

MaxiForce™ Round Removable and Fixed Steel Bollard Installation Schedule

Per American Association of State Highway and Transportation Officials (AASHTO) Section 2.7

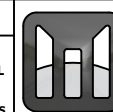
Engineered Anchorage System for MaxiForce™ Round Removable and Fixed Steel Bollards per American Association of State Highway and Transportation Officials (AASHTO) Section 2.7

MRHD / HDH or MFR Size	Bollard Ultimate Load / Max. Capacity	Design Load (lbs.)	Concrete Pier Diameter (in.)	Concrete Pier Height (in.)	Concrete Pier Reinforcing	Bollard Sleeve / Embedment at Concrete Pier	Concrete Grade Beam Depth (In.)	Concrete Grade Beam Width (In.)	Concrete Grade Beam Reinforcing	
									Longitudinal	Stirrups
<i>Individual Footing Option</i>						<i>Continuous Footing Option</i>				
3"	3,185	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4" (5.0)	5,945	3,333	16	53	4 - #4 vert.	18" Sleeve / 18" Embedment	26	12	4 - #4 cont.	#3 at 11" o.c.
4" (1.0)	5,945	5,000	16	60	4 - #5 vert.	18" Sleeve / 18" Embedment	28	12	4 - #4 cont.	#3 at 12" o.c.
4" (1.0)	5,945	5,000	18	57	4 - #5 vert.	18" Sleeve / 18" Embedment	24	16	4 - #4 cont.	#3 at 10" o.c.
5"	10,093	10,000	16	72	6 - #5 vert.	18" Sleeve / 18" Embedment	30	16	4 - #4 cont.	#3 at 11" o.c.
5"	10,093	10,000	18	72	6 - #5 vert.	18" Sleeve / 18" Embedment	28	18	4 - #4 cont.	#3 at 9" o.c.
6"	18,769	10,000	16	72	6 - #5 vert.	18" Sleeve / 18" Embedment	30	16	4 - #4 cont.	#3 at 11" o.c.
6"	18,769	10,000	18	72	6 - #5 vert.	18" Sleeve / 18" Embedment	28	18	4 - #4 cont.	#3 at 9" o.c.
8"	36,246	10,000	16	72	6 - #5 vert.	18" Sleeve / 18" Embedment	30	16	4 - #4 cont.	#3 at 11" o.c.
8"	36,246	10,000	18	72	6 - #5 vert.	18" Sleeve / 18" Embedment	28	18	4 - #4 cont.	#3 at 9" o.c.

Design and Construction Notes:

- Two (2) bollard array required to meet AASHTO section 2.7. Minimum of 2 bollards shall engage the vehicle in a vehicle barrier design. Maximum bollard spacing at 3'-0" o.c.
- Allowable Foundation Pressure = 2,000 psf. Allowable Lateral Bearing = 150/psf. Assumed in-place soil: Sand, Silty Sand, Clayey Sand, Silty Gravel, or Clayey Gravel. For higher soil allowable design values, site soil investigation by a Registered Geotechnical Engineer is required.
- See supplemental concrete pier / beam details for additional information.
- Material Specifications: Concrete = 3,000 psi (28-day min.); Reinforcing ASTM A615 (60 ksi for all bars #5 and larger/ 40 ksi for all bars #4 and smaller).
- Three (3) bollard array required to meet AASHTO section 2.7. Minimum of 3 bollards shall engage the vehicle in a vehicle barrier design. Maximum bollard spacing at 2'-0" o.c.
- For continuous footing option, maximum single bollard spacing at 4'-0" o.c.

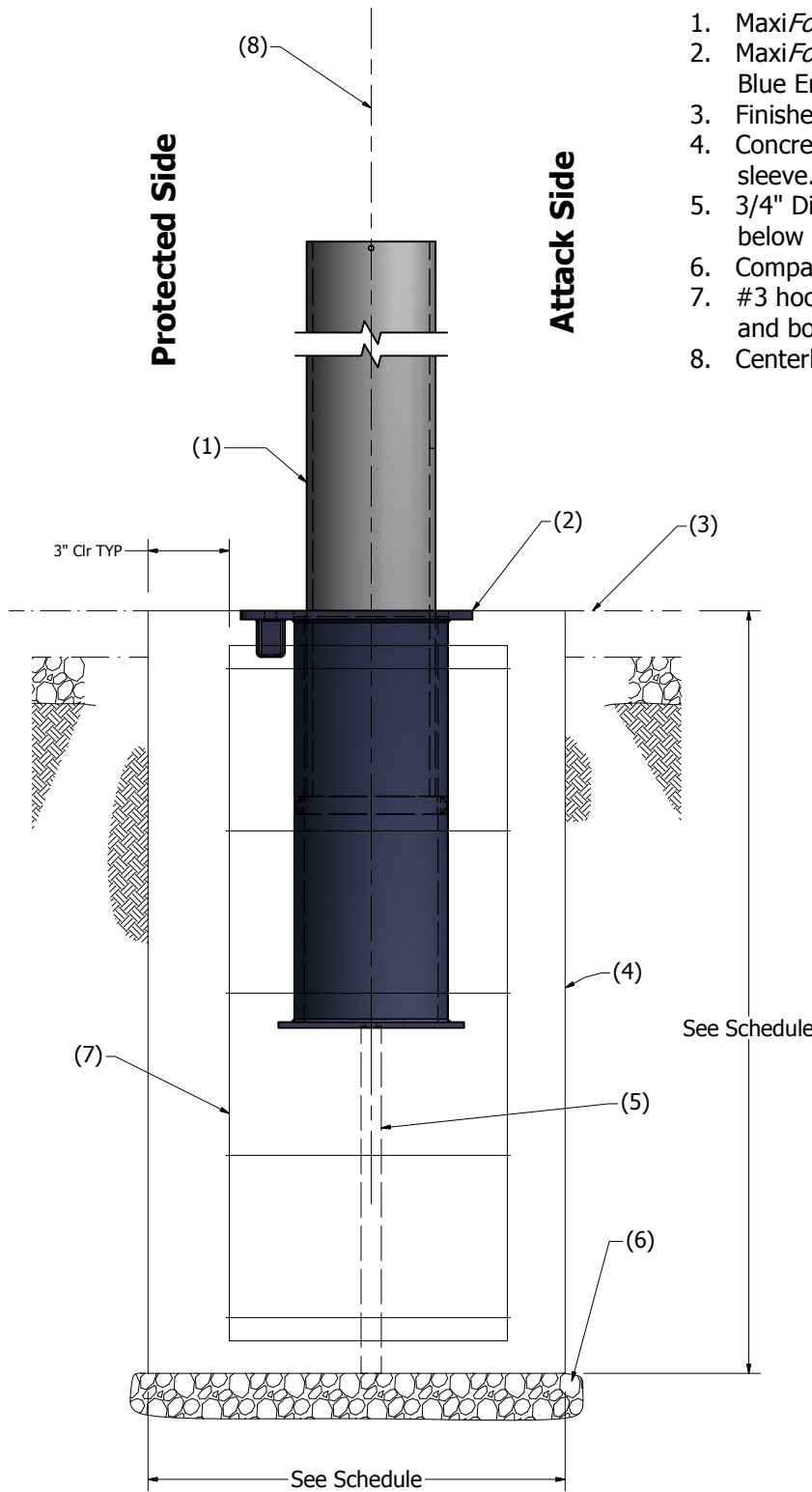
Drawing Rev. 1	Created 11/1/2010
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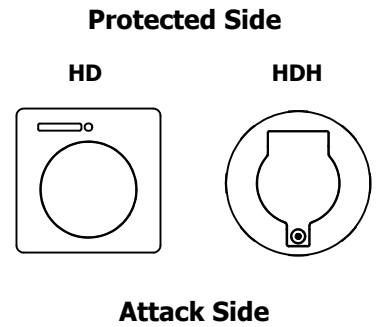
Model	HD/HDH & MFR Inst Sched (AASHTO 2.7)		
Size	File Name	Scale	Sheet
C	HD_HDH & MFR Inst Sched (AASHTO)	NA	DO NOT SCALE DRAWING Sheet 1 Of 1


Engineered Anchorage System for the MaxiForce™ HD and HDH Base Circular Concrete Pier Footing



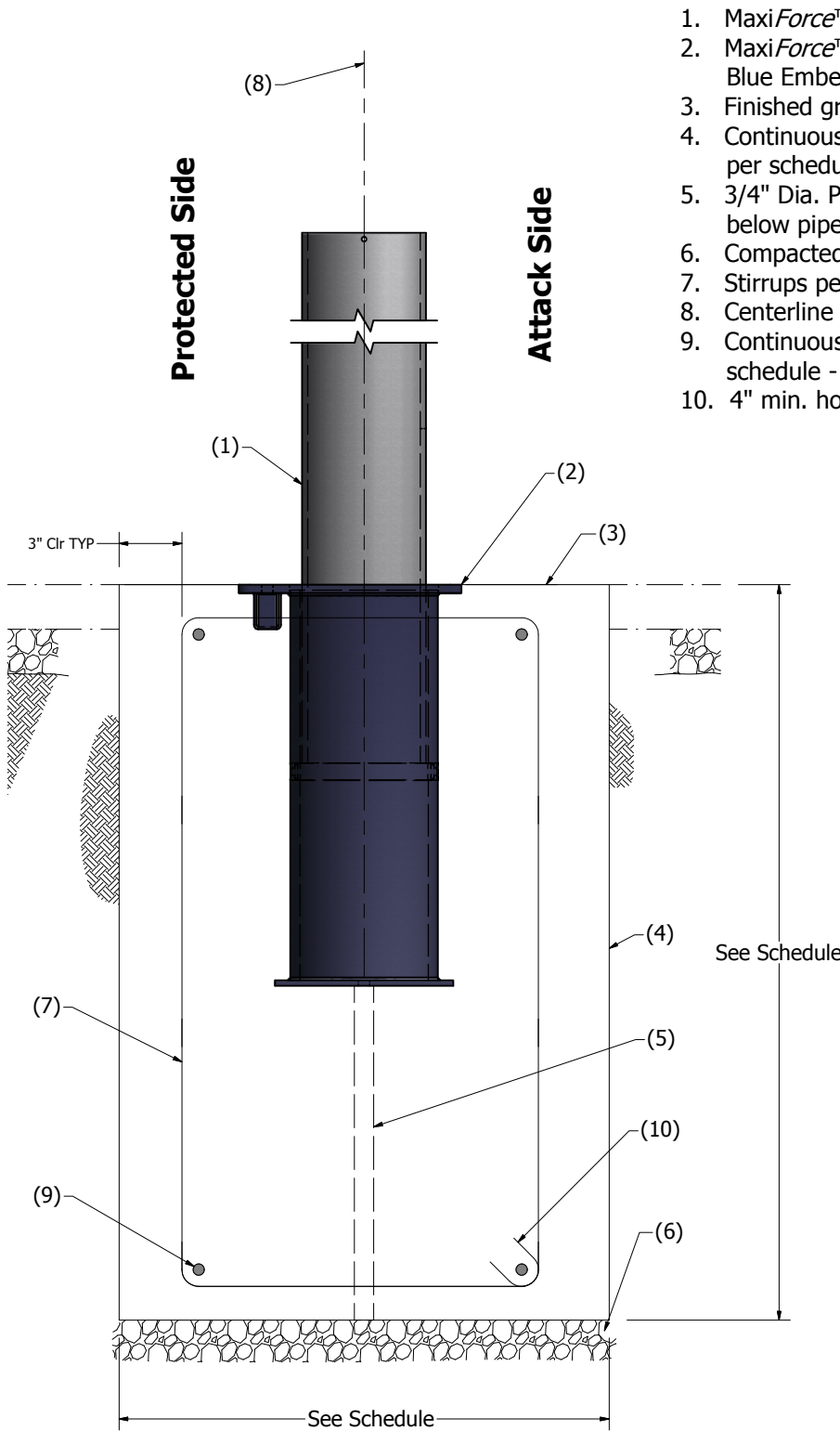
1. MaxiForce™ Steel pipe bollard per specification.
2. MaxiForce™ HD or HDH Base assembly per Blue Ember Technologies.
3. Finished grade or pavement.
4. Concrete base pier per schedule at each pipe sleeve.
5. 3/4" Dia. PVC pipe as needed for drainage below pipe sleeve.
6. Compacted gravel bed (3" minimum).
7. #3 hoop ties at 12" O.C. and 2 - #3 ties at top and bottom of concrete pier.
8. Centerline of bollard and concrete base pier.

Installation Orientation



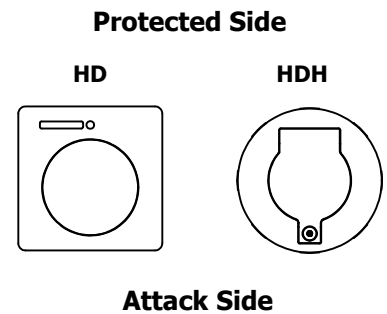
Drawing Rev. 1	Created 11/1/2010	 MaxiForce™ Traffic Control Bollards 7560 Main Street Sykesville, MD 21784 410-552-9888 (phone) - 410-552-9939 (fax) www.maxiforcebollards.com - sales@maxiforcebollards.com			
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Model HD/HDH Base Pier Footing		File Name HD_HDH Base Pier Footing	Scale NA	DO NOT SCALE DRAWING	Sheet 1 Of 1


Engineered Anchorage System for the MaxiForce™ HD and HDH Base Continuous Concrete Beam Footing



1. MaxiForce™ Steel pipe bollard per specification.
2. MaxiForce™ HD or HDH Base assembly per Blue Ember Technologies.
3. Finished grade or pavement.
4. Continuous concrete grade beam per schedule.
5. 3/4" Dia. PVC pipe as needed for drainage below pipe sleeve.
6. Compacted gravel bed (3" minimum).
7. Stirrups per schedule.
8. Centerline of bollard and concrete grade beam.
9. Continuous longitudinal reinforcement per schedule - lap splice 32" min. for #4 rebars.
10. 4" min. hooks with 135 degree bend - TYP. UNO.

Installation Orientation



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Model HD/HDH Base Beam Footing		Size C	File Name HD_HDH Base Beam Footing	Scale NA	DO NOT SCALE DRAWING
				Sheet 1	Of 1