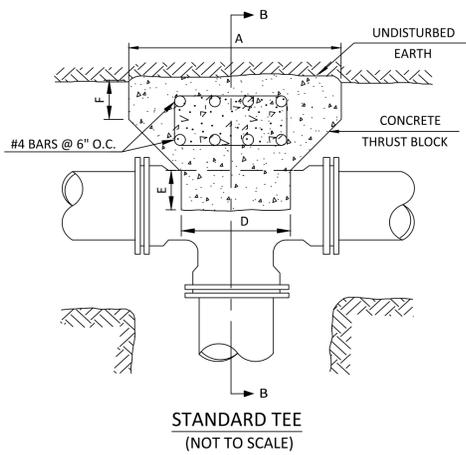


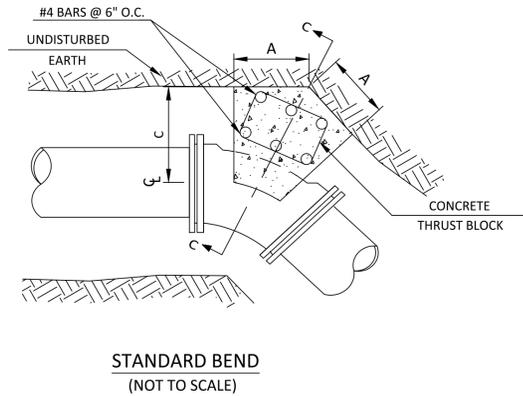
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PLOT DATE: 1/16/2020 2:44 PM

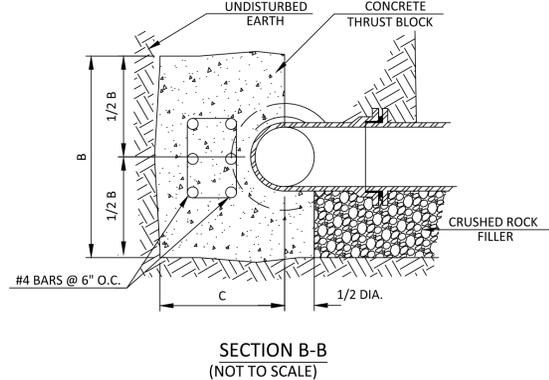
PLOTTED BY: BROOKE WEIR



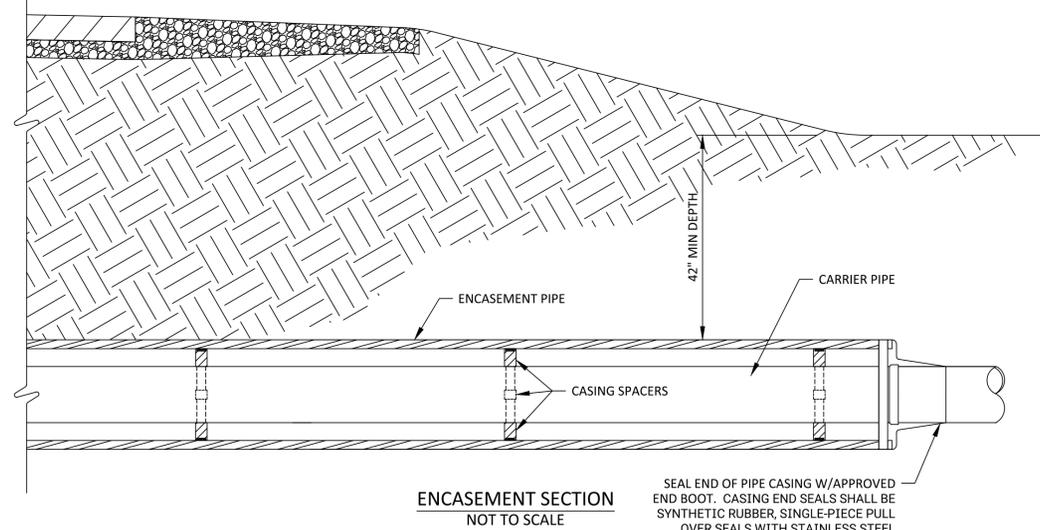
**STANDARD TEE**  
(NOT TO SCALE)



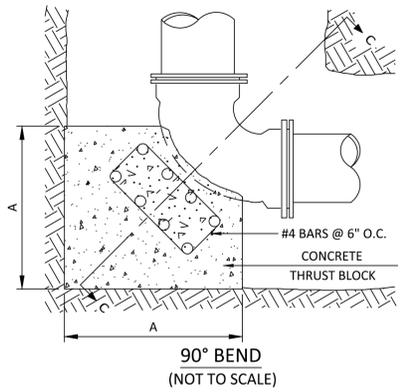
**STANDARD BEND**  
(NOT TO SCALE)



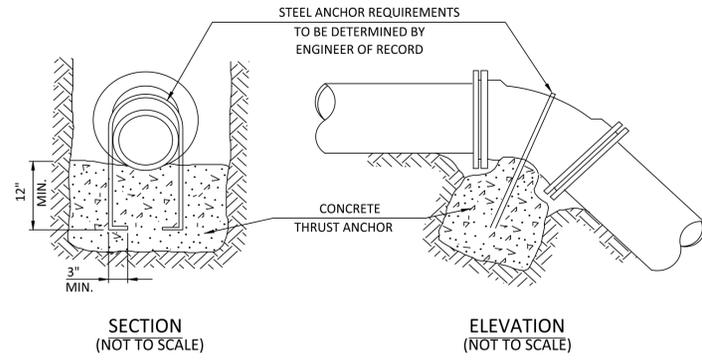
**SECTION B-B**  
(NOT TO SCALE)



**ENCASUREMENT SECTION**  
NOT TO SCALE



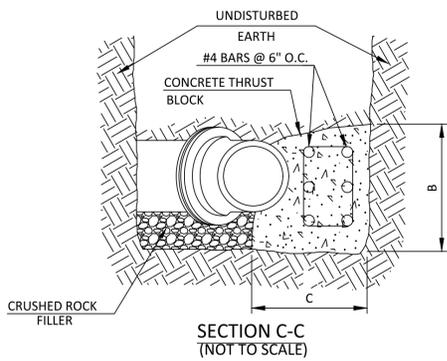
**90° BEND**  
(NOT TO SCALE)



**SECTION**  
(NOT TO SCALE)

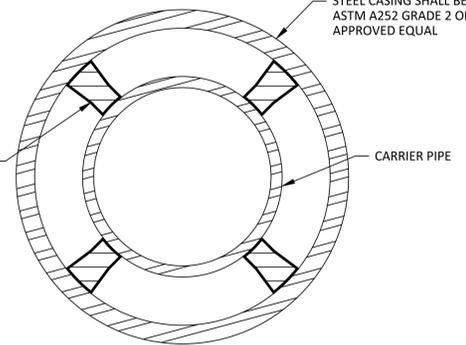
**ELEVATION**  
(NOT TO SCALE)

**VERTICAL CHANGE IN DIRECTION**



**SECTION C-C**  
(NOT TO SCALE)

CASING SPACERS SHALL HAVE A MINIMUM OF 3 SETS OF 4 RUNNERS AND SHALL HOLD THE CARRIER PIPE IN THE CENTER OF THE CASING. SPACERS SHALL BE CCI MODEL CSP OR APPROVED EQUAL



**ENCASUREMENT SECTION**  
NOT TO SCALE

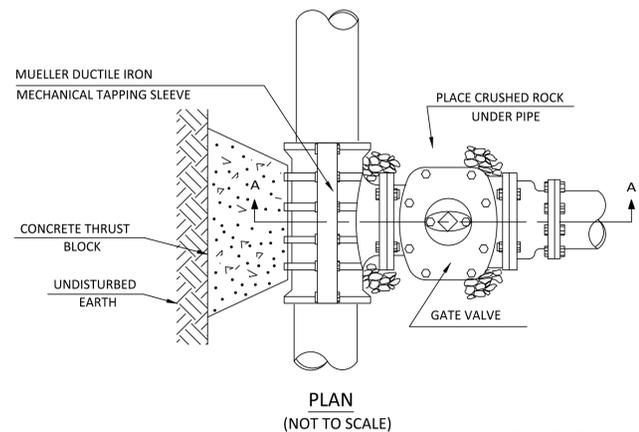
CROSSING ENCASUREMENT		
PIPE SIZE	CROSSING ENCASUREMENT	MINIMUM THICKNESS
1 1/2" DIP	3" STEEL	0.216"
2" DIP	4" STEEL	0.237"
2 1/2" DIP	6" STEEL	0.280"
3" DIP	6" STEEL	0.280"
4" DIP	8" STEEL	0.322"
6" DIP	12" STEEL	0.375"
8" DIP	14" STEEL	0.375"
10" DIP	16" STEEL	0.375"
12" DIP	20" STEEL	0.375"
18" DIP	24" STEEL	0.375"
24" DIP	30" STEEL	0.375"

MINIMUM THICKNESS IS BASED ON PIPE SCHEDULE (STD)

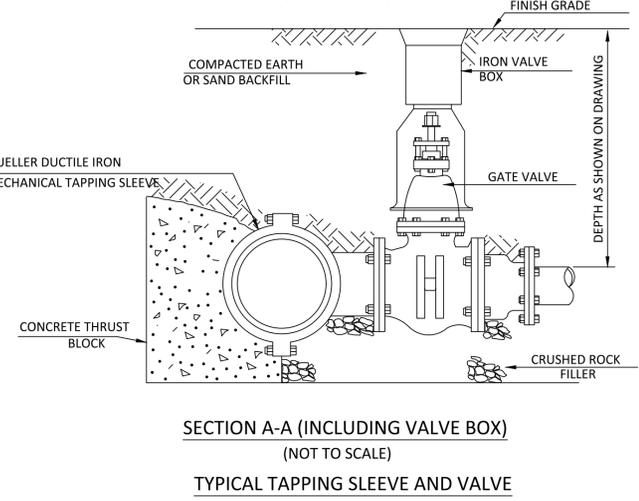
- NOTES:
- ALL EQUIPMENT, LABOR AND MATERIALS REQUIRED TO CONSTRUCT CONCRETE THRUST BLOCKS SHALL BE SUBSIDIARY TO WATERLINE FITTING AND TAPPING SLEEVE BID ITEMS.
  - JOINT RESTRAINT SHALL BE PROVIDED ON ALL BENDS, PLUGS OR CAPS; BETWEEN A VALVE AND FITTING; AND ON BOTH SIDES OF THE VALVE WHEN IT IS IN-LINE. JOINT RESTRAINT SHALL BE SUBSIDIARY TO WATERLINE FITTING AND VALVE BID ITEMS.
  - ALL FITTINGS SHALL BE WRAPPED IN 6 MIL HEAVY PLASTIC AND SHALL BE SUBSIDIARY TO WATERLINE FITTING BID ITEMS.

PIPE DIA	TEES/PLUGS						90° BEND			45° BEND			22.5° BEND			11.25° BEND		
	A	B	C	D	E	F	A	B	C	A	B	C	A	B	C	A	B	C
4"	13"	22"	9"	13"	-	-	18"	12"	9"	9"	12"	12"	6"	12"	12"	-	-	-
6"	24"	30"	16"	16"	6"	6"	24"	18"	16"	10"	24"	12"	7"	18"	12"	-	-	-
8"	34"	32"	21"	18"	7"	6"	30"	26"	21"	13"	36"	18"	9"	24"	18"	9"	24"	18"
10"	40"	42"	23"	22"	8"	6"	35"	34"	24"	18"	38"	27"	12"	30"	27"	12"	30"	27"
12"	48"	52"	27"	24"	9"	6"	42"	42"	30"	21"	48"	33"	14"	36"	30"	10"	42"	24"
16"	54"	54"	32"	30"	12"	6"	50"	42"	36"	24"	48"	40"	15"	42"	34"	10"	42"	24"
18"	60"	60"	34"	32"	12"	6"	54"	48"	38"	27"	54"	44"	17"	46"	37"	10"	42"	24"
20"	72"	66"	36"	36"	24"	10"	72"	66"	54"	36"	66"	48"	18"	66"	42"	15"	48"	30"
24"	96"	72"	36"	44"	19"	8"	82"	60"	60"	44"	60"	72"	22"	60"	54"	15"	48"	36"
30"	108"	96"	60"	50"	20"	12"	108"	72"	84"	54"	72"	84"	28"	72"	64"	17"	60"	36"
36"	108"	108"	60"	56"	23"	12"	108"	108"	80"	68"	84"	96"	34"	84"	69"	20"	72"	36"

PIPE SIZE	VERTICAL CHANGE ANCHORS							
	90° BEND		45° BEND		22.5° BEND		11.25° BEND	
	CONCRETE	NO.	CONCRETE	NO.	CONCRETE	NO.	CONCRETE	NO.
	C.Y.	BAR	C.Y.	BAR	C.Y.	BAR	C.Y.	BAR
6"	2.0	2	1.0	1	1.0	1	1.0	1
8"	3.5	4	2.0	2	1.0	1	1.0	1
10"	5.5	6	3.0	3	1.5	2	1.0	1
12"	8.0	8	4.5	5	2.5	3	2.0	2

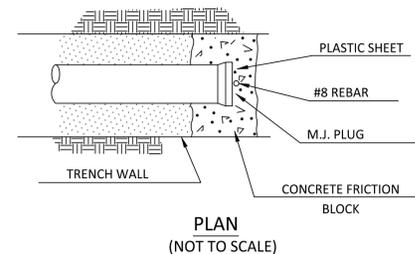


**PLAN**  
(NOT TO SCALE)

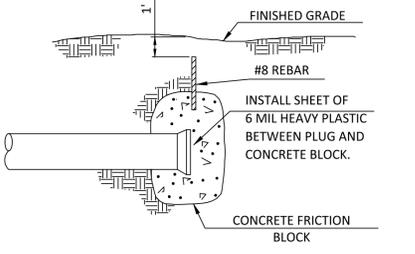


**SECTION A-A (INCLUDING VALVE BOX)**  
(NOT TO SCALE)

**TYPICAL TAPPING SLEEVE AND VALVE**



**PLAN**  
(NOT TO SCALE)



**ELEVATION**  
(NOT TO SCALE)

**LINE PLUG & FRICTION BLOCK DETAIL**



NO.	2020.01.16	UPDATED DETAIL	BY
DATE		DESCRIPTION	

**City of Manhattan Kansas**  
 PUBLIC WORKS  
 1101 POYNTZ AVE., MANHATTAN, KS 66502 (785) 587-2415

**MANHATTAN STANDARD DETAILS**  
**MSD 2310 WATER MAIN DETAILS**

CITY ENGINEER: BRIAN JOHNSON, P.E.    DESIGN BY: \_\_\_\_\_  
 CITY PROJ. #: \_\_\_\_\_  
 DATE: \_\_\_\_\_    DRAWN BY: \_\_\_\_\_    PAGE \_\_\_\_\_ OF \_\_\_\_\_