HDPE PIPE INSTALLATION NOTES

1. MATERIALS: UNLESS OTHERWISE SPECIFIED ON THE PLANS OR HEREIN, CORRUGATED POLYETHYLENE PIPE SHALL CONFORM TO AASHTO M-294, LATEST EDITION, STANDARD SPECIFICATION FOR CORRUGATED POLYETHYLENE
2. RESINS: CORRUGATED POLYETHYLENE PIPE SHALL BE MANUFACTURED FROM HIGH DENSITY POLYETHYLENE VIRGIN COMPOUNDS, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM D-3350 FOR THE CELL CLASSIFICATION 335420C.
3. JOINTS AND FITTINGS: JOINTS SHALL CONSIST OF A BELL AND SPIGOT TYPE JOINT WITH AN "O"-RING RUBBER GASKET MEETING ASTM F477 PLACED ON THE SPIGOT END. AT LEAST TWO (2) CORRUGATIONS OF THE SPIGOT END MUST INSERT INTO THE BELL END.

   PIPE SIZE CHANGES SHALL BE ACCOMPLISHED WITH PRE-FABRICATED REDUCERS MADE BY THE PIPE MANUFACTURER.

   PIPE FITTINGS SHALL CONFORM TO AASHTO M294 OR AS DESIGNATED BY THE ENGINEER.
4. DESIGNATION OF TYPE: THE PIPE SHALL BE OF THE FOLLOWING TYPE: TYPE S: THIS PIPE WILL HAVE A FULL CIRCULAR CROSS-SECTION, WITH AN OUTER CORRUGATED PIPE WALL AND A SMOOTH INNER LINER.

CLASSES OF EMBEDMENT AND BACKFILL MATERIALS

CLASS	TYPE	SOIL GROUP SYMBOL D 2487	DESCRIPTION	PERCENTAGE PASSING SIEVE SIZES 1 1/2 IN. (40 MM)	NO. 4 (4.75 MM)	NO. 200 (0.075 MM)
IA	MANUFACTURED AGGREGATES OPEN-GRADED, CLEAN.	NONE	ANGULAR, CRUSHED STONE OR ROCK, CRUSHED GRAVEL, BROKEN CORAL, CRUSHED SLAG, CINDERS OR SHELLS: LARGE VOID CONTENT, CONTAIN LITTLE OR NO FINES.	100 %	≤ 10 %	< 5 %
IB	MANUFACTURED, PROCESSED AGGREGATES; DENSE-GRADED, CLEAN	NONE	ANGULAR, CRUSHED STONE (OR OTHER CLASS IA MATERIALS) AND STONE/SAND MIXTURES WITH GRADATIONS SELECTED TO MINIMIZE MIGRATION OF ADJACENT SOILS; CONTAIN LITTLE OR NO FINES (SEE X1&.).	100 %	≤ 50 %	< 5 %
II	COARSE-GRAINED SOILS, CLEAN	GW	WELL-GRADED GRAVELS AND GRAVEL-SAND MIXTURES; LITTLE OR NO FINES.	100 %	< 50 % "COARSE FRACTION"	< 5 %
		GP	POORLY-GRADED GRAVELS AND GRAVEL-SAND MIXTURES; LITTLE OR NO FINES.			
		SW	WELL-GRADED SANDS AND GRAVELY SANDS; LITTLE OR NO FINES.		> 50 % OF "COARSE FRACTION"	
		SP	POORLY-GRADED SANDS AND GRAVEL SANDS; LITTLE OR NO FINES.			
	COARSE-GRAINED SOILS, BORDERLINE CLEAN TO W/FINES	E.G. GW-GC, SP-SM.	SANDS AND GRAVELS WHICH ARE BORDERLINE BETWEEN CLEAN AND WITH FINES.	100 %	VARIES	5 % TO 12 %

TABLE 1
RECOMMENDATIONS FOR INSTALLATION AND USE OF SOILS AND AGGREGATES FOR FOUNDATION, EMBEDMENT AND BACKFILL

	SOIL CLASS		
	CLASS IA	CLASS IB	CLASS II
GENERAL RECOMMENDATIONS AND RESTRICTIONS	DO NOTE USE WHERE CONDITIONS MAY CAUSE MIGRATION OF FINES FROM ADJACENT SOIL AND LOSS OF PIPE SUPPORT. SUITABLE FOR USE AS A DRAINAGE BLANKET AND UNDERDRAIN IN ROCK CUTS WHERE ADJACENT MATERIAL IS SUITABLY GRADED	PROCESS MATERIAL AS REQUIRED TO OBTAIN GRADATION WHICH WILL MINIMIZE MIGRATION OF ADJACENT MATERALS SUITABLE FOR USE AS DRAINAGE BLANKET AND UNDERDRAIN.	WHERE HYDRAULIC GRADIENT EXISTS CHECK GRADATION TO MINIMIZE MIGRATION. "CLEAN" GROUPS SUITABLE FOR USE AS DRAINAGE BLANKET AND UNDERDRAIN.
FOUNDATION	SUITABLE AS FOUNDATION AND FOR REPLACING OVER-EXCAVATED AND UNSTABLE TRENCH BOTTOM AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS.	SUITABLE AS FOUNDATION AND FOR REPLACING OVER-EXCAVATED AND UNSTABLE TRENCH BOTTOM. INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS.	SUITABLE AS FOUNDATION AND FOR REPLACING OVER-EXCAVATED AND UNSTABLE TRENCH BOTTOM AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS.
BEDDING	SUITABLE AS RESTRICTED ABOVE. INSTALL IN 6-IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS).	INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS).	SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS).
HAUNCHING	SUITABLE AS RESTRICTED ABOVE. INSTALL IN 6-IN. MAXIMUM LAYERS. WORK IN AROUND PIPE BY HAND TO PROVIDE UNIFORM SUPPORT	INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS WORK IN AROUND PIPE BY HAND TO PROVIDE UNIFORM SUPPORT.	SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT IN 6-IN. MAXIMUM LAYERS. LEVEL FINAL GRADE BY HAND. MINIMUM DEPTH 4 IN. (6 IN. IN ROCK CUTS).
INITIAL BACKFILL	SUITABLE AS RESTRICTED ABOVE. INSTALL TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN.	INSTALL AND COMPACT TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN	SUITABLE AS RESTRICTED ABOVE. INSTALL AND COMPACT TO A MINIMUM OF 6 IN. ABOVE PIPE CROWN.
EMBEDMENT COMPACTION [B]	PLACE AND WORK BY HAND TO INSURE ALL EXCAVATED VOIDS AND HAUNCH AREAS ARE FILLED, FOR HIGH DENSITIES USE VIBRATORY COMPACTORS.	MINIMUM DENSITY 85 % STD. PROCTOR, USE HAND TAMPERS OR VIBRATORY COMPACTORS.	MINIMUM DENSITY 85 % STD. PROCTOR, USE HAND TAMPERS OR VIBRATORY COMPACTORS.
FINAL BACKFILL	COMPACT AS REQUIRED BY THE ENGINEER.	COMPACT AS REQUIRED BY THE ENGINEER.	COMPACT AS REQUIRED BY THE ENGINEER.

[B] WHEN USING MECHANICAL COMPACTORS AVOID CONTACT WITH PIPE. WHEN COMPACTING OVER PIPE CROWN MAINTAIN A MINIMUM OF 6 IN. COVER WHEN USING SMALL MECHANICAL COMPACTORS. WHEN USING LARGER COMPACTORS MAINTAIN MINIMUM CLEARANCES AS REQUIRED BY THE ENGINEER.
THE MINIMUM DENSITIES GIVEN IN THE TABLE ARE INTENDED AS THE COMPACTION REQUIREMENTS FOR OBTAINING SATISFACTORY EMBEDMENT STIFFNESS IN MOST INSTALLATION CONDITIONS.

HIGH DENSITY CORRUGATED POLYETHYLENE PIPE
HEIGHT OF COVER
H-20 AND E-80 LIVE LOADS

NOMINAL DIAMETER IN. (MM)	MINIMUM COVER IN. & (MM) H-20/H-25	E-80	MAXIMUM COVER FT. (M)
12 (300)	12 (300)	24 (600)	58 (18)
15 (375)	12 (300)	24 (600)	59 (18)
18 (450)	12 (300)	24 (600)	62 (19)
24 (600)	12 (300)	24 (600)	61 (19)
30 (750)	12 (300)	24 (600)	61 (19)
36 (900)	12 (300)	24 (600)	61 (19)
42 (1050)	12 (300)	24 (600)	61 (19)
48 (1200)	12 (300)	24 (600)	61 (19)

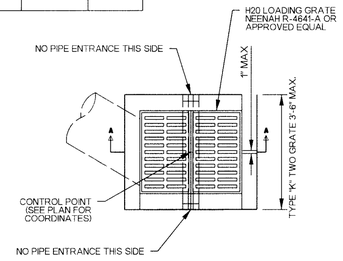
STRUCTURAL DESIGN CALCULATIONS BASED UPON LOAD FACTOR DESIGN METHODOLOGY PER AASHTO.

MINIMUM TRENCH WIDTH

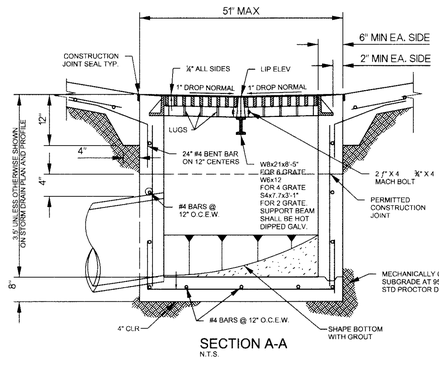
DIAMETER	O.D.	TRENCH WIDTH
12"	14.45"	31"
15"	17.57"	34"
18"	21.20"	39"
24"	27.80"	48"
30"	35.10"	66"
36"	41.70"	78"
42"	47.00"	83"
48"	53.00"	89"

NOTE: ALL ON-SITE HDPE STORM DRAINAGE PIPES ARE PRIVATE.

NOTE:
TRENCH WIDTH SHALL BE SUFFICIENT TO ENSURE WORKING ROOM TO PROPERLY AND SAFELY PLACE AND COMPACT HAUNCHING AND OTHER BACKFILL MATERIALS. THE SPACE BETWEEN THE PIPE AND TRENCH WALL MUST BE WIDER THAN THE COMPACTION EQUIPMENT USED IN THE PIPE ZONE. TRENCH WIDTH IN UNSUPPORTED, UNSTABLE SOILS WILL DEPEND ON THE SIZE OF THE PIPE, THE STIFFNESS OF THE BACKFILL AND INSITU SOIL, AND THE DEPTH OF COVER. THE TRENCH SHALL BE EXCAVATED TO THE WIDTH, DEPTH, AND GRADE AS INDICATED ON THE PLANS AND/OR GIVEN BY THE ENGINEER.



PLAN VIEW
N.T.S.

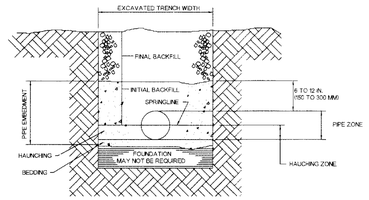


SECTION A-A
N.T.S.

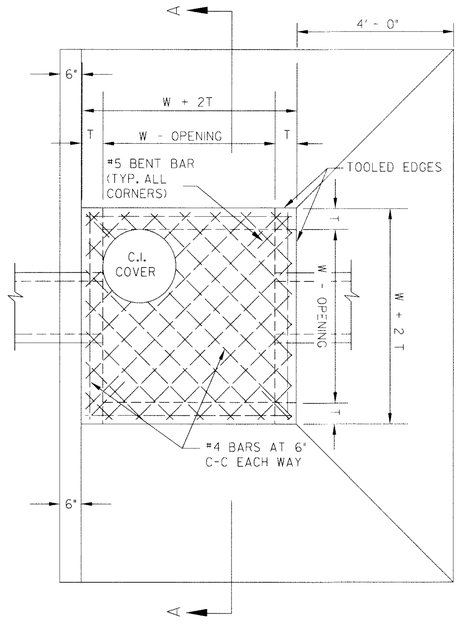
TYPES "K" GRATE INLET ⚠4
N.T.S.

NOTE:
1. ALL CONCRETE FOR STRUCTURES TO BE 4000 PSI
2. UNLETS "J", "K", "L", AND "M") DIMENSIONS SHOWN ARE BASED ON NEENAH R-4641-A GRATE. CONTRACTOR SHALL ADJUST DIMENSIONS FOR APPROVED "OR EQUAL" GRATES. CONTRACTOR SHALL ADHERE TO MINIMUM AND MAXIMUM DIMENSIONS SHOWN. GRATE SLOT OPENING SHALL BE A MAXIMUM OF 1" WIDE.

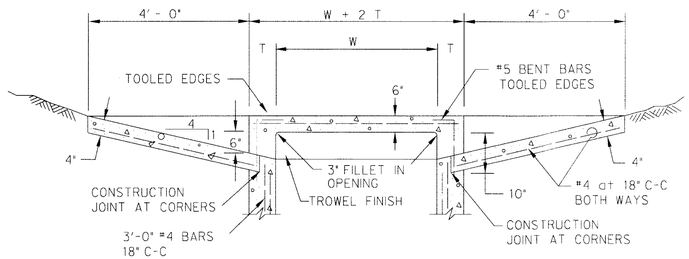
HDPE PIPE TRENCHING, PLACEMENT, AND BACKFILL



TRENCH CROSS SECTION SHOWING TERMINOLOGY



PLAN OF TOP SLAB
N.T.S.



SECTION "A-A"
N.T.S.

NOTES:
1. MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF NCTCOG STANDARD SPECIFICATIONS FOR STANDARD CONCRETE MANHOLES. MINIMUM CLASS "A" CONCRETE.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. FOR DETAILS OF REINFORCING OF LOWER PORTIONS OF INLET SEE APPROPRIATE SQUARE MANHOLE DETAILS.
4. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH WILL BE SHOWN ON PLANS AT LOCATION OF INLET.
5. DROP INLET IS TO BE DESIGNED WITH THREE OPENINGS ON THREE SIDES. THE SIDE FACING THE DETENTION POND SHALL NOT HAVE AN OPENING.
6. DECK MAY BE REINFORCED SAME AS 4' SQUARE MANHOLE.

DROP INLET ⚠2
2', 4', 5' OR 6' SQUARE

INLET SIZE	T	W
2' SQUARE	7"	2'-0"
4' SQUARE	7"	4'-0"
5' SQUARE	8"	5'-0"
6' SQUARE	9"	6'-0"

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ROCKWALL, TEXAS

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Revision No.	Date	Description
1	04/13/2010	ADD 3-SIDED DROP INLET
2	07/19/2010	ADDED GRATE DETAIL

RECORD DRAWING
APRIL 2011
These Record Documents have been prepared based upon information provided by Manhattan Construction. The Design Professional has not verified the accuracy and / or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result
Design Consultant: Halff Associates, Inc.
RECORD DRAWING SUBMITTAL

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PROFESSIONAL ENGINEER
7/19/10

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Issued:	APRIL 2011
Drawn By:	BJG
Checked By:	SBC
Scale:	AS NOTED

Sheet Title
HDPE STORM DRAIN AND DROP INLET DETAILS

C5.11
Sheet Number

$DATE$ $TIME$ $USER$ $CLIENT$ $FILE$ $PLTDRV$ $MODELNAME$