

**108-inch Diameter Maintenance Hole Section**

Base Section Type	Depth (ft) (Invert to street grade)	Tw = 9.0"			Tw = 10.0"			Tw = 10.75"		
		outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)
TYPE 1	0 - 15	0.28	0.19	0.38	0.25	0.17	0.34	0.23	0.15	0.31
	15 - 30	0.47	0.30	0.89	0.41	0.33	0.77	0.37	0.32	0.70
TYPE 2	0 - 15	0.30	0.19	0.43	0.28	0.17	0.38	0.26	0.15	0.35
	15 - 30	0.52	0.30	1.00	0.45	0.33	0.86	0.42	0.32	0.78

"C" Bars - 2 No 6 hoops 2" clear of top of Maintenance Hole barrel section. } Required for less than 2'-0" clearance between  
2 No 4 hoops 2" clear over pipe blockouts } blockout and top of full thickness wall.

**120-inch Diameter Maintenance Hole Section**

Base Section Type	Depth (ft) (Invert to street grade)	Tw = 10.0"			Tw = 11.0"			Tw = 11.75"		
		outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)
TYPE 1	0 - 15	0.31	0.21	0.42	0.28	0.18	0.38	0.26	0.17	0.35
	15 - 30	0.53	0.33	1.02	0.47	0.37	0.90	0.43	0.36	0.82
TYPE 2	0 - 15	0.33	0.21	0.50	0.33	0.18	0.45	0.30	0.17	0.42
	15 - 30	0.57	0.33	1.12	0.50	0.37	1.00	0.47	0.36	0.90

"C" Bars - 2 No 7 hoops 2" clear of top of Maintenance Hole barrel section. } Required for less than 2'-0" clearance between  
2 No 4 hoops 2" clear over pipe blockouts } blockout and top of full thickness wall.

**132-inch Diameter Maintenance Hole Section**

Base Section Type	Depth (ft) (Invert to street grade)	Tw = 11.0"			Tw = 12.0"			Tw = 12.75"		
		outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)
TYPE 1	0 - 15	0.34	0.22	0.46	0.31	0.20	0.42	0.28	0.19	0.39
	15 - 30	0.58	0.37	1.15	0.52	0.40	1.02	0.48	0.40	0.94
TYPE 2	0 - 15	0.37	0.22	0.55	0.36	0.20	0.50	0.33	0.19	0.46
	15 - 30	0.62	0.37	1.24	0.57	0.40	1.09	0.51	0.40	1.01

"C" Bars - 2 No 7 hoops 2" clear of top of Maintenance Hole barrel section. } Required for less than 2'-0" clearance between  
2 No 4 hoops 2" clear over pipe blockouts } blockout and top of full thickness wall.

**144-inch Diameter Maintenance Hole Section**

Base Section Type	Depth (ft) (Invert to street grade)	Tw = 12.0"			Tw = 13.0"			Tw = 13.75"		
		outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)	outside (in <sup>2</sup> /ft)	inside (in <sup>2</sup> /ft)	centered (in <sup>2</sup> /ft)
TYPE 1	0 - 15	0.36	0.23	0.50	0.33	0.21	0.45	0.31	0.20	0.43
	15 - 30	0.63	0.40	1.27	0.57	0.44	1.13	0.54	0.43	1.05
TYPE 2	0 - 15	0.40	0.23	0.60	0.39	0.21	0.55	0.37	0.20	0.52
	15 - 30	0.68	0.40	1.39	0.62	0.44	1.24	0.58	0.43	1.15

"C" Bars - 2 No 8 hoops 2" clear of top of Maintenance Hole barrel section. } Required for less than 2'-0" clearance between  
2 No 4 hoops 2" clear over pipe blockouts } blockout and top of full thickness wall.

**NOTES:**

- Areas are in in<sup>2</sup>/ft of circumference and may be welded wire fabric, bars or a combination of both.
- Provide minimum longitudinal reinforcement, as shown, 1 inch clear of inside and outside faces, or at center of wall.
- Maximum longitudinal bar spacing is 12 inches center-to-center.
- Each "C" bar may be substituted with a 1/2" low-relaxation 7-wire prestressing strand, 15" minimum lap length, staggered.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user.

Manufacturing Standards for Precast Concrete Products

Appendix A

**Large Precast Conc. Maintenance Hole - Longitudinal Section Reinforcement**



Bureau of Environmental Services  
CITY OF PORTLAND, OREGON

Chief Engineer

Calc. Book No.  
001

Effective Date  
01-01-09

Standard Drawing No.

**P-147**