

MATERIAL SPECIFICATIONS
 STEEL PIPE:
 $f_y = 250 \text{ MPa (MIN.) (36 KSI)}$
 REINFORCED STEEL:
 $f_y = 420 \text{ MPa (MIN.) (60 KSI)}$
 CONCRETE:
 $f'_c = 25 \text{ MPa (MIN.) (44 KSI)}$
 @ 28 DAYS

1 SECTION - ANTI-RAM REMOVABLE BOLLARD

NOTE: THIS DESIGN IS USED WHERE K-12 ANTI-RAM PROTECTION IS REQUIRED AND FIELD CONDITIONS DICTATE THE PROTECTION BE REMOVABLE.

TABLE 1 OTHER CONSIDERATIONS IN DESIGN OF DS-22R REMOVABLE BOLLARD

SINCE EACH BOLLARD WEIGHS APPROXIMATELY 1100 - 1200 POUNDS. LOCKING MAY NOT BE REQUIRED. DEPENDING ON SITE SPECIFIC APPLICATION AND CONDITIONS OWNER MAY WANT TO CONSIDER AUGMENTING THE REMOVABLE BOLLARD WITH A HASP AND LOCK.

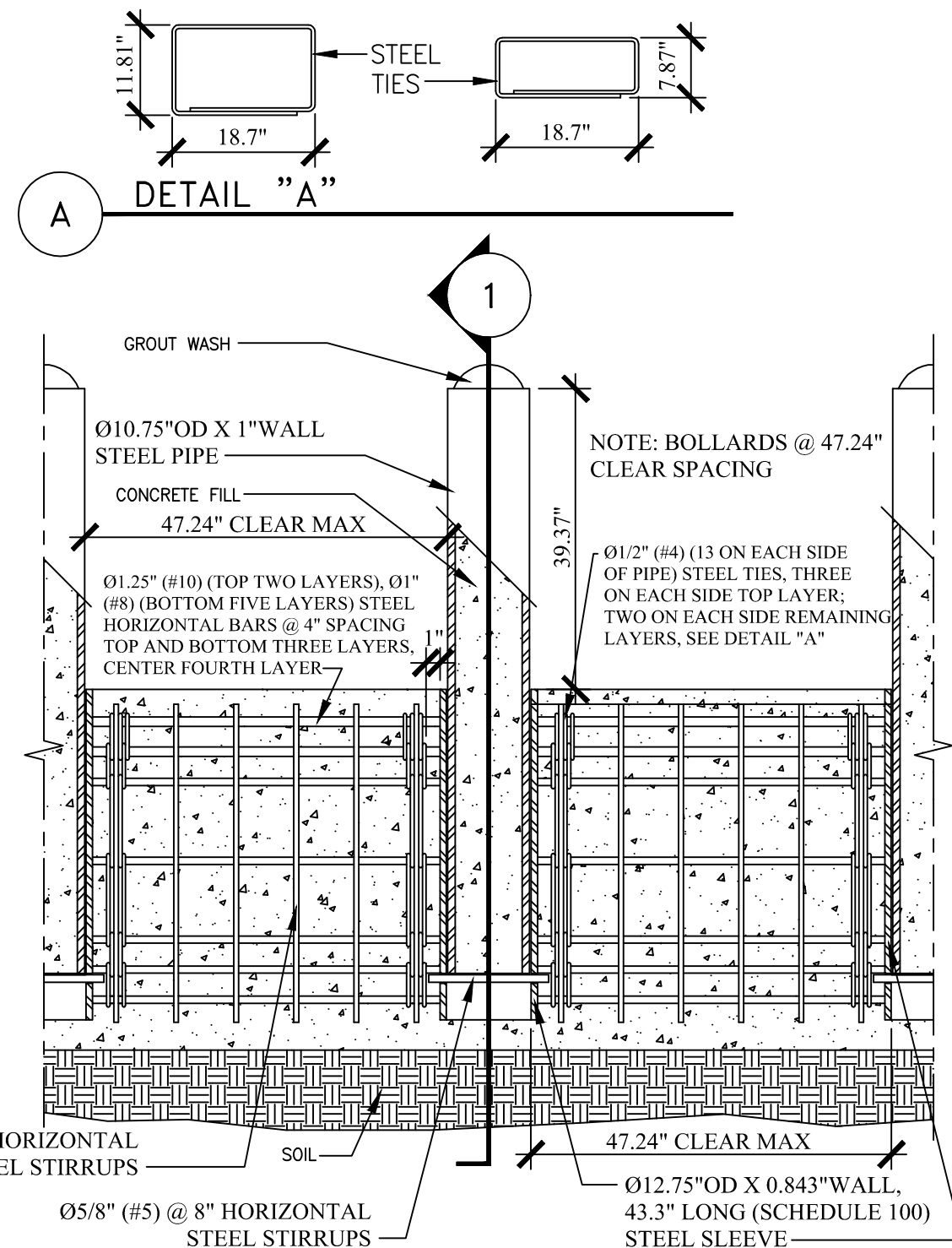
OTHER FEATURES SUCH AS MOISTURE DRAINAGE, HOT DIP GALVANIZING, WELDED CAP PLATES, A HOLE NEAR THE TOP FOR LIFTING BY A THOUGH ROD OR CABLE, ETC., SHOULD BE INCORPORATED INTO THE FINAL DRAWING. THESE FEATURES ARE ACCEPTABLE PROVIDED THEY DO NOT ALTER THE STRUCTURAL INTEGRITY AND PERFORMANCE OF THE BARRIER. OWNER WILL REVIEW THE INCORPORATION OF THESE FEATURES.

SOIL REQUIREMENTS:

THE SOIL SHOULD BE LOW-COHESIVE, WELL-GRADED CRUSHED OR BROKEN GRAVEL OF A PARTICLE SIZE DISTRIBUTION COMPARABLE TO TABLE 1. SOIL DEPTH SHOULD BE AT LEAST THE FOUNDATION DEPTH AND 1.5 TIMES EMBEDMENT DEPTH BEHIND THE INSTALLATION OR 0.6 METERS (2 FEET), WHICHEVER IS GREATER UP TO A MAXIMUM OF 2 METERS (6 FEET). SOIL SHOULD BE COMPACTED TO A DENSITY OF NOT LESS THAN 90 PERCENT MAXIMUM DRY DENSITY.

TABLE: RECOMMENDED SOIL FOUNDATION MATERIAL

Sieve Size	Mass Percent Passing
50.0 mm (2 in.)	100
25.0 mm (1 in.)	75-95
9.5 mm (3/8 in.)	40-75
4.75 mm (No. 4)	30-60
2.00 mm (No. 10)	20-45
0.425 mm (No. 40)	15-30
0.075 mm (No. 200)	5-20



2 SECTION - ANTI-RAM REMOVABLE BOLLARD

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.xx	Decimal ± .030	OFF DRAWING			
.xxx	Decimal ± .020				
.xxxx	Decimal ± .010	Angular ± 0.5°			
REVISION HISTORY					
REV	ECN	AUTHOR	DATE	DESCRIPTION	
B	ECN	DM	11/05/13	CHANGE DIMS FROM METRIC TO IMPERIAL	
TITLE: ASP DS22R BOLLARD LAYOUT				DATE: 03/06/13	SHEET: 1 of 1
DRN BY: NJB				REV: B	
DRAWING NO: ASP DS22R					