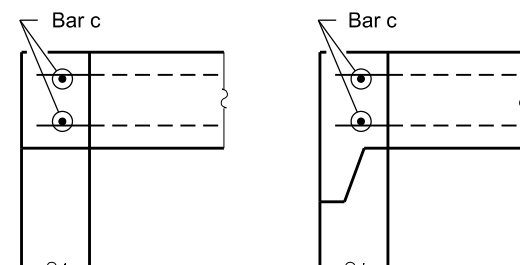
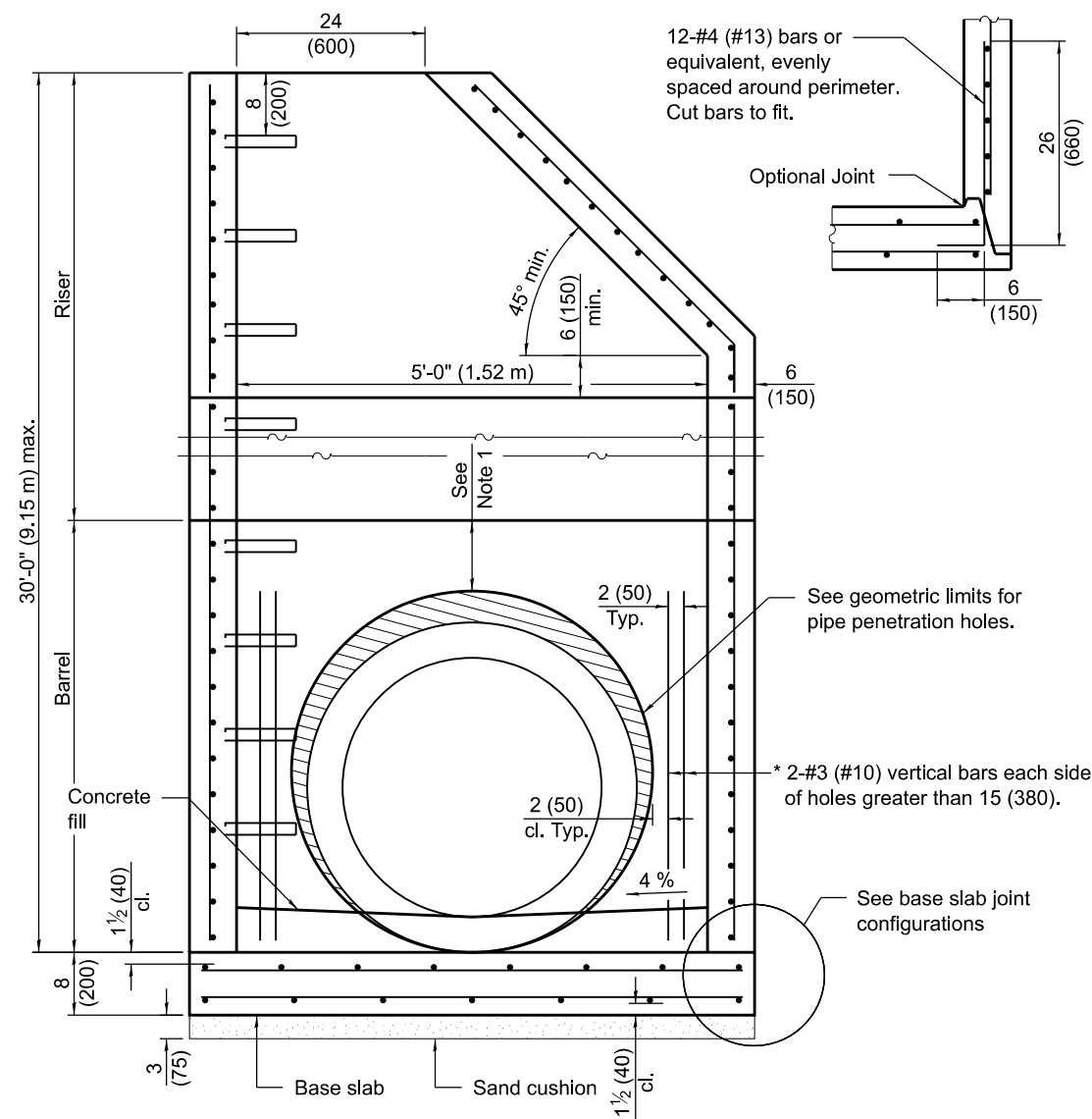


**SECTION PARALLEL TO PIPE**  
(Without conical top riser)



**FLAT SLAB TOP JOINT CONFIGURATIONS**  
(Shown at access hole)

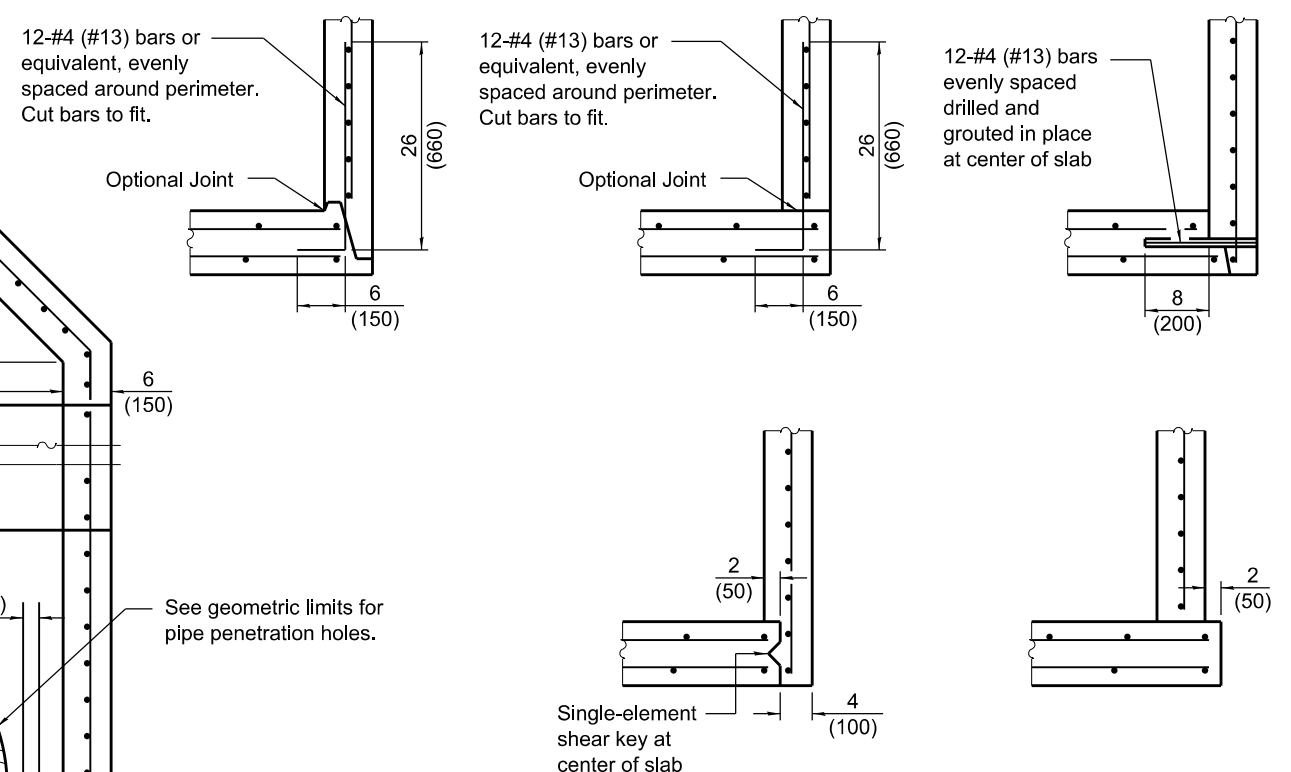


**SECTION PERPENDICULAR TO PIPE**  
(With conical top riser)

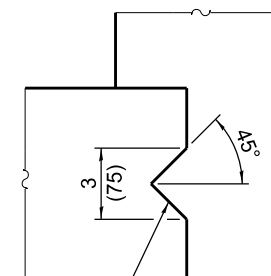
\* As an alternate, the barrel wall reinforcement may be reduced to riser wall reinforcement with #3 (#10) bars placed around the pipe penetration holes as shown. This option may be utilized when the pipe penetration holes are formed as opposed to cored.

**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

- Note 1: A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 32 (810).
- Note 2: A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
- Note 3: A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
- Note 4: Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
- Note 5: The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
- Note 6: Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.



**BASE SLAB JOINT CONFIGURATIONS**



Single-element shear key at center of slab

**SHEAR KEY GEOMETRY**  
(Reinforcement not shown for clarity)

**GENERAL NOTES**

The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.

Lifting holes shall be located in the sections as per the manufacturer's recommendations.

See Standard 602701 for details of manhole steps.

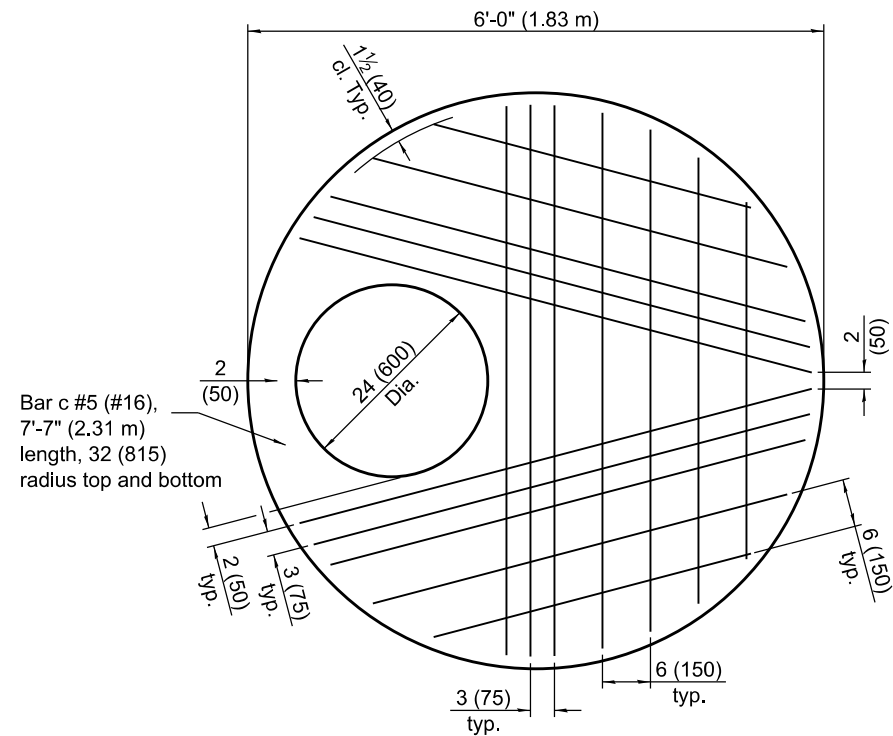
All dimensions are in inches (millimeters) unless otherwise noted.

DATE	REVISIONS
1-1-21	Revised Note 1 and lifting hole general note.
3-1-19	Moved wall reinforcement from inside face to middle.

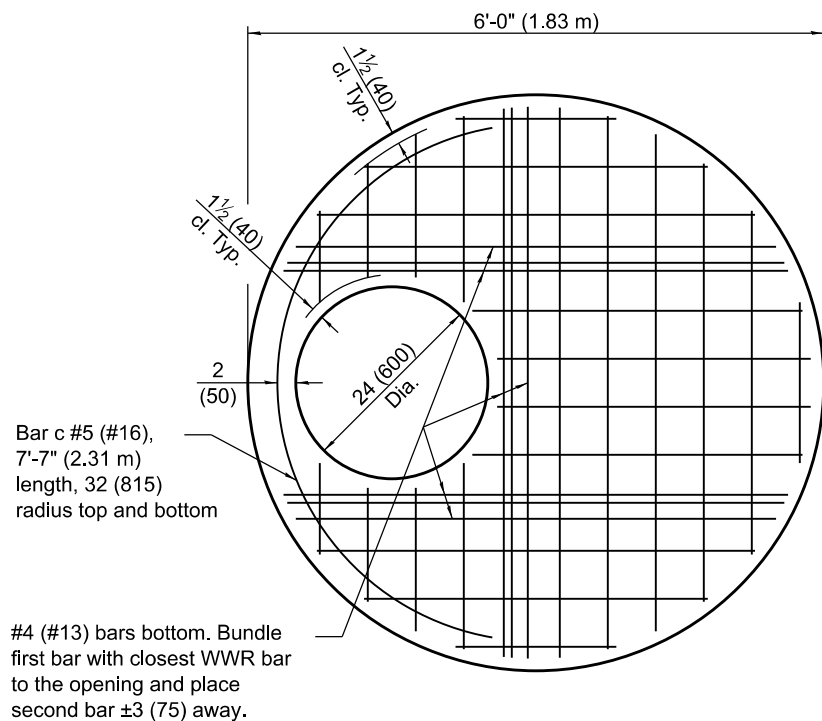
**PRECAST MANHOLE TYPE A**  
**5' (1.52 m) DIAMETER**

(Sheet 1 of 2)

**STANDARD 602402-03**

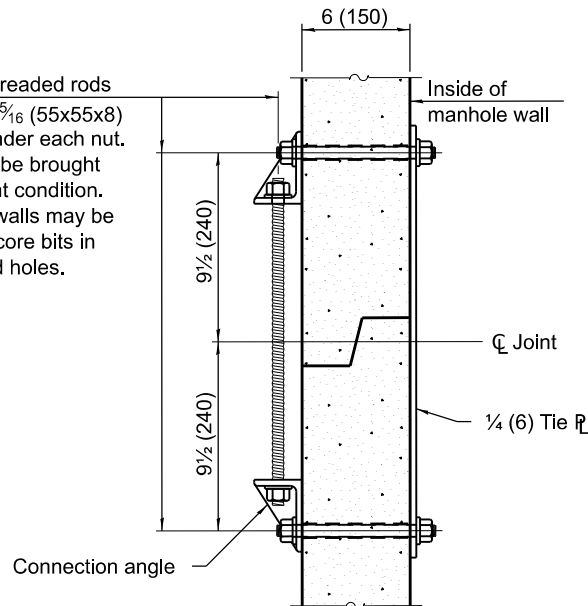


**PLAN - FLAT SLAB TOP**  
(Showing layout of bottom reinforcement bars and c bars)

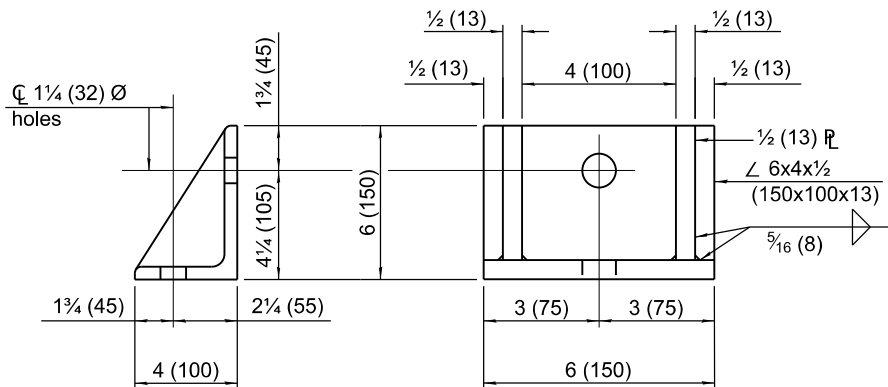


**PLAN - FLAT SLAB TOP**  
(Showing layout of welded wire reinforcement and c bars)

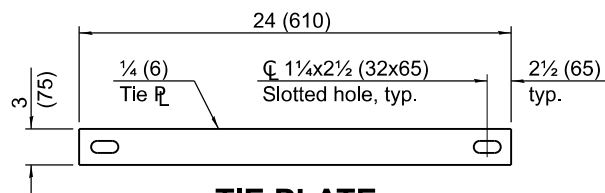
1 (25) Ø Threaded rods with 2 1/4 x 2 1/4 x 5/16 (55x55x8) washers under each nut. All nuts shall be brought to a snug tight condition. Holes in the walls may be drilled using core bits in lieu of formed holes.



**JOINT SPLICE**



**CONNECTION ANGLE**



**TIE PLATE**

## FLAT SLAB TOP REINFORCEMENT

Location	WWR (each direction)		Rebar (each direction except as noted)		
	A <sub>s</sub> (min.)	Spacing (max.)	A <sub>s</sub> (min.)	Spacing (max.)	Bar Size
Top Mat	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)	#3 or #4 (#10) (#13)
Bottom Mat	** 0.40 sq. in./ft. (847 sq. mm/m)	6 (150)	See plan view for rebar orientation and spacing and this table for bar size		

\*\* Only one layer of WWR permitted to avoid congestion.

## WALL REINFORCEMENT

Location	Orientation	WWR or Rebar	
		A <sub>s</sub> (min.)	Spacing (max.)
Riser	Circumferential	0.15 sq. in./ft. (318 sq. mm/m)	6 (150)
	Vertical	0.045 sq. in./ft. (95 sq. mm/m)	8 (200)
Barrel	Circumferential	0.15 sq. in./ft. (318 sq. mm/m)	6 (150)
	Vertical	0.16 sq. in./ft. (339 sq. mm/m)	4 (100)

## BASE SLAB REINFORCEMENT

Location	Total Height	WWR or Rebar (each direction)	
		A <sub>s</sub> (min.)	Spacing (max.)
Top Mat	≤ 20 ft. (6.10 m)	0.24 sq. in./ft. (508 sq. mm/m)	10 (250)
	> 20 ft. (6.10 m)	0.28 sq. in./ft. (593 sq. mm/m)	8 (200)
Bottom Mat	All	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)

# PRECAST MANHOLE TYPE A 5' (1.52 m) DIAMETER

(Sheet 2 of 2)

STANDARD 602402-03