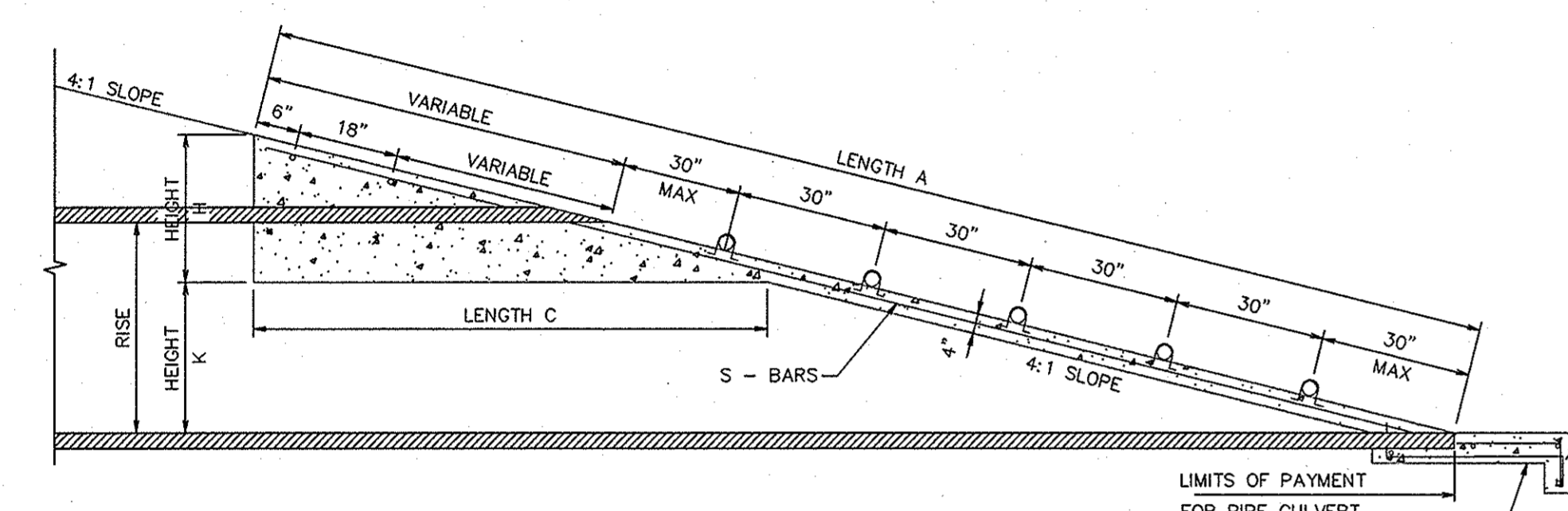
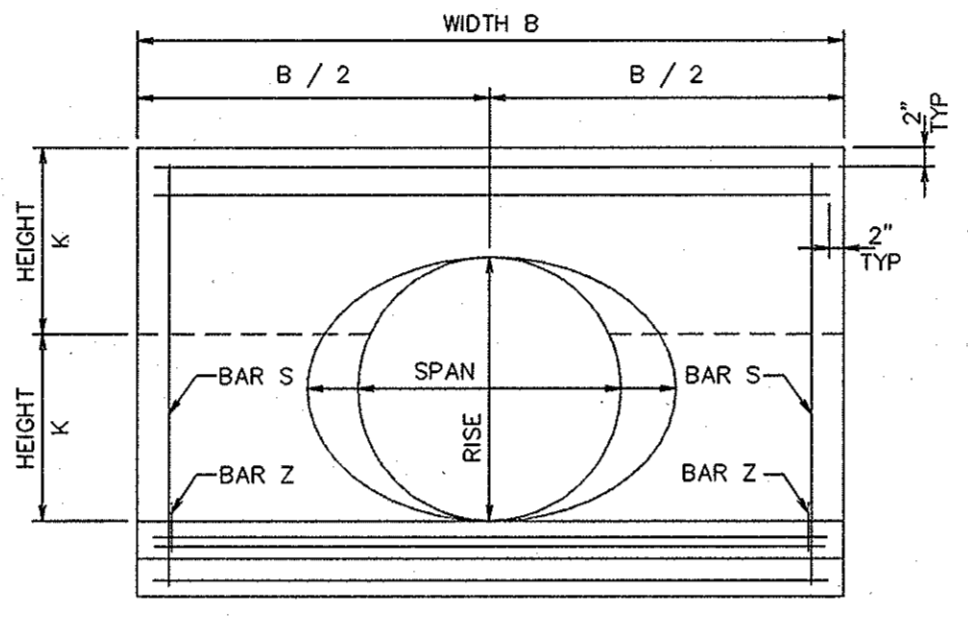


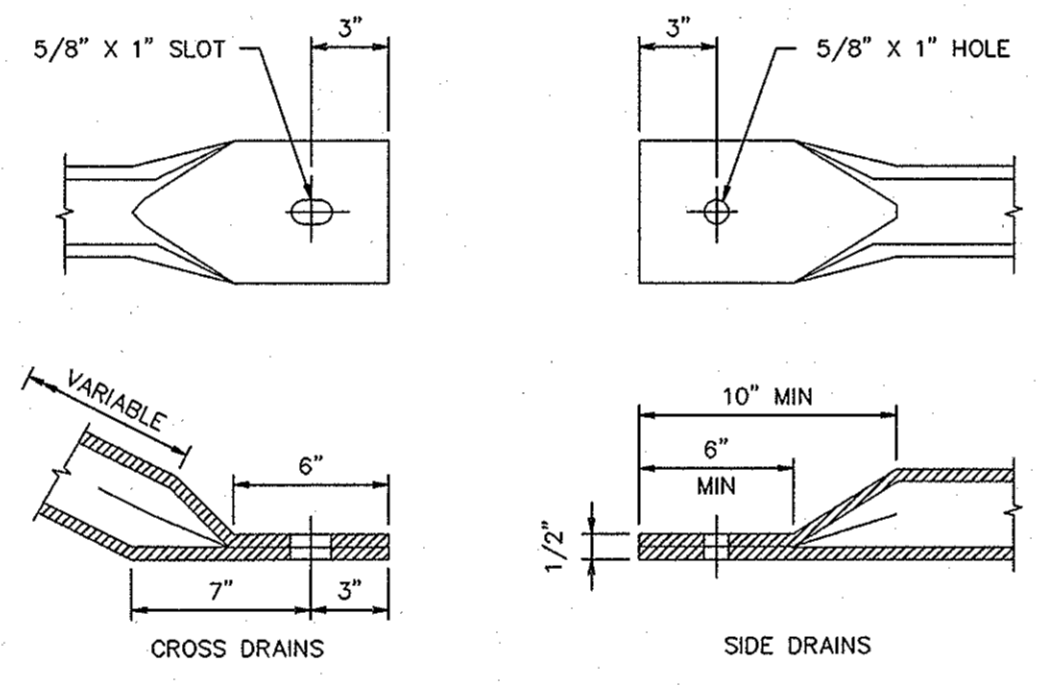
SECTION A - A



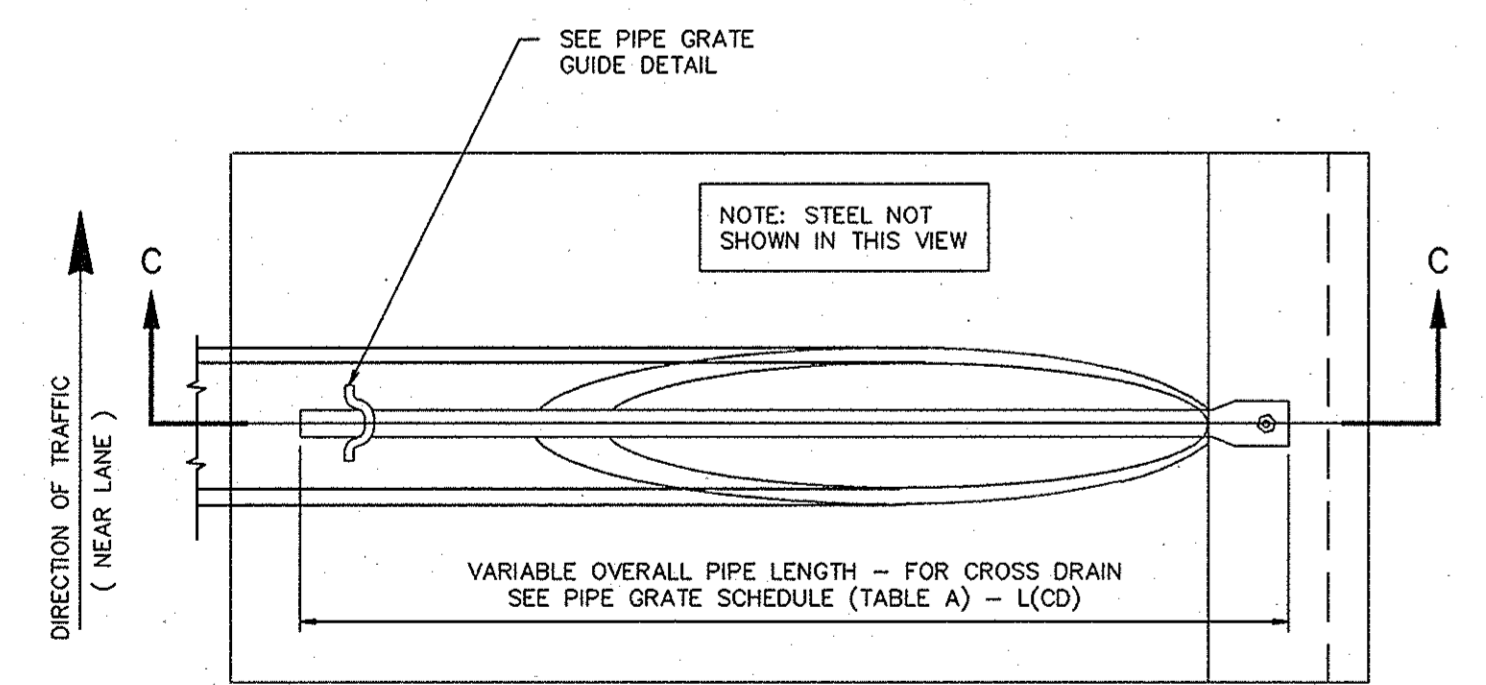
SECTION B - B
INSTALLATION DETAIL SIDE DRAIN WITH PIPE GRATES



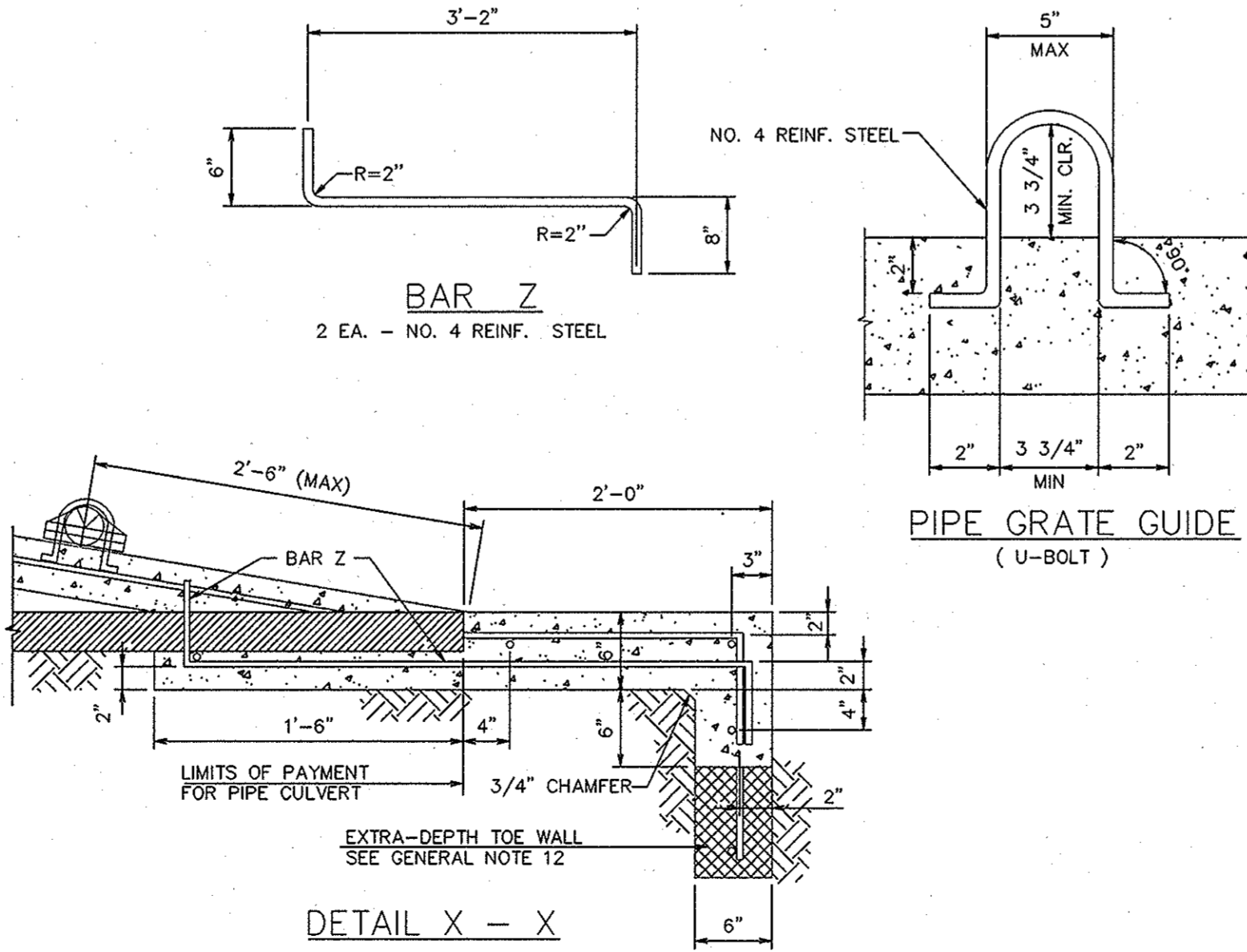
END VIEW
(PIPE GRATES NOT SHOWN IN THIS VIEW)



ANCHOR END DETAIL
(PIPE GRATE MEMBERS)



SECTION C - C
INSTALLATION DETAIL CROSS DRAIN WITH PIPE GRATE



DETAIL X - X
CONCRETE PIPE END TREATMENT

SINGLE PIPE INSTALLATION - 4 TO 1 SAFETY SLOPE

TABLE A - SCHEDULE OF PIPE SAFETY GRATES - AASHTO DESIGNATED PIPE SIZES

C.E.T. TYPE	ROUND INCHES	REINF. CONC. ARCH PIPE INCHES	REINF. CONC. ELLIPTICAL PIPE INCHES	SIDE DRAIN GRATES L (SD)	CROSS DRAIN GRATES L (CD)		
A4	15"	2		36"	NONE		
	18"	2		36"	NONE		
	(18")		22 x 13 26 x 15	1 14 x 23 2	42" 45" 45" NONE		
B4	21"	2		42"	NONE		
	24"	2		45"	NONE		
	(24")		28 x 18 36 x 22	2 19 x 30 3 22 x 34	2 48" 2 54"	1 @ 10'-9" 1 @ 12'-0" 1 @ 12'-6" 1 @ 12'-6"	
		30"	5		50"	NONE	
C4	(30")		43 x 26	3	64" 64" 64" 70" 70"	1 @ 13'-6" 1 @ 14'-3" 1 @ 14'-3" 1 @ 15'-3" 1 @ 15'-9"	
			51 x 31	4	70" 72"	1 @ 15'-9" 1 @ 15'-9"	
				34 x 53	4	72"	1 @ 15'-9"
					54" 60"	1 @ 16'-6" 1 @ 18'-9"	
					60" 78"	1 @ 18'-9" 1 @ 17'-3"	
D4	36"	4		84"	2 @ 19'-0"		
	42"	5		84"	2 @ 19'-0"		
(42")			58 x 36 65 x 40	4 38 x 60 5	5 78" 84" 66" 88"	1 @ 20'-9" 2 @ 19'-0" 1 @ 20'-9" 2 @ 19'-0"	
	48"	6		92"	2 @ 20'-6"		
E4	(48")		73 x 45	6 48 x 76	6 96"	2 @ 20'-9"	

☒ NUMBER OF HORIZONTAL PIPE GRATES FOR SIDE DRAIN OPTION ☉ DIMENSIONS SHOWN AS RISE BY SPAN.

SINGLE PIPE INSTALLATION - 4 TO 1 SAFETY SLOPE

TABLE B - SCHEDULE OF DIMENSIONS FOR C. E. T. TYPES

C.E.T. TYPE	LENGTH A	WIDTH B	WIDTH B	LENGTH C	HEIGHT H	HEIGHT K	STEEL LENGTH		
							R H-BARS	A E H-BARS	S-BARS
	10'-4"	5'-6"	6'-2"	5'-8"	21"	9"	5'-2"	5'-10"	12'-4"
	12'-4"	6'-0"	7'-2"	6'-0"	22"	14"	5'-8"	6'-10"	15'-4"
	15'-9"	6'-6"	8'-5"	7'-4"	26"	20"	6'-2"	8'-1"	19'-6"
	19'-3"	7'-6"	9'-6"	8'-0"	28"	27"	7'-2"	9'-2"	21'-6"
	20'-8"	8'-0"	10'-4"	8'-8"	30"	30"	7'-8"	10'-0"	23'-4"

- ☒ ROUND SHAPE CULVERT OPTIONS
- ☉ ARCH SHAPE CULVERT OPTIONS
- ☉ HORIZONTAL ELLIPSE SHAPE CULVERT OPTIONS

ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH GOVERNING MUNICIPALITY'S STANDARD SPECIFICATIONS.

QUANTITIES SHOWN IN TABLE A ARE FOR ONE END ONLY.

CLASS A CONCRETE SHALL CONFORM TO THE MINIMUM REQUIREMENTS AS SET FORTH BY THE GOVERNING MUNICIPALITY'S STANDARD SPECIFICATIONS OR QUIKTRIP CORPORATIONS, WHICHEVER IS MORE STRINGENT.

TYPES A4 THROUGH E4 END SECTIONS, AS SHOWN IN TABLE A, MAY BE USED WITH ANY AASHTO DESIGNATED METAL, ALUMINUM & CONCRETE PIPE SIZES, AS SHOWN IN TABLE B.

END SECTION QUANTITIES ARE BASED ON METAL PIPE DIMENSIONS, NO PIPE WALL THICKNESS AND SMALLEST LISTED CULVERT ROUND OR ARCH PIPE WITHIN TYPE.

SLOPED END OF CULVERT PIPE SHALL BE SHOP CUT. TWO COATS OF COLD GALVANIZATION WILL BE APPLIED TO CUT EDGES OF STEEL CULVERT PIPE. COST OF CUTTING AND GALVANIZING IS INCLUDED IN THE PRICE BID FOR PIPE CULVERT.

ALL SIZES OF CULVERT PIPE WILL BE CUT ON 4 TO 1 SLOPE.

PIPE FOR SAFETY GRATES SHALL BE 3" x 7.58 LBS./FT. STANDARD WEIGHT STEEL PIPE, SCHEDULE 40. IT SHALL BE FURNISHED GALVANIZED, PLAIN END AND SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A-53 (HYDROSTATIC TESTS MAY BE WAVED) OR ASTM F 1083.

ANY GALVANIZED AREAS OF METAL PIPE DISTRESSED DURING THE POST FABRICATION AND/OR HANDLING PROCESS SHALL BE COATED WITH AN APPROVED ZINC RICH PAINT.

REINFORCING STEEL AND PIPE GRATE GUIDES SHALL BE NO. 4 DEFORMED BARS.

CRITERIA FOR USE OF PIPE SAFETY GRATE MEMBERS:

- (A) ALL SIDE DRAIN AND MULTIPLE PIPE INSTALLATIONS WITHIN THE CLEAR ZONE.
- (B) ALL CROSS DRAIN INSTALLATIONS WITH A CULVERT SPAN OF 30' OR
- (C) ALL INSTALLATIONS OUTSIDE THE CLEAR ZONE WHERE HAZARD POTENTIAL IS HIGH BASED ON TRAFFIC DIRECTION, SPEED, VOLUME AND SIZE OF CULVERT.

NOTE: ANALYZE HYDRAULIC PERFORMANCE AT VARYING DEGREES OF CLOGGING AND APPLY RISK ASSESSMENT BEFORE USING GRATES.

PIPE GRATE MEMBERS ARE NOT SHOWN IN END VIEW.

ANCHOR END OF PIPE GRATE MEMBERS SHALL BE HELD IN PLACE WITH A 1/2" x 5 1/2" GALVANIZED BOLT, NUT AND WASHER. THREADS, 1 3/4" (NOM.) SHALL REMAIN EXPOSED FOR INSTALLING GRATE, WASHER AND NUT. ALL BOLTS, NUTS AND WASHERS SHALL CONFORM TO ASTM A-307.

FOR TOTAL QUANTITY OF EXTRA DEPTH TOE WALL, MULTIPLY WIDTH B TIMES 0.0185 FOR EACH FOOT OF DEPTH OF TOE WALL REQUIRED.

SITE BENCHMARK
"a" Chiseled on Traffic
Signal Light Pole
at NW corner of 143rd St & Kellogg Ave
Elevation=1318.61
(NGVD 29)

QuikTrip 316

DRAINAGE STRUCTURE - 2

CITY OF WICHITA, KANSAS

JIM ARMOUR, P.E. - CITY ENGINEER

BSW INTERNATIONAL ENGINEERS, P.C.

ONE WEST THIRD ST., STE. 800
WICHITA, KS 67202
PHONE (913) 265-4221
FAX (913) 265-4221
CERTIFICATE OF AUTHORITY NO. E-510
EXPIRATION DATE 12/31/2008

Designed By: J. Crip

Drawn By: J. Bradford

BSW Job No.: 106-0021

Date: 07/30/08

Sheet 7 of 9