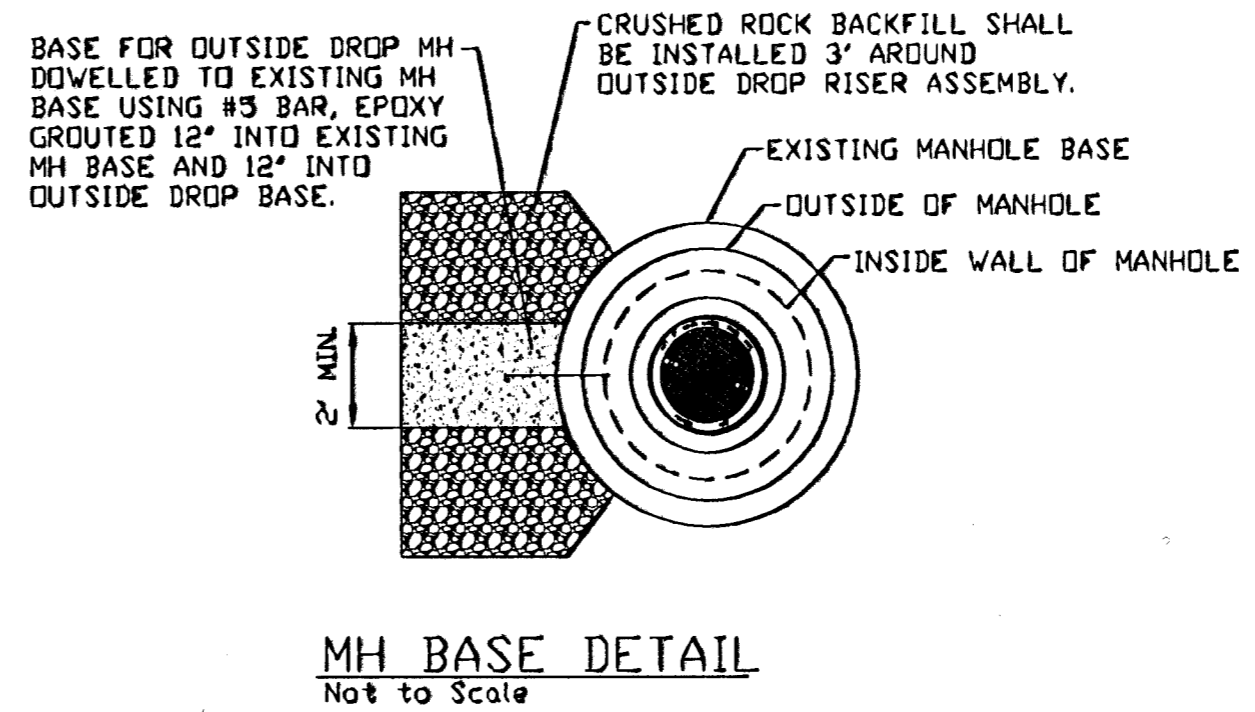
**TYPE P
OUTSIDE DROP MANHOLE**
Not to Scale

PRECAST MANHOLE GENERAL NOTES

1. ALL PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO THE LATEST REVISIONS OF A.S.T.M. C479 AS MODIFIED BY THE SPECIFICATIONS.
2. NON-SHRINK GROUT SHALL BE NON-METALLIC TYPE.
3. APPROVED FLEXIBLE WATERSTOP GASKETS SHALL BE INSTALLED TO JOIN THE SEWER TO THE MANHOLE WALL WHEN 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 CRUSHED ROCK A MINIMUM OF 3 FEET FROM THE MANHOLE WALL AND TO THE FIRST JOINT FOR V.C.P. SUCH THAT THE JOINT REMAINS FLEXIBLE.
4. ALL INSIDE SURFACES OF THE CONCRETE MANHOLE WHICH WOULD BE EXPOSED TO SEWER GAS SHALL BE COATED PER SECTION 804.4 OF STANDARD SPECIFICATIONS.
5. EXTERIOR MANHOLE WALLS SHALL BE COATED PER SECTION 804.4 OF STANDARD SPECIFICATIONS.
6. JOINT SEALING COMPOUND SHALL BE PER 804.4 OF STANDARD SPECIFICATIONS.
7. PRECAST MANHOLES SHALL BE SET AT LEAST 4 INCHES INTO THE MANHOLE BASE.
8. 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.
9. LIFTING HOLES SHALL BE FILLED WITH NON-SHRINK GROUT AND THE INTERIOR SURFACE COATED AS SPECIFIED.
10. MORTAR USED IN MASONRY CONSTRUCTION SHALL CONTAIN 9 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. COMPLETED MANHOLE SHALL BE WITHOUT LEAKS AND WATER TIGHT.
11. 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. ALL COSTS FOR FURNISHING AND INSTALLING REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE MANHOLE.
12. WALL THICKNESS SHALL BE 1" GREATER THAN MANHOLE DIAMETER IN FEET.
13. OPENINGS SHALL BE CORE DRILLED INTO THE MANHOLE WALL WHEN OUTSIDE DROPS ARE CONSTRUCTED ON EXISTING MANHOLES. SUCH OPENINGS DRILLED 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. 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.
14. 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 NEAT LINES FOR THE FULL INSIDE DIAMETER OF THE MANHOLE. MANHOLE FLOORS SHALL THEN BE SHAPED AROUND THE BOTTOM HALF OF THE PIPE WHICH FORMS THE FLOW CHANNEL.
15. 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.
16. THE VERTICAL DROP IN INSIDE DROP MANHOLES SHALL NOT EXCEED 2' REGARDLESS OF PIPE SIZE. THE CROWNS OF INFLOWING PIPES SHALL NEVER BE SET LOWER THAN THE CROWN OF THE OUTFLOWING PIPE.
17. 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.
18. 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.
19. THE FULL DIAMETER OF THE MANHOLE SHALL EXTEND THE ENTIRE DEPTH OF THE MANHOLE TO THE CONE SECTION. NO REDUCTION IN MANHOLE DIAMETER WILL BE ALLOWED.
20. REFER TO PLANS FOR SIZE OF OUTSIDE DROP RISER, SADDLES AND CROSS.



* CRUSHED ROCK USED FOR ENCASEMENT AND BEDDING SHALL CONFORM TO ASTM C-33, GRADATION NO. 67, AND SHALL MEET ALL REQUIREMENTS FOR PORTLAND CEMENT CONCRETE PAVEMENT COARSE AGGREGATE, SECTION 408.2, CITY OF WICHITA STANDARD SPECIFICATIONS. ALL CRUSHED ROCK FOR BEDDING AND ENCASEMENT SHALL EXTEND TO THE LIMITS OF THE MANHOLE EXCAVATION.



**STANDARD
TYPE 'P'
MANHOLES**

CITY ENGINEER
JAMES L. ARMOUR, P.E., L.S.

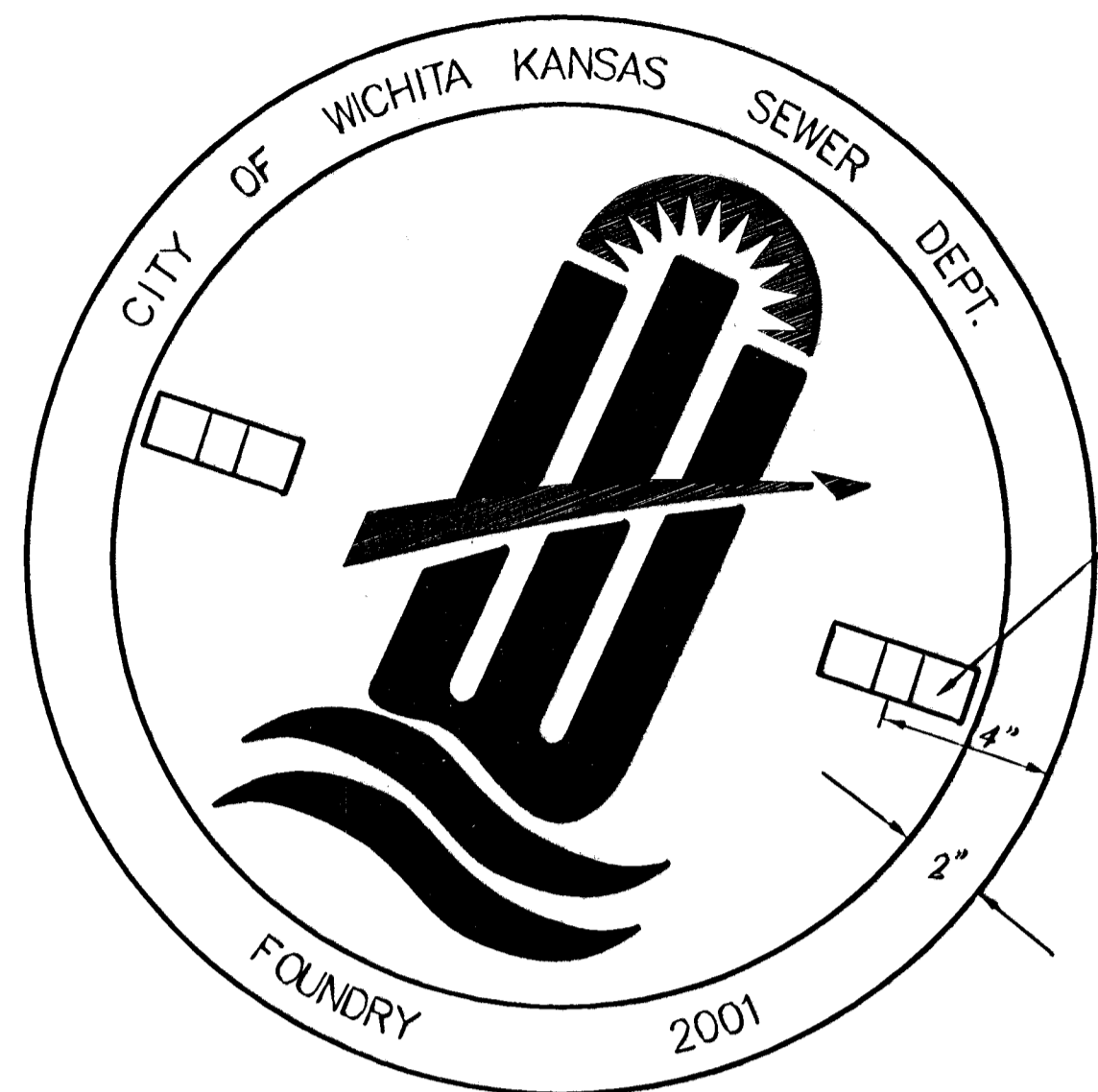
PROJECT NUMBER 468-84565	OGA NUMBER 620532	DATE 08/07
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CITY ENGINEER'S OFFICE CITY HALL - SEVENTH FLOOR 454 NORTH MAIN STREET WICHITA, KANSAS 67202 (316) 268-4501 (316) 268-4114 FAX	DESIGN City	DRAWN City
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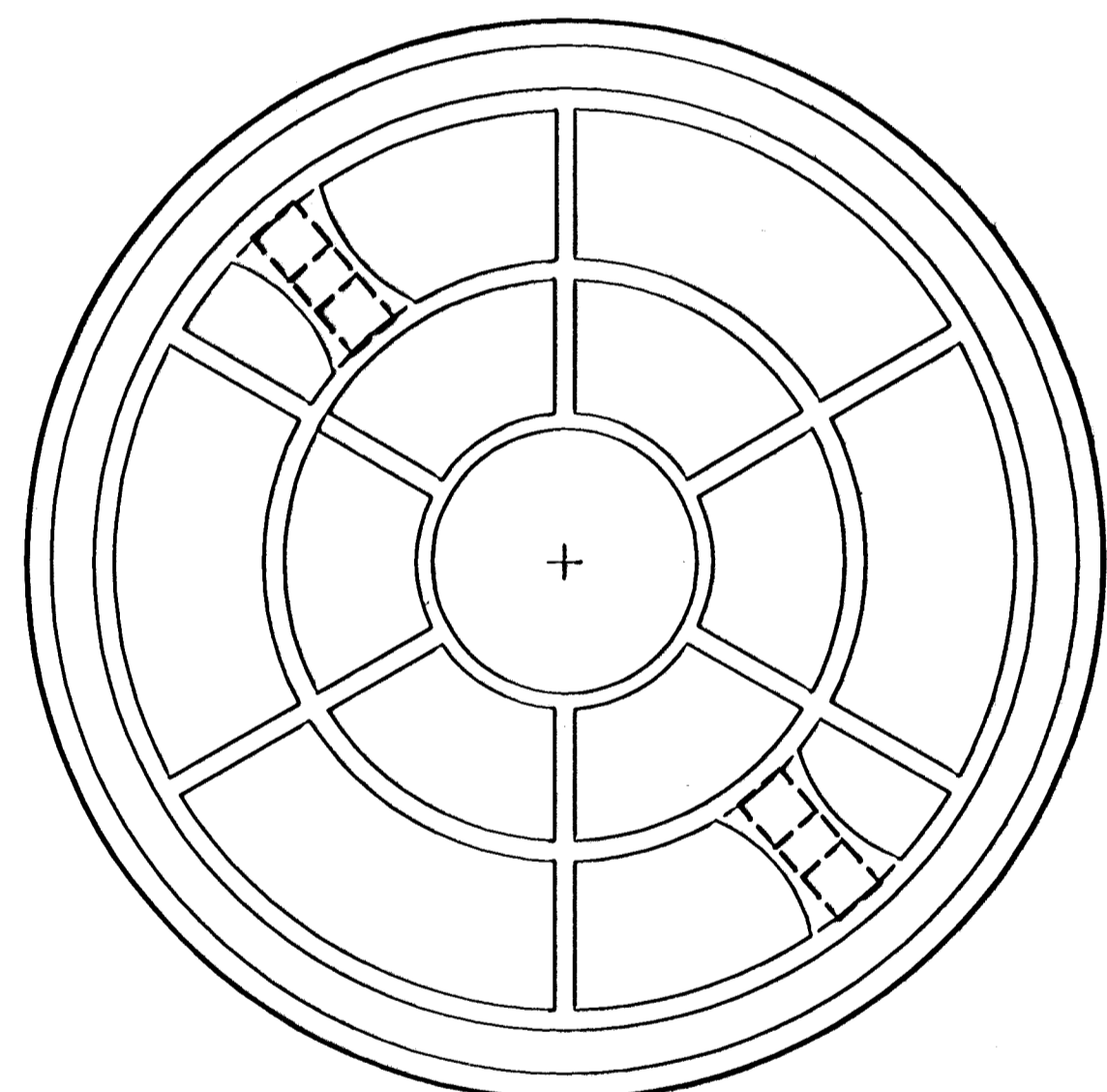
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W17 OF 23

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MANHOLE COVER
Weight = 180 Lbs.



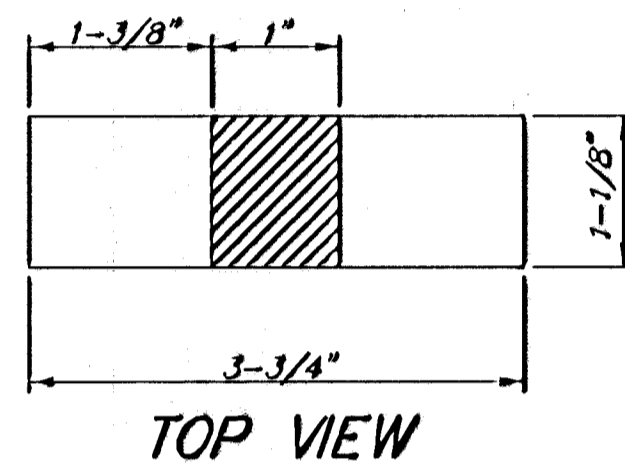
TOP VIEW



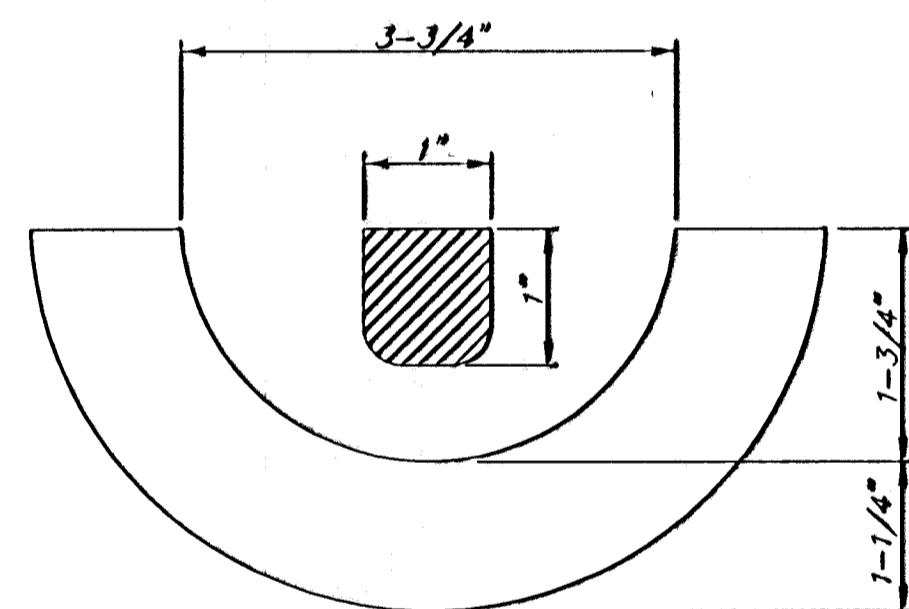
BOTTOM VIEW

CLOSED PICKHOLE (SEE DETAIL)

PICKHOLE DETAIL



TOP VIEW

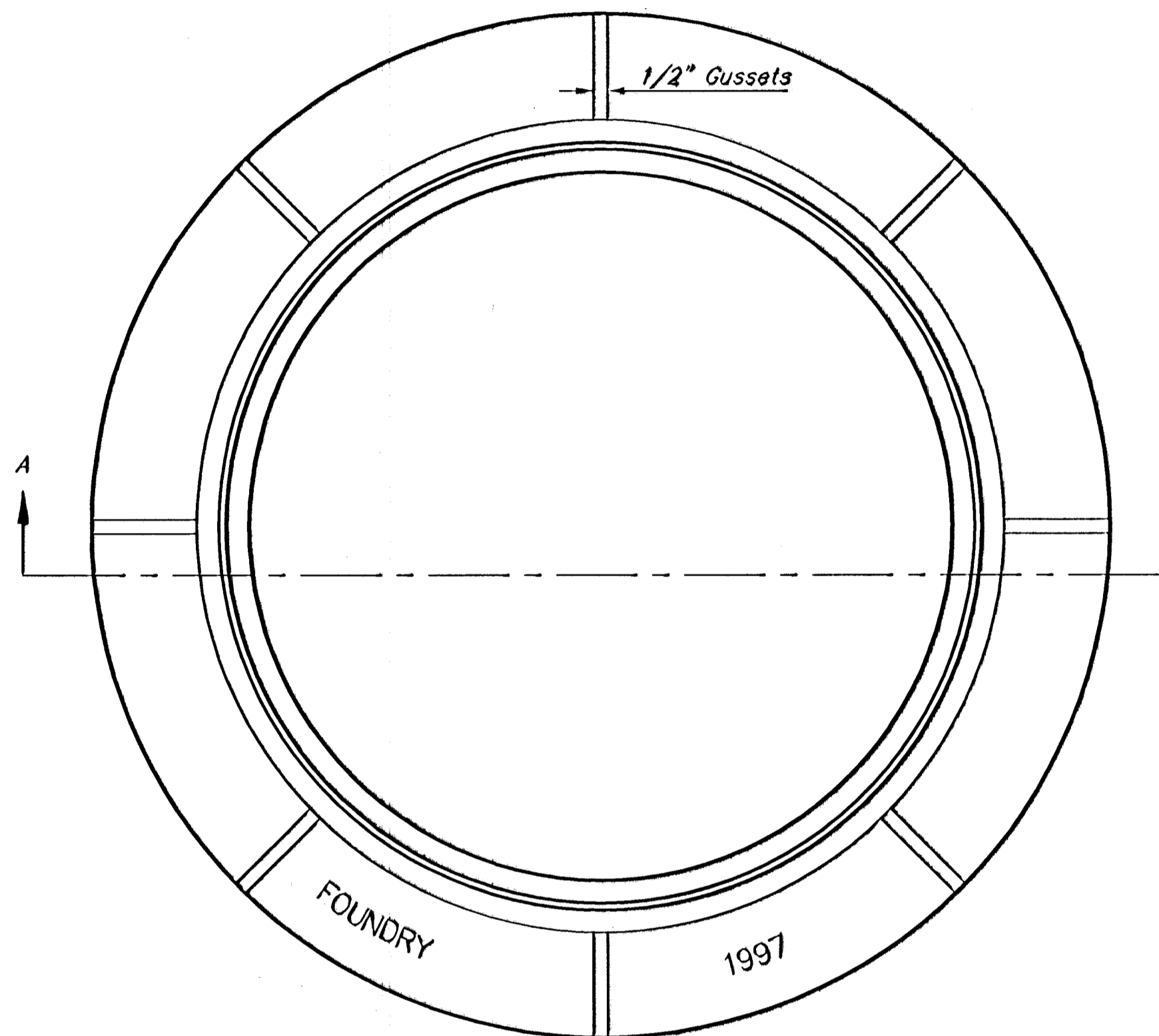


SECTION VIEW

MANHOLE FRAME AND COVER DETAIL

ADOPTED AS STANDARD DESIGN BY
CITY OF WICHITA, KANSAS

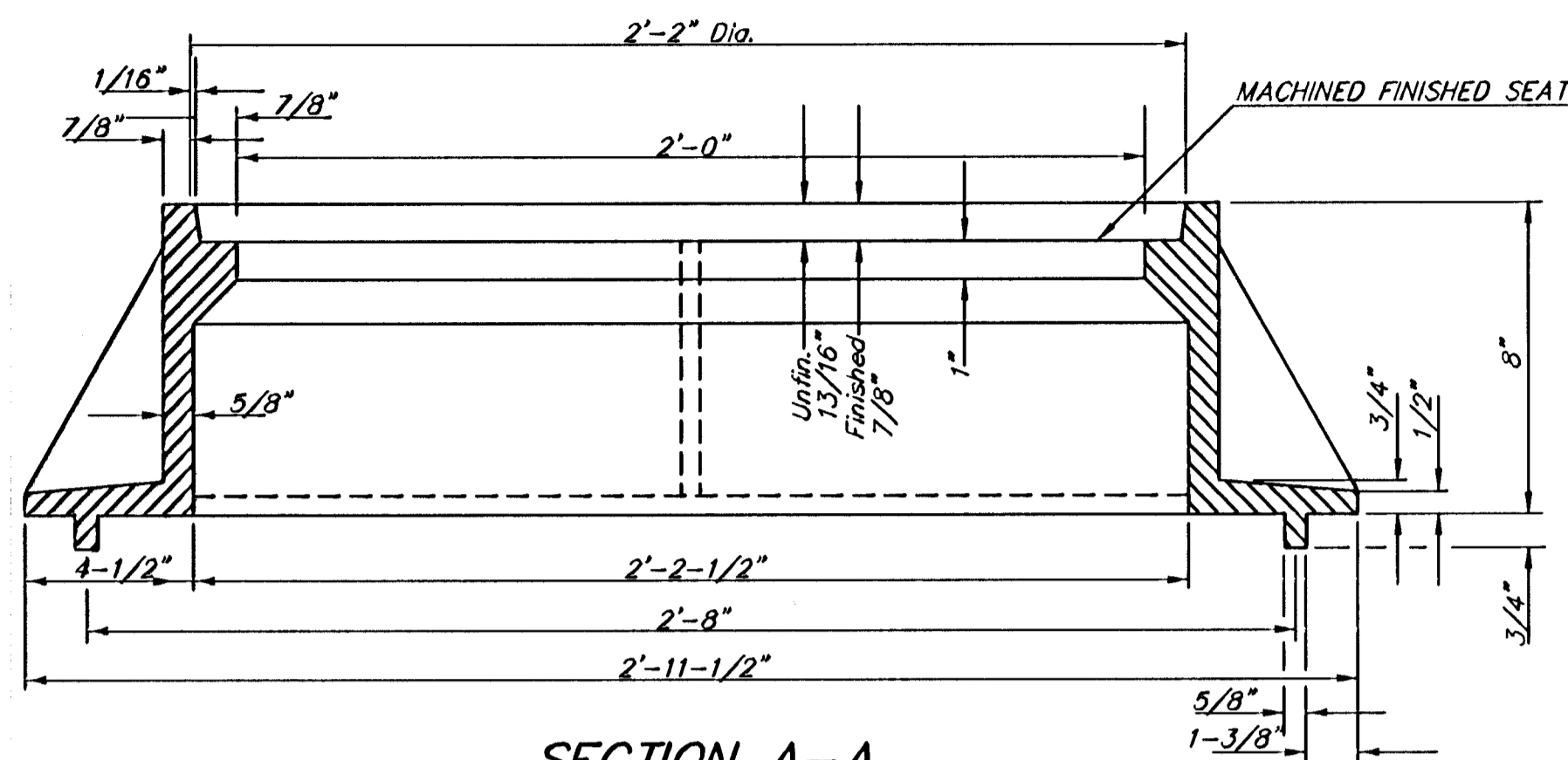
MANHOLE FRAME
Weight = 240 Lbs.



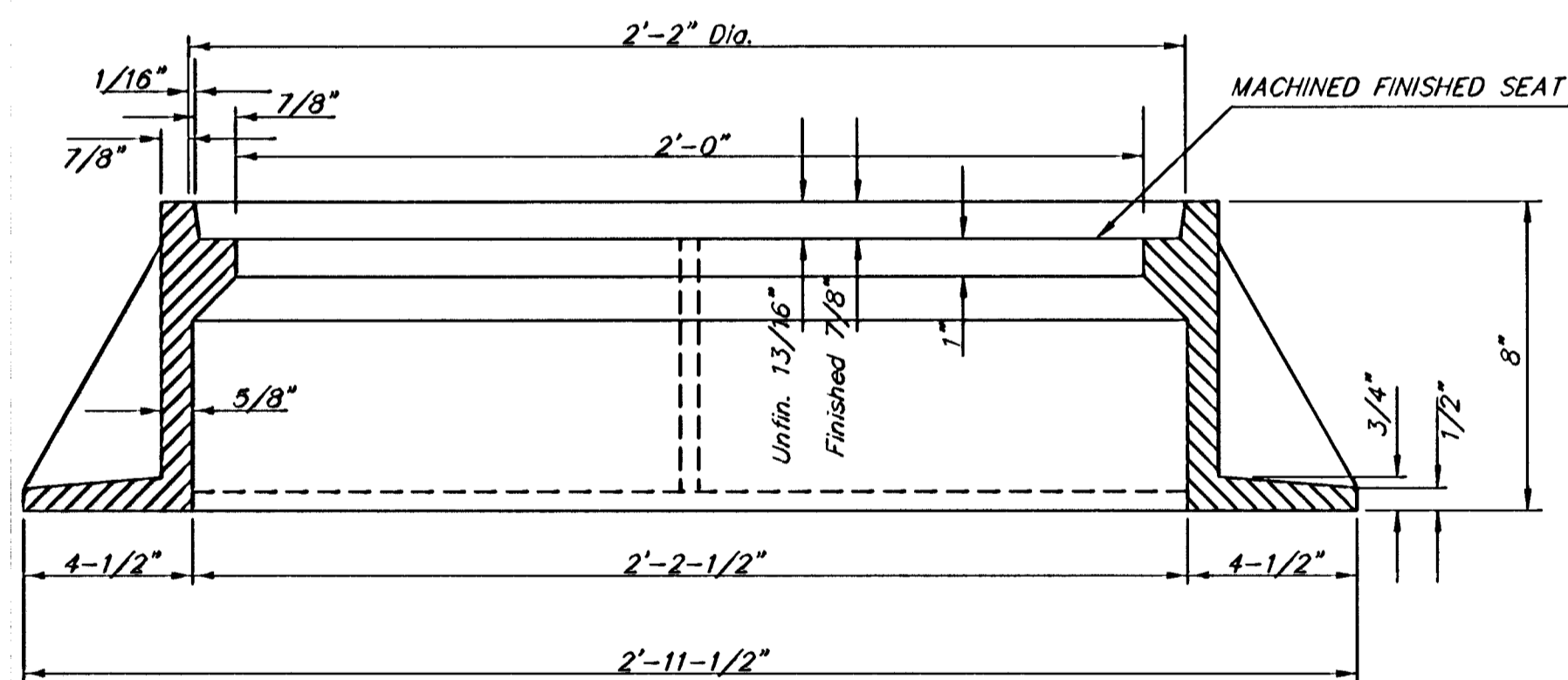
TOP VIEW

GENERAL NOTES

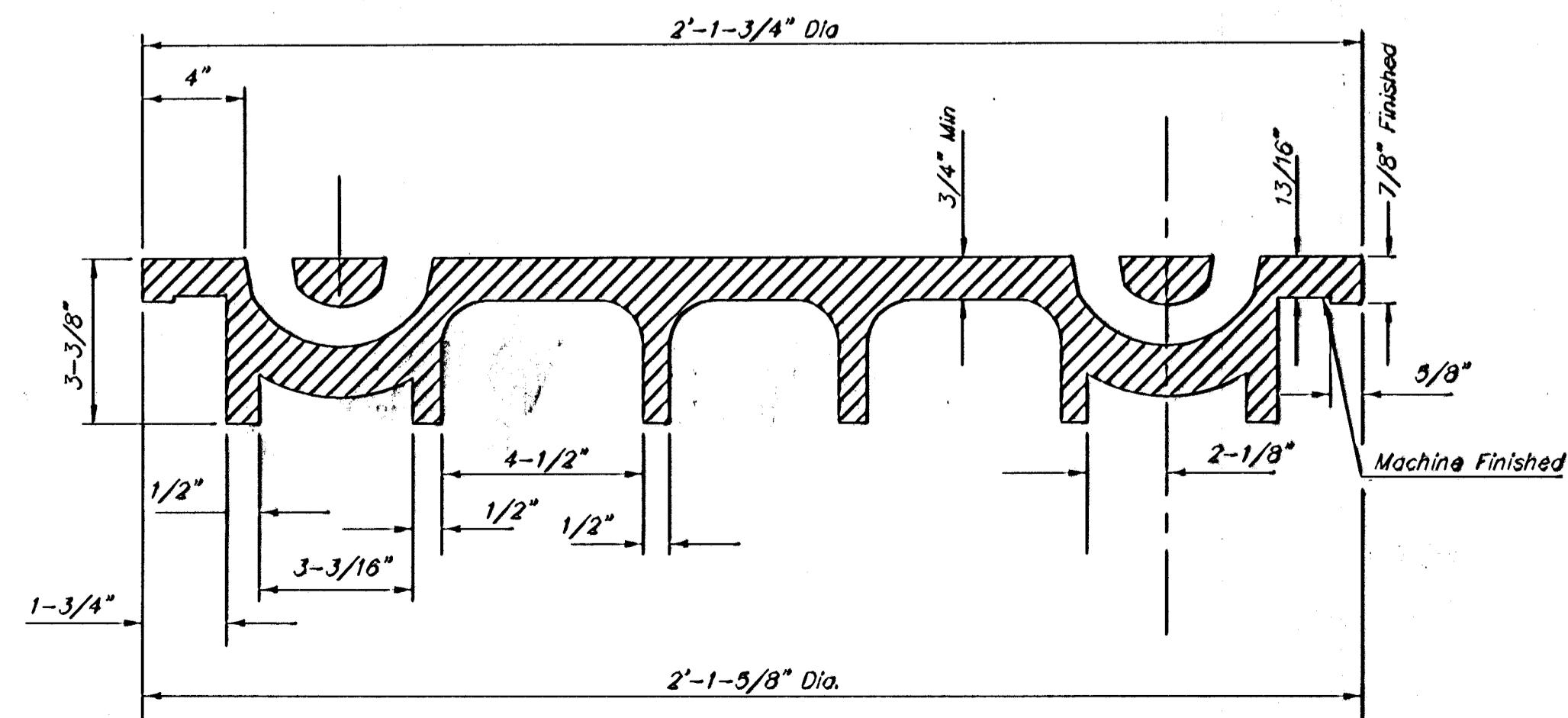
1. MANHOLE CASTINGS SHALL BE MANUFACTURED USING GOOD QUALITY GRAY IRON CONFORMING TO CLASS 30 OF A.S.T.M. DESIGNATION A-48. DIMENSIONS AND WEIGHTS SHOWN ON THE DETAILED DRAWINGS SHALL BE CONSIDERED AS MINIMUM REQUIREMENTS AND ANY DEVIATIONS FROM THE DIMENSIONS SHOWN MUST BE SPECIFICALLY APPROVED. THE FINISHED CASTINGS SHALL BE OF UNIFORM QUALITY, FREE FROM BLOWHOLES, POROSITY, HARD SPOTS, SHRINKAGE DISTORTIONS OR OTHER DEFECTS.
2. 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.
3. 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.
4. 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.
5. 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 WITH THE CITY OF WICHITA LOGO 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 BLOCKOUT AND LETTERING MAY VARY FROM THAT SHOWN ON THE DETAILED DRAWING.



SECTION A-A
MUD RING



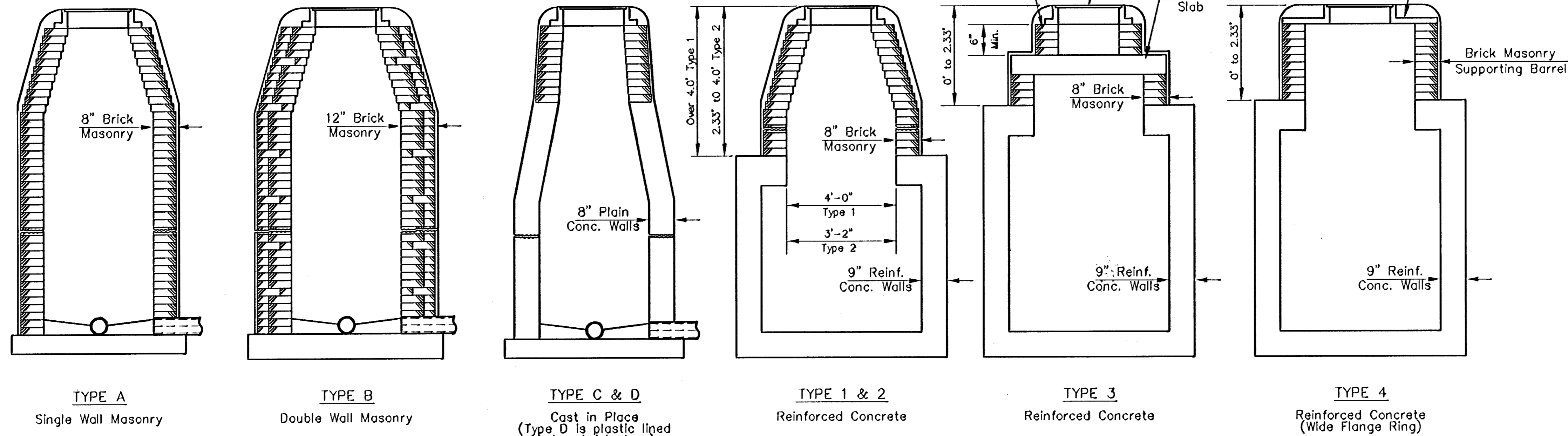
SECTION A-A



SECTION VIEW

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<p>THE CITY OF WICHITA</p> <p>CITY ENGINEER'S OFFICE 405 NORTH MAIN STREET WICHITA, KANSAS 67202 (316) 268-4601 (316) 268-3113 FAX</p>	MANHOLE FRAME AND COVER	
	JAMES L. ARMOUR, P.E. - CITY ENGINEER	
	PROJECT NUMBER 468-84565	OCA NO. 620532
	DATE MAR 96	SHEET W18 OF 23



DEFINITION SKETCHES - CITY OF WICHITA STANDARD MANHOLES

GENERAL NOTES

MANHOLES DESIGNATED FOR ADJUSTMENT SHALL BE RAISED OR LOWERED AS NECESSARY SUCH THAT THE CASTING WILL CONFORM TO THE REQUIRED ELEVATION. TOPS OF STORM OR SANITARY SEWER MANHOLES LOCATED IN PAVED AREAS SHALL BE SET FLUSH WITH THE PAVEMENT. TOPS OF SANITARY SEWER MANHOLES LOCATED IN GRASSED AREAS SHALL BE SET FOUR TENTHS OF ONE FOOT (0.40') HIGHER THAN THE FINISHED GRADE. TOPS OF STORM SEWER MANHOLES LOCATED IN GRASSED AREAS SHALL BE SET FLUSH WITH THE FINISHED GRADE. TOPS OF STORM OR SANITARY SEWER MANHOLES LOCATED IN UNPAVED TRAVEL WAYS SHALL BE SET SIX INCHES (6") BELOW FINISHED GRADE.

THE NEW TOP SPECIFIED ON THE PLANS WAS ESTABLISHED FROM THE BEST INFORMATION AVAILABLE AT THE TIME THE PLANS WERE PREPARED. THE ACTUAL TOP ELEVATION SHALL BE VERIFIED OR ESTABLISHED, IN THE FIELD, BY THE ENGINEER AT THE TIME THE ADJUSTMENT IS MADE. NO ADJUSTMENT IN BID PRICE SHALL BE MADE FOR A CHANGE IN TOP ELEVATION DEEMED NECESSARY BY THE ENGINEER.

THE ADJUSTMENT OF ALL MANHOLES WHICH ARE TO BE LOWERED OR RAISED TWELVE INCHES (12") OR LESS SHALL BE ACCOMPLISHED BY REMOVING THE EXISTING RING AND COVER AND REMOVING OR ADDING THE APPROPRIATE COURSE(S) OF BRICK AND REPLACEMENT OF THE RING AND COVER. ALL WORK SHALL BE IN ACCORDANCE WITH NOTES BELOW.

ALL UPWARD OR DOWNWARD ADJUSTMENT IN EXCESS OF TWELVE INCHES (12") SHALL BE IN ACCORDANCE WITH DETAILS AND NOTES SHOWN ON THIS SHEET.

NEW BRICK USED IN THE ADJUSTMENT OF MANHOLES SHALL CONFORM TO THE REQUIREMENTS SPECIFIED FOR GRADE MS IN A.S.T.M. C32-73 OR GRADE SW IN A.S.T.M. C62-69. BRICK SHALL HAVE NOMINAL DIMENSIONS WHICH WILL PERMIT THE ADJUSTED PORTION TO MATCH THE DIMENSIONS OF THE WALLS OF THE STRUCTURE BEING ADJUSTED. UNDAMAGED EXISTING BRICK, SALVAGED AS PART OF EXISTING MANHOLE ADJUSTMENT(S), FOR THIS PROJECT, MAY BE REUSED IN COMPLETING ADJUSTMENT(S) IF THOROUGHLY CLEANED OF EXISTING MORTAR AND IF APPROVED AS TO SUITABILITY BY THE ENGINEER.

ALL BRICK SHALL BE LAID WITH SHOVE JOINTS. PORTLAND CEMENT MORTAR, AS SPECIFIED BELOW, SHALL BE USED IN LAYING THE BRICK. THE ENTIRE OUTSIDE SURFACE OF THE MANHOLES, ADJUSTED WITH BRICK, SHALL BE PLASTERED WITH A MINIMUM OF ONE INCH (1") OF THE CEMENT MORTAR. ALL CONTACT SURFACES BETWEEN BRICK MASONRY, FLAT CONCRETE SLABS (IF REQUIRED), AND CAST IRON RINGS SHALL BE SEALED WITH A LAYER OF THE CEMENT MORTAR. BACKFILL OF ADJUSTED SECTIONS SHALL NOT BE ACCOMPLISHED UNTIL THE MORTAR HAS CURED FOR TWENTY-FOUR (24) HOURS.

MORTAR USED IN ADJUSTMENT OF MANHOLES SHALL CONTAIN EIGHT (8) SACKS OF PORTLAND CEMENT PER CUBIC YARD, FINE AGGREGATE, AND SUFFICIENT WATER TO PRODUCE A WORKABLE AND PLASTIC MIX OF SUCH CONSISTENCY AS TO PERFORM PROPERLY THE FUNCTION OF MASONRY CONSTRUCTION.

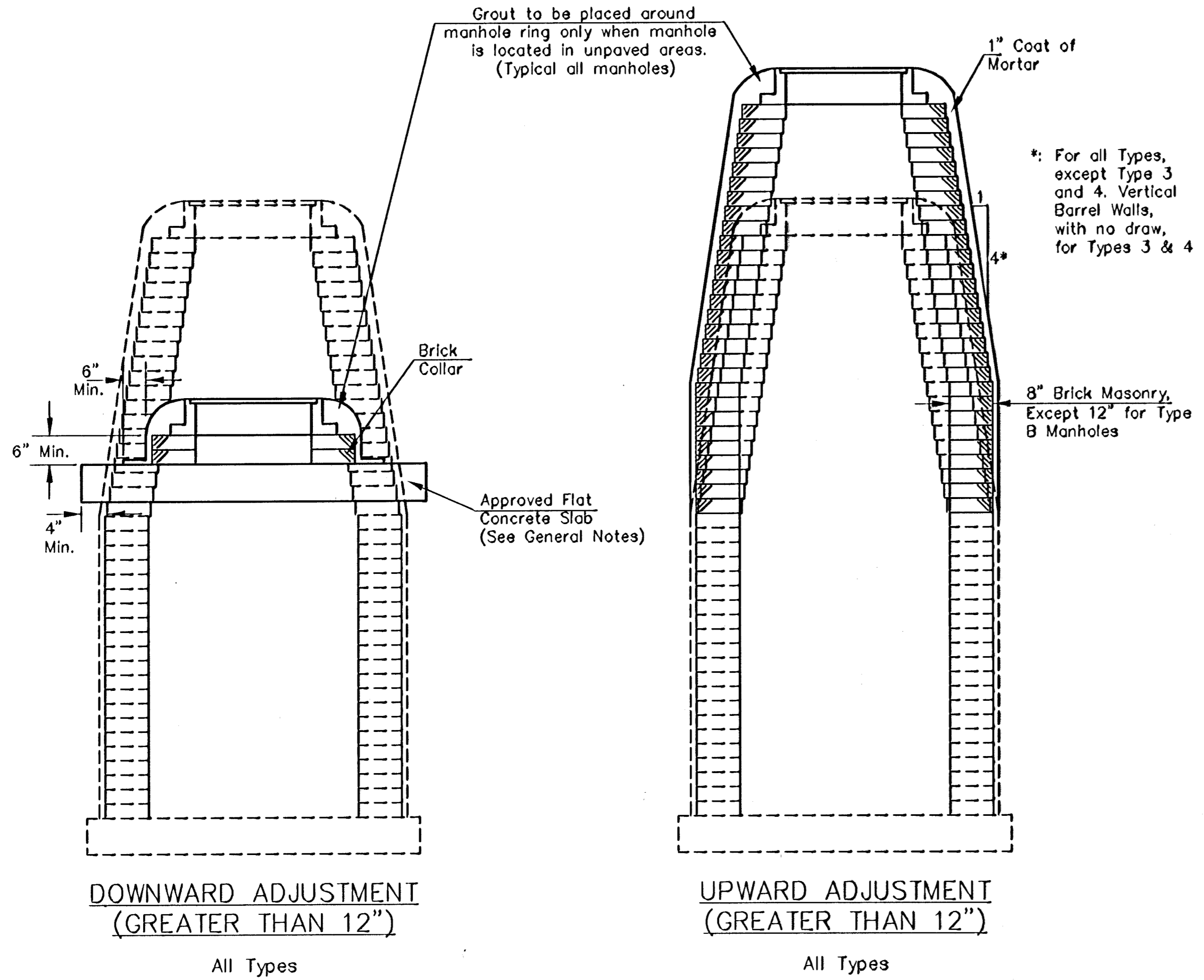
CEMENT USED FOR MORTAR SHALL BE TYPE I COMPLYING WITH THE REQUIREMENTS OF THE LATEST REVISION OF A.S.T.M. DESIGNATION C-150.

FINE AGGREGATE USED FOR MORTAR SHALL MEET THE REQUIREMENTS FOR TYPE FA-A, DIVISION 1102, OF THE "STANDARD SPECIFICATIONS FOR STATE ROAD AND BRIDGE CONSTRUCTION," KANSAS DEPARTMENT OF TRANSPORTATION, 1980 EDITION.

WATER USED FOR MORTAR SHALL MEET THE REQUIREMENTS OF DIVISION 2401, OF THE MENTIONED STANDARD SPECIFICATIONS.

AN APPROVED TYPE OF FLAT CONCRETE SLAB, CONFORMING TO THE REQUIREMENTS OF A.S.T.M. C-478, SHALL BE USED TO SUPPORT THE MANHOLE RING AND COVER WHERE IT IS NECESSARY TO LOWER MANHOLES MORE THAN TWELVE INCHES (12"). ALL SURFACES OF THE FLAT CONCRETE SLAB, FOR SANITARY SEWER MANHOLES, WHICH WOULD BE EXPOSED TO SEWER GAS SHALL BE PROTECTED BY A PLASTIC LINING. A MINIMUM SIX INCH (6") BRICK COLLAR CONFORMING TO THE SAME TYPE OF CONSTRUCTION AS SPECIFIED ABOVE SHALL BE INSTALLED BETWEEN THE MANHOLE RING AND THE FLAT CONCRETE SLAB TO FACILITATE MINOR ADJUSTMENTS IN ELEVATION.

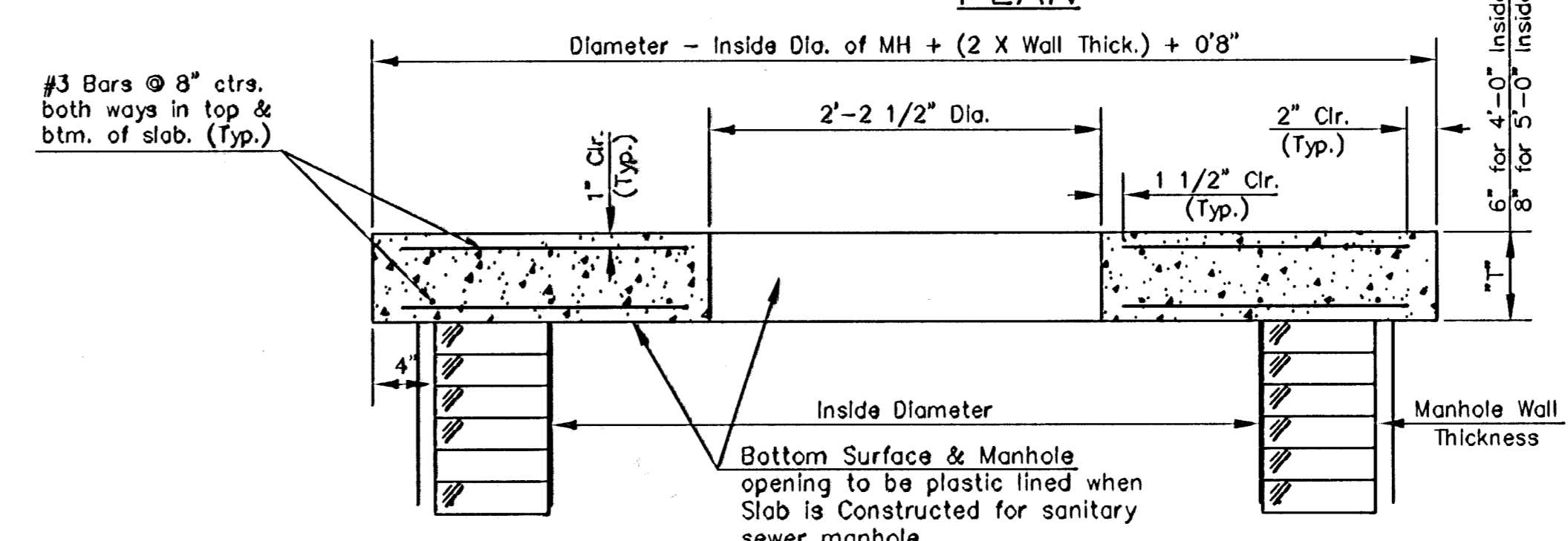
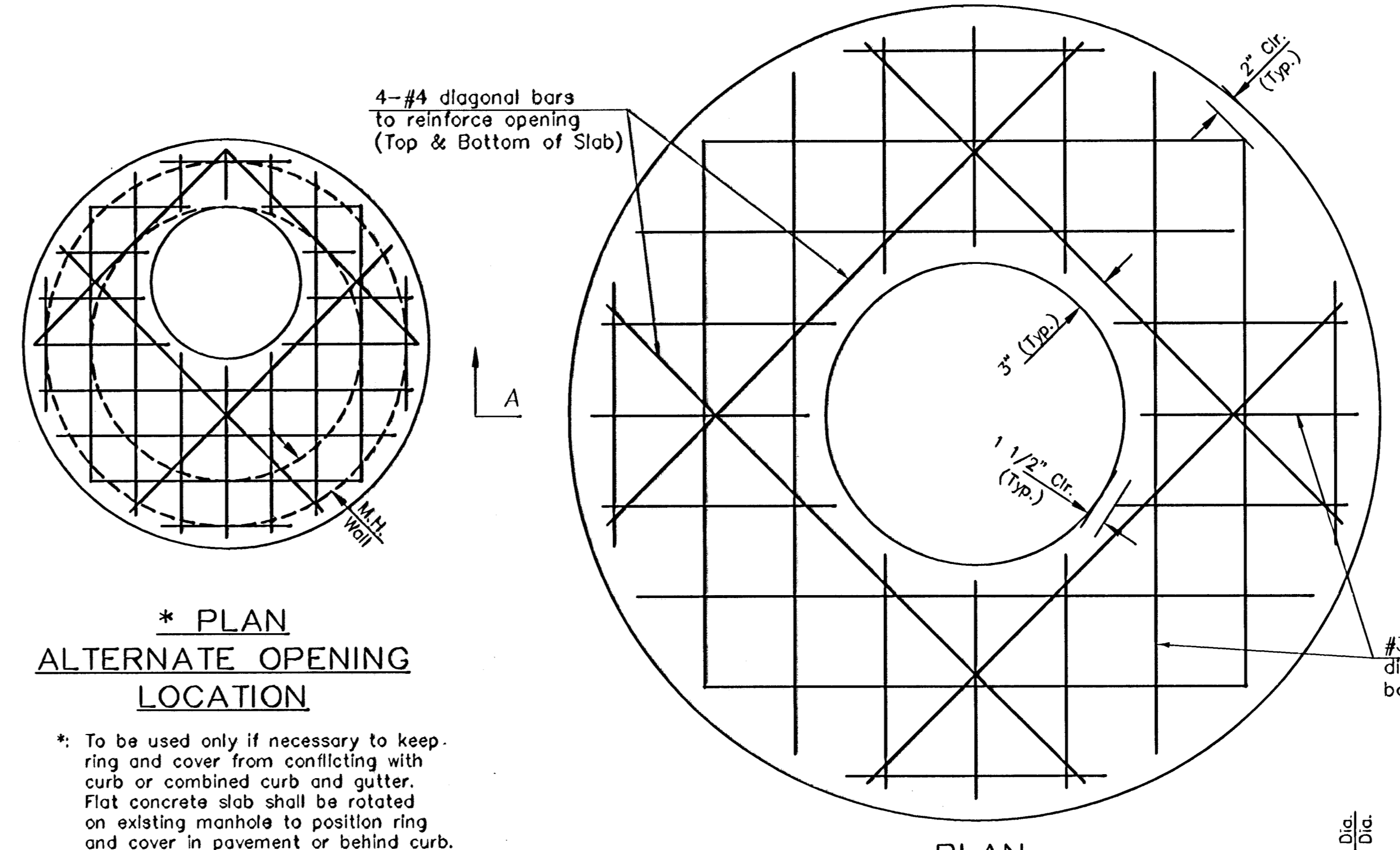
PLASTIC LINING REQUIRED FOR FLAT CONCRETE SLABS, TO BE PLACED IN CONNECTION WITH THE ADJUSTMENT OF SANITARY SEWER MANHOLES, MAY BE AMER-PLATE T-LOCK LINER PLATE, B.F. GOODRICH LOK-RIB KOROSEAL, OR AN APPROVED EQUAL. THE PLASTIC LINING MANUFACTURER'S RECOMMENDATIONS FOR INSTALLING, SEALING JOINTS, TESTING AND INSPECTION OF THE LINING SHALL BE CONSIDERED AS INCORPORATED IN AND FORMING A PART OF THESE SPECIFICATIONS. THREE (3) COPIES OF THE PLASTIC LINING MANUFACTURER'S RECOMMENDATIONS FOR LINING INSTALLATION SHALL BE FURNISHED TO THE ENGINEER FOR APPROVAL PRIOR TO THE FABRICATION OF ANY FLAT SLABS REQUIRING PLASTIC LINING.



THE APPROPRIATE PORTIONS OF THE DRAW AND BARREL OF TYPE A, B, C, D, 1 AND 2 MANHOLES SHALL BE REMOVED. A FLAT CONCRETE SLAB SHALL BE PLACED AND THE RING AND COVER RESET. ALL WORK AND MATERIALS SHALL CONFORM TO THE DETAILS SHOWN AND THE GENERAL NOTES.

COURSES OF BRICK BARREL SUPPORTING THE WIDE FLANGE RING FOR TYPE 4 MANHOLES AND FLAT CONCRETE SLAB FOR TYPE 3 MANHOLES SHALL BE REMOVED AS NECESSARY PRIOR TO RESETTING THE WIDE FLANGE RING OR FLAT CONCRETE SLAB AND RING. ALL WORK AND MATERIALS SHALL CONFORM TO THE DETAILS SHOWN AND THE GENERAL NOTES.

THE ENTIRE DRAW OF TYPES A, B, C, D, 1 AND 2 MANHOLES SHALL BE REMOVED, THE MANHOLE BARREL RAISED THE APPROPRIATE AMOUNT, A NEW DRAW CONSTRUCTED, AND THE RING AND COVER RESET. THE UPPER PORTION OF TYPE 3 MANHOLES SHALL BE REMOVED TO THE BOTTOM OF THE FLAT CONCRETE SLAB, THE BRICK MASONRY BARREL SUPPORTING THE SLAB SHALL BE RAISED THE APPROPRIATE AMOUNT, AND THE SLAB AND RING AND COVER RESET. THE WIDE FLANGE RING AND COVER OF TYPE 4 MANHOLES SHALL BE REMOVED, THE BRICK MASONRY BARREL SUPPORTING THE RING SHALL BE RAISED THE APPROPRIATE AMOUNT AND THE RING AND COVER RESET. ALL WORK REQUIRED FOR A GREATER THAN TWELVE INCH (12") UPWARD ADJUSTMENT OF ANY MANHOLE SHALL BE ACCOMPLISHED WITH BRICK MASONRY IN ACCORDANCE WITH THE DETAILS SHOWN AND THE GENERAL NOTES.



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<p>THE CITY OF WICHITA</p> <p>CITY ENGINEER'S OFFICE CITY HALL - SEVENTH FLOOR 405 NORTH MAIN STREET WICHITA, KANSAS 67202 (316) 268-2001 (316) 268-2112 FAX</p>	MANHOLE ADJUSTMENT DETAILS	
	JAMES L. ARMOUR, P.E. - CITY ENGINEER	
	PROJECT NUMBER 468-84565	CCA NO. 620532
	DATE MAR 96	SHEET W19 OF 23