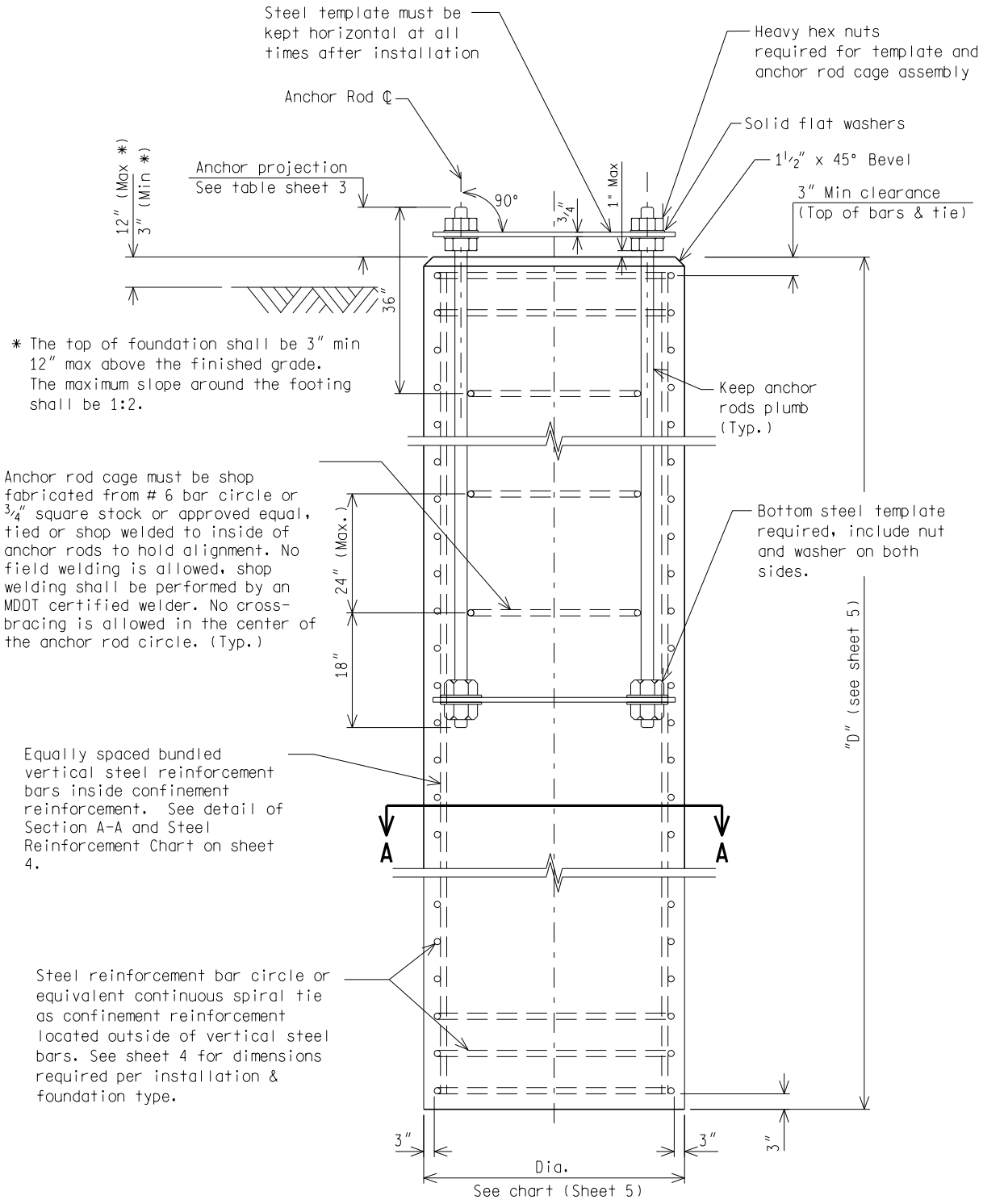
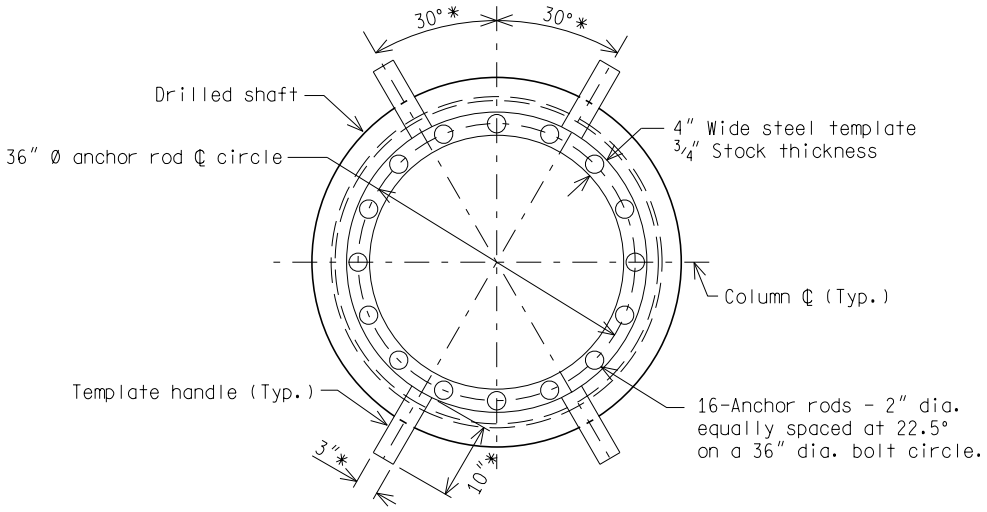


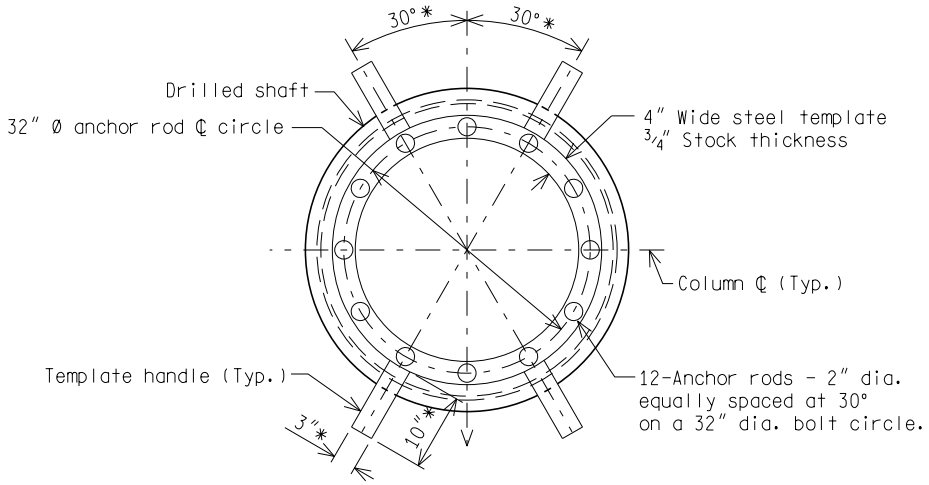
ELEVATION

MDOT Michigan Department of Transportation PREPARED BY ANCILLARY STRUCTURES DRAWN BY: HNTB CHECKED BY: MLO	DEPARTMENT DIRECTOR Bradley C. Wieferich, P.E. APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	MICHIGAN DEPARTMENT OF TRANSPORTATION DRILLED SHAFT FOUNDATION FOR CANTILEVER TYPE J (SPECIAL DETAIL) F.H.W.A. APPROVAL | 05/21/24 PLAN DATE | SIGN-350-C | SHEET 1 OF 6



PLAN VIEW 1.

(For use with 35 ft and 40 ft cantilever arms)
* Or as required by the engineer.

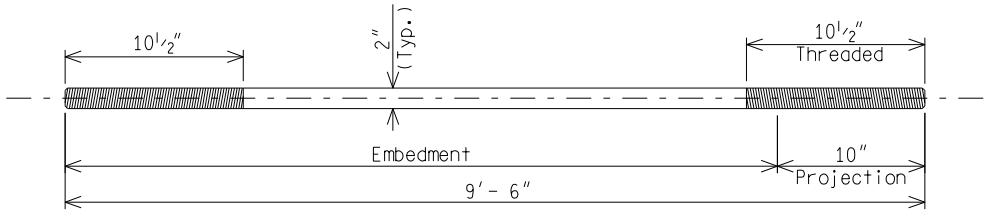


PLAN VIEW 2.

(For use with 20 ft through 30 ft cantilever arms or
with 35 ft and 40 ft cantilever arms with
reduced sign area (see chart on sheet 5).
* Or as required by the engineer.

DRILLED SHAFT FOR TYPE J CANTILEVERS

NOT TO SCALE



ANCHOR ROD DETAIL

16 Anchors required for 30ft-40ft cantilever arms, 12 Anchors required for 20ft-30ft cantilever arms. Provide 4 nuts and 4 washers per anchor rod.

NOTES:

1. Steel reinforcement shall be per section 905 of the MDOT Standard Specifications for Construction, except anchor rod cage bar reinforcement welded to anchor rods and lap welded confinement reinforcement must meet the requirements of ASTM A706.

2. Anchor rods, nuts, and washers must be per section 908.14 of the MDOT Standard Specifications for Construction.

3. A template and anchor rod cage shall be shop fabricated and assembled.

4. Diameter of bolt holes in template shall be 1/16" larger than anchor rod diameter.

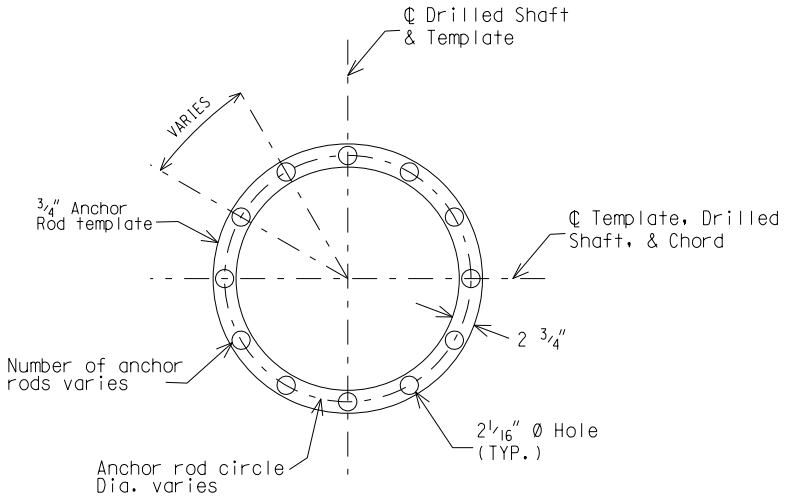
5. The template and handles must be well supported, horizontally level and firmly anchored in place a minimum of 24 hours after concrete placement is complete.

6. During concrete placement, avoid displacing the anchor rods. Concrete shall be in accordance with MDOT Standard Specifications for Construction subsections 810.03.N.1 and 706.03.H.

7. Hammering on the anchor rods or template will not be allowed.

8. After template is removed, thread nuts onto rod flush with the rod end to protect threads until sign support is erected.

9. Top and bottom anchor rod templates may be fabricated from multiple parts using CJP welds located a minimum of 2" clear of anchor rod holes.



BOTTOM ANCHOR ROD TEMPLATE DETAIL

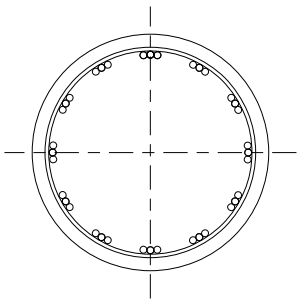
NOT TO SCALE

Steel Bar Reinforcement Chart						
Structure Type	Foundation Diameter (in)	Vertical Reinforcement		Confinement Reinforcment		
		Bar Size	Number of Bars	Bar Radius	Bar Size	Bar Spacing
Type J Cantilever	48	11	36	20 1/4"	6	5"
	60	11	63	26 1/4"	6	5"
	72	11	57	32 1/4"	6	6"

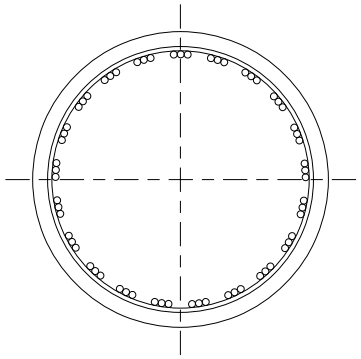
See sheet 5 for foundation information.

Provide a 3'-10" lap for # 6 bar circles or a 12" lap if bar circle lap is shop welded. Shop welding must be in accordance with AWSD1.4 by an MDOT certified welder.

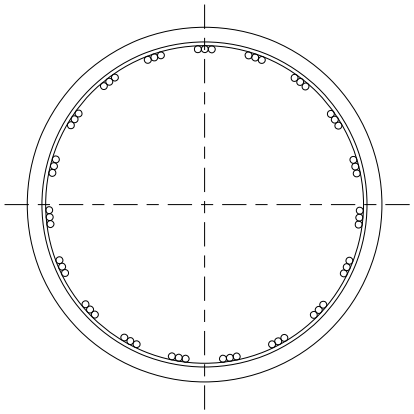
Vertical reinforcement bars must be bundled side by side, 3 bars per bundle, all in the same plane. Provide a 9'-2" lap, stagger the ends of the individual bar laps by the amount of the lap length within each bundle.



TYPE J CANTILEVER 48" DIAMETER

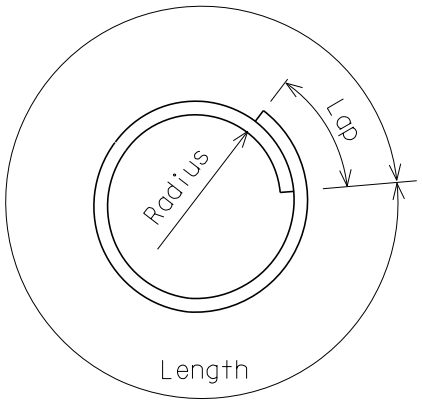


TYPE J CANTILEVER 60" DIAMETER

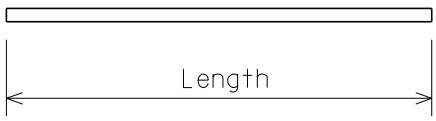


TYPE J CANTILEVER 72" DIAMETER

SECTION A-A
(SHEET 1)



CONFINEMENT REINFORCEMENT



VERTICAL REINFORCEMENT

REINFORCEMENT DETAILS

NOT TO SCALE

Cantilever Foundation Chart

Cantilever Type	Soil Type	Soil Condition		Diameter (in)**	Depth "D" (ft)	Concrete (cyd)
		Su	N60			
J	Low Sand	-	5 < N60 < 10	48*	37	17.3
	Med Sand	-	10 ≤ N60 < 20		33	15.4
	High Sand	-	N60 ≥ 20		31	14.5
	Low Clay	400 < Su < 1000	-		52	24.3
	Med Clay	1000 ≤ Su < 2000	-		31	14.5
	High Clay	Su ≥ 2000	-		27	12.6
	Low Sand	-	5 < N60 < 10	60	45	32.8
	Med Sand	-	10 ≤ N60 < 20		38	27.7
	High Sand	-	N60 ≥ 20		38	27.7
	Low Clay	400 < Su < 1000	-	72	49	51.4
	Med Clay	1000 ≤ Su < 2000	-		35	36.7
	High Clay	Su ≥ 2000	-		31	32.5

A site specific foundation design is required if the maximum sign area for the specified arm length exceeds that shown in the graph below.

Su = Undrained shear strength of cohesive soils (lbs/ft2)

N60 = SPT blow count corrected for hammer efficiency (blows/ft)
(ASTM Testing Procedure D1586)

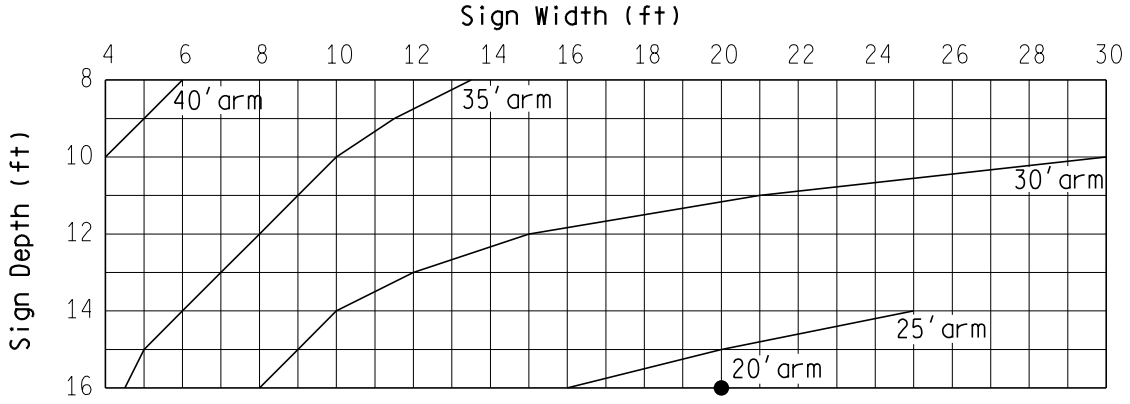
* Use of 48"Ø drilled shaft foundation is for arm lengths with sign dimensions as shown in the graph below.

** Shaft diameter is for concrete if uncased. If casing is used, O.D. shall be at least equal to the shaft diameter.

NOTE:

If soils with spt N60-values greater than 50 bpf dominate the lower $^1/_2$, or more, of a drilled shaft, or if rock sockets for the drilled shafts are required, then a detailed site specific design for the drilled shaft foundation is required.

MAXIMUM SIGN DIMENSIONS - TYPE J CANTILEVER FOR 48" DIA. DRILLED SHAFT FOUNDATION



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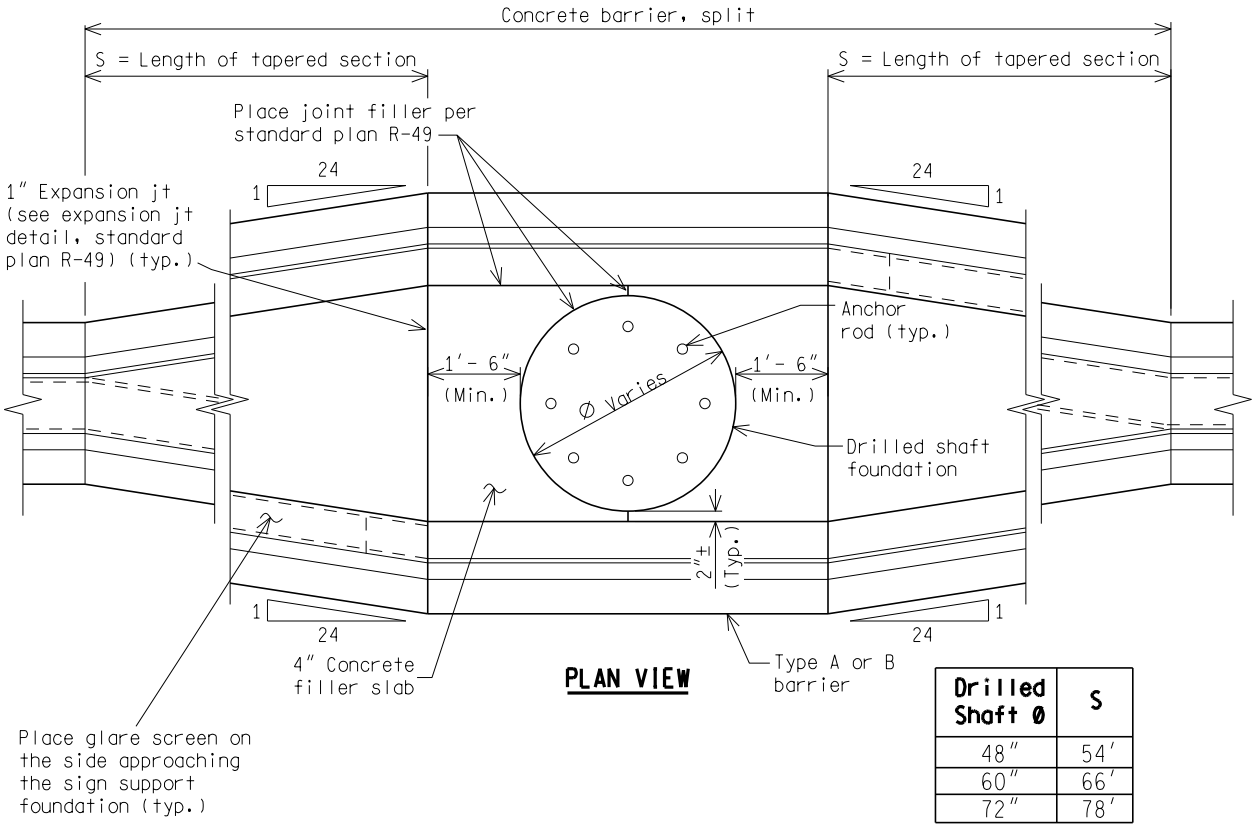
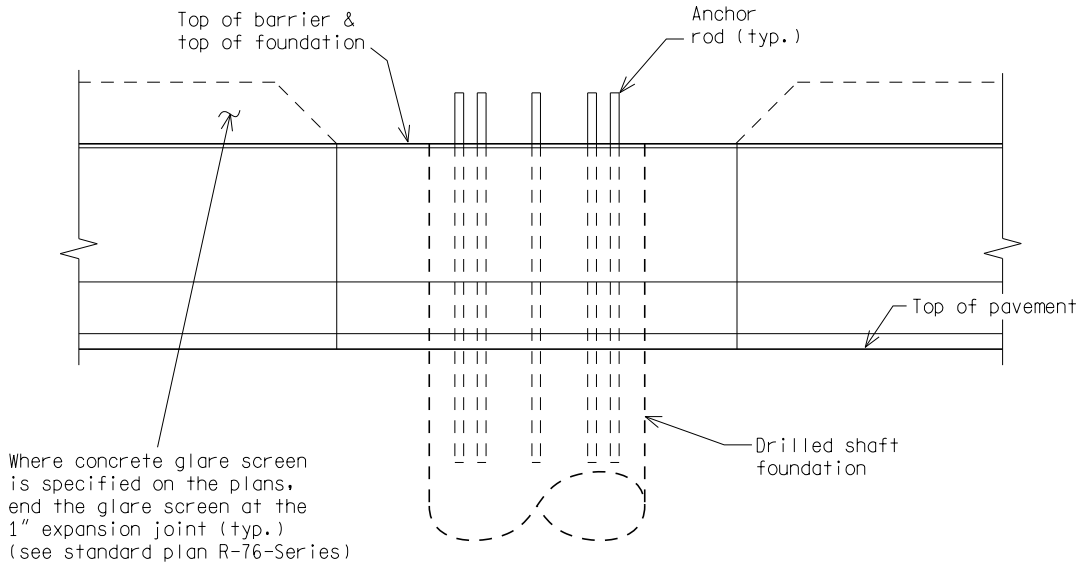


PLAN VIEW

Drilled Shaft Ø	S
48"	54'
60"	66'
72"	78'



ELEVATION

MEDIAN BARRIER FOUNDATION DETAILS

NOTE:

When the foundation is located within the median barrier, use standard plan R-49-Series. Increase the foundation depth by the height of the barrier (not including the height of the glare screen, if present) and locate the top of foundation at the top of barrier. Provide a parallel barrier section along the drilled shaft foundation.

Specific details vary depending on the use of Type A or Type B barrier. For barrier details not shown see standard plan R-49.

NOT TO SCALE