

METROPOLITAN UTILITIES DISTRICT	Construction Standard	No: 1.8.1
Prepared by: D.J. Satterfield	Precast Vault Installation - Water	Page: 1 of 12
Approved by: Jeff Schovanec		Supersedes: 10-19-11
		Effective: 5-19-15

GENERAL

This standard covers the procedures for the installation of 30", 48", 54" (adjustments only), 60" and 72" diameter precast concrete vaults over 4" and larger water valves, air taps, pipe access ports, pitot taps and other appurtenances requiring vaults.

PURPOSE

The purpose of a vault is to provide safe access for workers to a valve or other appurtenance for operation and maintenance. Any vault installation that does not provide safe access for persons or provide for proper operation and maintenance of the valve or appurtenance shall be corrected or reinstalled to meet the purpose of the vault within sound economic guidelines.

GUIDE TO THE USE OF PRECAST VAULTS

When vaults are not specifically called out on construction drawings, refer to Table 1 for vault sizing.

Table 1

Water Valves and Appurtenances	Vault Size
<i>Air Taps only (all sizes, includes pitometers, automatic air releases, automatic air reliefs, automatic air and vacuum reliefs, automatic vacuum reliefs, permanent pressure gauges, pressure sustaining valves and pipe access ports)</i>	48"
<i>Gate Valves, 4" – 14", with less than 7' of backfill above main</i>	CC Box
<i>Gate Valves, 4" – 14", with 7' or more of backfill above main</i>	48"
<i>Gate Valves, 4" – 14", in paving of major street or intersection (See Note 1)</i>	48" ⁽¹⁾
<i>Gate Valves, 4" – 14", with one air tap (See Note 1)</i>	48" ⁽¹⁾
<i>Check Valves, 4" thru 14"</i>	48"
<i>Gate Valves, 16" and larger</i>	48"
<i>Gate Valves, 16" and larger with one air tap</i>	60"
<i>Check Valves, 16" and larger</i>	60"
<i>Butterfly Valves, 18" and larger with vault installed over operator</i>	60"
<i>Gate Valves, any size with two air taps (See Note 2)</i>	60" ⁽²⁾
<i>Drain Connection Valves on 18" and larger mains</i>	48"
<i>Pressure Control Valves, 4" or larger</i>	60"

Note 1: If the top of the main is less than 7' below the ground surface and space requirements will not allow the installation of a 48" vault, a 30" vault may be used at the direction of the District Engineer. It is not permitted to use a 30" vault on a 4", 6" or 8" valve with an air tap.

Note 2: Minimum vault size is 60".

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Vaults shall be installed on the operator of all butterfly valves 18” and larger. Vaults shall be installed with a reinforced concrete floor that extends under the vault and the valve (see accompanying drawings plan and elevation details of vaults for butterfly valves).

Vaults for other appurtenances such as pipe access ports, blow off fittings, automatic air release valves, etc. shall be as called for on the construction drawings.

PLACEMENT – SETTING OF BASE SECTION

1. The vault base shall be placed so that the valve and/or air tap(s) can be operated from above ground and normal maintenance operations can be performed. The center of the valve operator shall be between 15” and 20” from the inside of the vault wall.
2. The base section of the vault shall be set at a depth so as to avoid the need for non-standard adjustments to bring the vault frame to final grade. Furthermore, the base section shall be set at a depth so that the first step of the vault is no more than 38” down from the top of the ring and cover.
3. The base section shall be set on undisturbed soil. If the soil has been disturbed it shall be compacted to provide a firm foundation for the precast vault.
4. Reinforced concrete footings shall be installed under the base section of vaults set above the bottom of large diameter ≥ 24 ” water mains per Construction Standard 1.8.3.
5. If the depth and/or location of the base section of a vault is such that construction of a reinforced concrete slab is unfeasible as determined by the Engineer, reinforced concrete footings shall be installed per Construction Standard 1.8.3.
6. If the stability of the ground below the base section is such that it cannot be reasonably compacted as determined by the Engineer, a reinforced concrete slab and/or footings shall be used under the base section per construction Standard 1.8.3.
7. When a concrete slab is used with a precast base section, there shall be a mortar joint between the slab and the base section. The slab shall be cleaned before placing the mortar joint.
8. The base section shall not bear on the pipe line at any point.
9. Where bases with pipe passes are specified, the pipe passes shall be blocked with expansion joint material. The expansion joint material shall be held in place with plastic adhesive tape prior to backfilling (see accompanying drawings).

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ASSEMBLING THE VAULT SECTIONS

1. Joints between the precast vault sections shall be sealed with approved joint sealer and all lift holes shall be grouted with cement grout.
2. The final section on 30" precast vaults shall be a 4" or 8" precast straight riser section. Where vertical clearance does not permit straight risers, a precast tapered riser section may be used as the final section (see accompanying drawings).
3. Vault sections shall be installed so that the steps in any given section line up, as nearly as possible, directly above the steps on the section below it. It may be necessary to skew the barrel and eccentric cone sections slightly to provide adequate access to the operating nut of the valve.
4. Unless otherwise specified in the construction drawings or directed by the District Engineer, 48" vaults shall be installed with eccentric cone sections.
5. When a flat top vault lid is used, only one 4" riser shall be used to obtain final proper grade.
6. No more than 12" of riser sections shall be used on a vault with an eccentric cone section.

SETTING OF CAST IRON FRAME AND COVER

1. The vault frame shall be installed in accordance with City of Omaha, Douglas County, Sarpy County, State of Nebraska or other governing authority's specifications when set in streets, roads and right-of-ways of the governing authority.
2. The following shall be conducted before "final setting" of the cast iron frame:
 - a. Check to see if the valve and/or air tap(s) are easily operated from the ground surface. The District's Water Distribution Division will install a key extension when the distance from the top of the operating nut to the top of the vault frame exceeds 6'-0". If a key extension will be installed, the vault shall be installed as to prevent binding of the extension and valve key against the vault.
 - b. Check to see that the top of the vault frame is at the level of the surrounding ground or paving or set to proposed grade.
 - c. Check to see that the frame and any riser sections are centered and inline to provide for a uniform opening.
 - d. Check to see that the vault is as safe as possible for a person to enter. The first step shall not be more than 38" below the top of the frame and the steps shall be below the frame and cover.

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- An approved joint sealer shall be placed between the frame and the top precast vault section.

If the frame is to match up with existing paving, a mortar joint can be built up to a maximum of 1". If between 1" and 3" of adjustment is required, a mixture of mortar and cement brick chips or a full layer of cement bricks shall be used to adjust the frame to the existing paving. Required adjustments 4" and greater shall be conducted with the proper precast straight riser section. Joint sealer shall be placed after adjustments are complete. See Fig 1.

- Vaults installed in the traveled portion of an unpaved street shall have a concrete collar per Construction Standard 1.8.5.

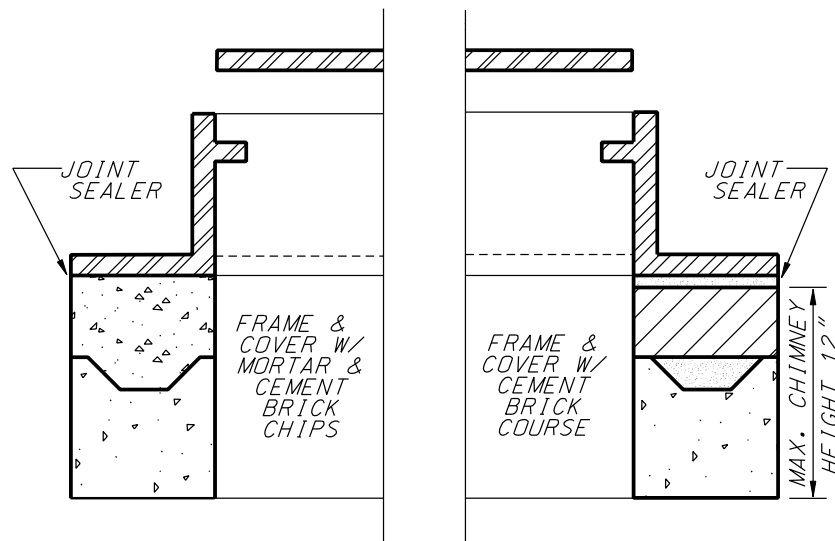
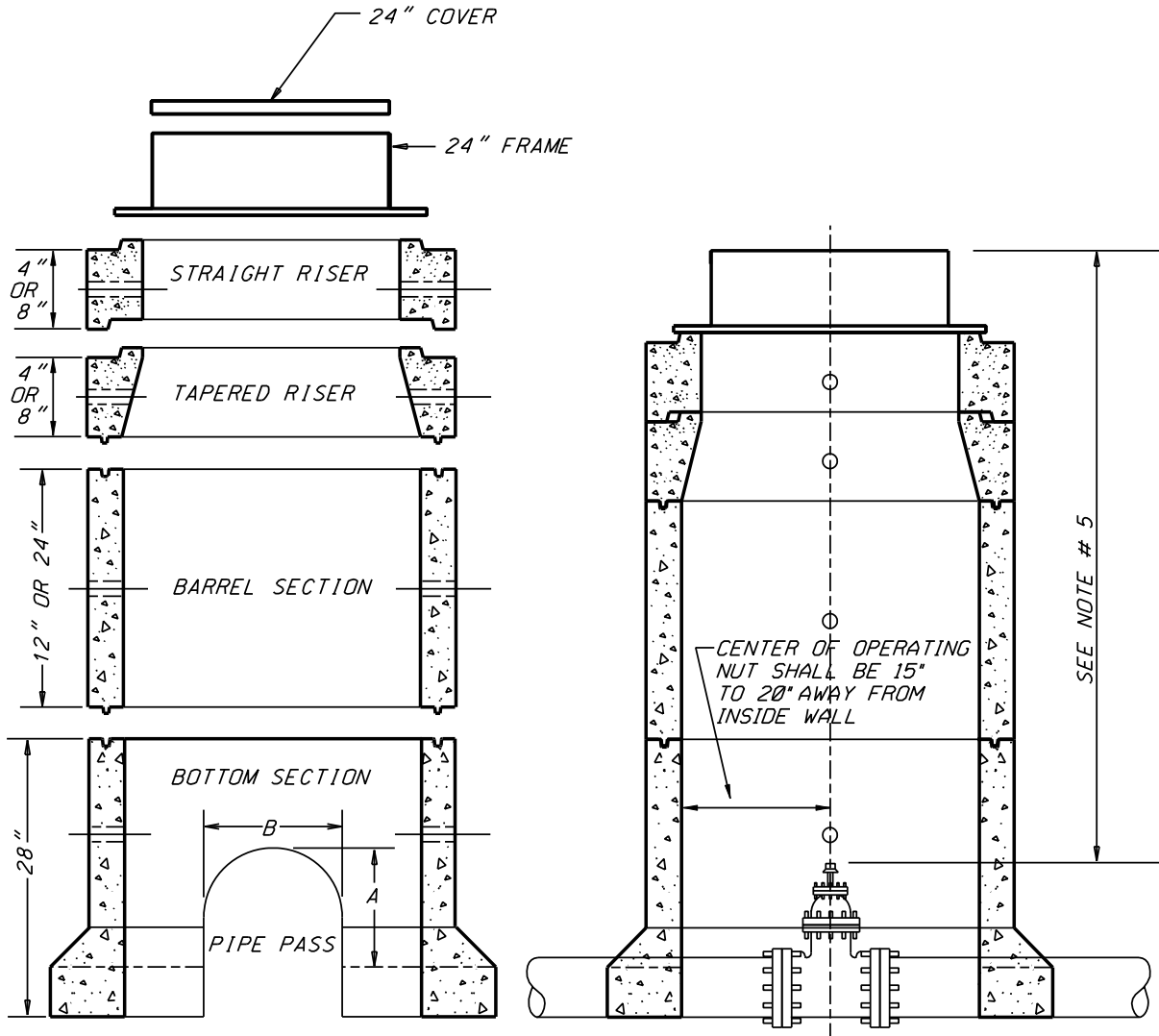


Fig 1
(Frame adjustment with mortar/bricks)

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30" VAULT



PIPE PASS REQUIRED				
BOTTOM SECTION SIZE	MAIN SIZE	PIPE PASS #	DIMENSION A	DIMENSION B
30" x 28"	4"-8"	1	12"	14"
	10"-12"	2	18"	20"

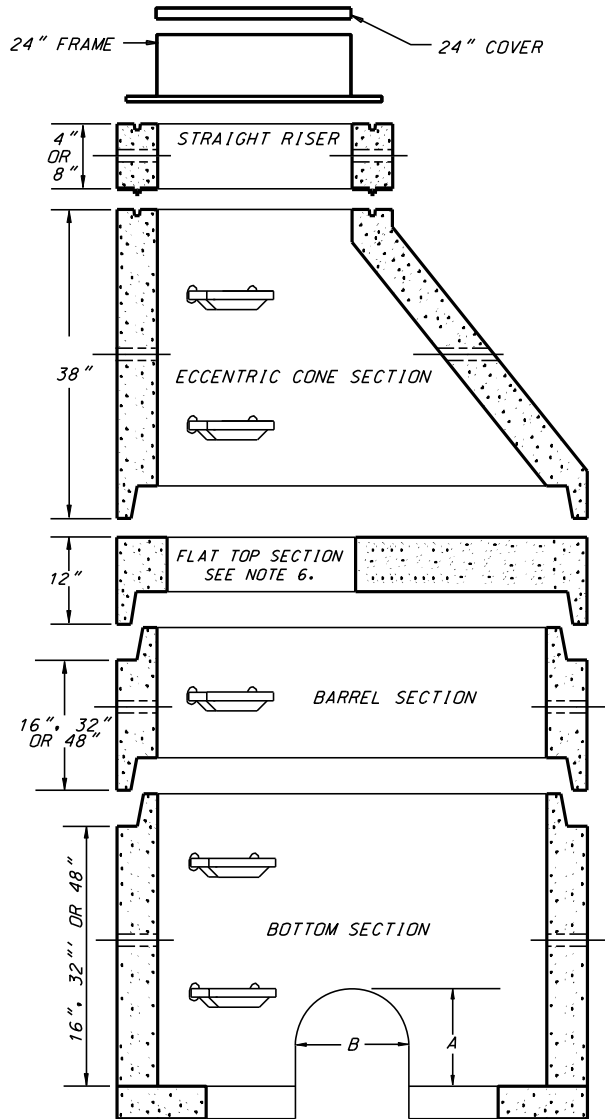
NOTES:

1. SEE CONST STAND 10.4.0 FOR WEIGHTS AND ITEM NUMBERS FOR PRECAST SECTIONS.
2. FILL ALL LIFT HOLES W/ CEMENT GROUT
3. SEAL ALL JOINTS WITH APPROVED JOINT SEAL (SEE MUD 119)
4. THE VALVE SHALL BE OPERATIONAL FROM ABOVE AND AT LEAST A PORTION OF THE STEPS SHALL BE VISIBLE THROUGH THE VAULT OPENING.
5. IF DEPTH OF VAULT IS 6' OR GREATER, PROVIDE LENGTH OF KEY EXTENSION TO WATER DISTRIBUTION SO THEY CAN HAVE EXTENSIONS MADE PRIOR TO CHLORINATION AND PRESSURE TESTING OF PROJECT.

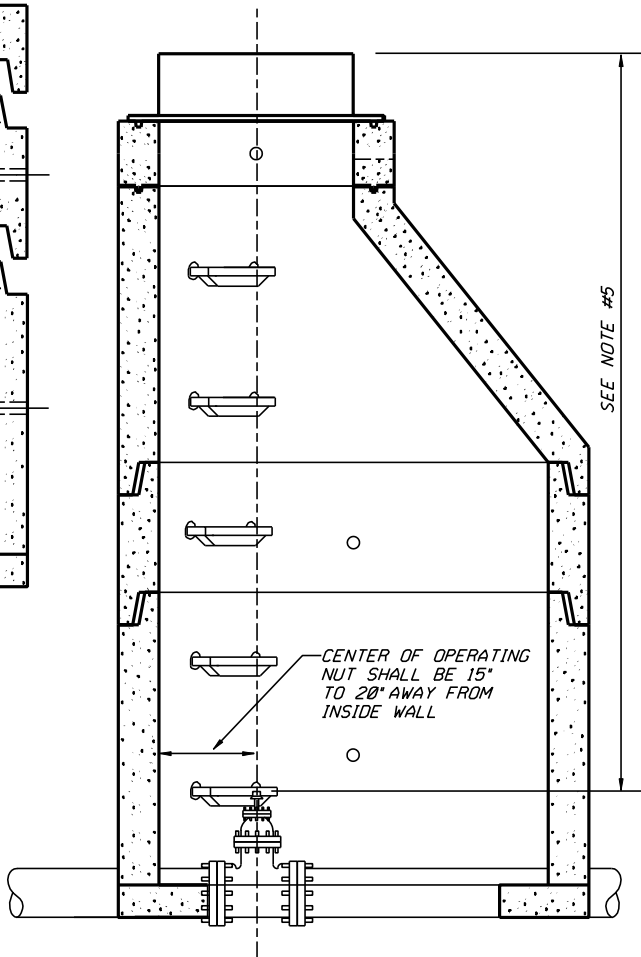
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48" VAULT

**



- NOTES:**
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 2. FILL ALL LIFT HOLES W/ CEMENT GROUT
 3. SEAL ALL JOINTS WITH APPROVED JOINT SEAL (SEE MUD 119)
 4. THE VALVE AND/OR AIR TAP SHALL BE OPERATIONAL FROM ABOVE AND AT LEAST A PORTION OF THE STEPS SHALL BE VISIBLE THROUGH THE VAULT OPENING.
 5. IF DEPTH OF VAULT IS 6' OR GREATER, PROVIDE LENGTH OF KEY EXTENSION TO WATER DISTRIBUTION SO THEY CAN HAVE EXTENSIONS MADE PRIOR TO CHLORINATION AND PRESSURE TESTING OF PROJECT.
 6. A FLAT TOP MAY ONLY BE INSTALLED IF SPECIFIED ON THE DRAWINGS OR IF DIRECTED BY THE ENGINEER.



PIPE PASS REQUIRED				
BOTTOM SECTION SIZE	MAIN SIZE	PIPE PASS #	DIMENSION A	DIMENSION B
48" x 16"	4"-8"	1	12"	14"
	4"-8"	1	12"	14"
48" x 32"	10"-12"	2	18"	20"
	14"-18"	3	25"	27"
48" x 48"	4"-8"	1	12"	14"

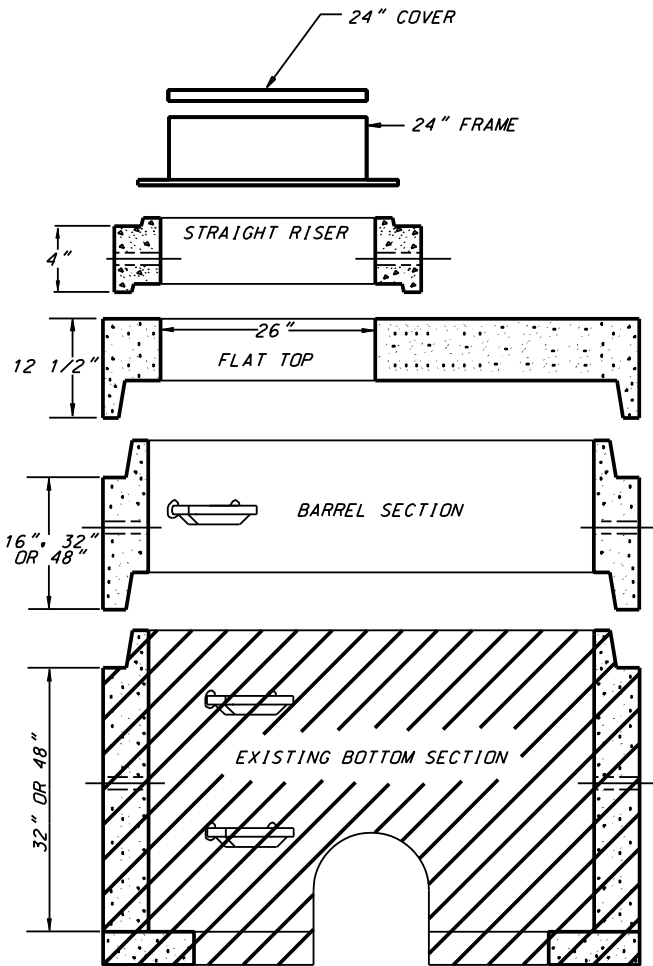
** Revised Drawing



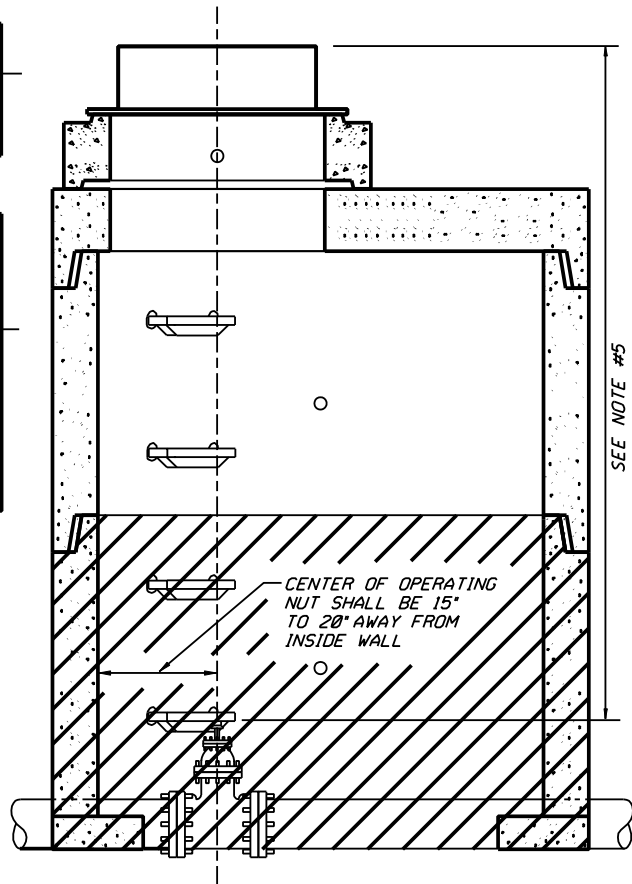
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54" VAULT

(FOR ADJUSTMENTS ONLY - DO NOT INSTALL NEW 54" VAULTS)

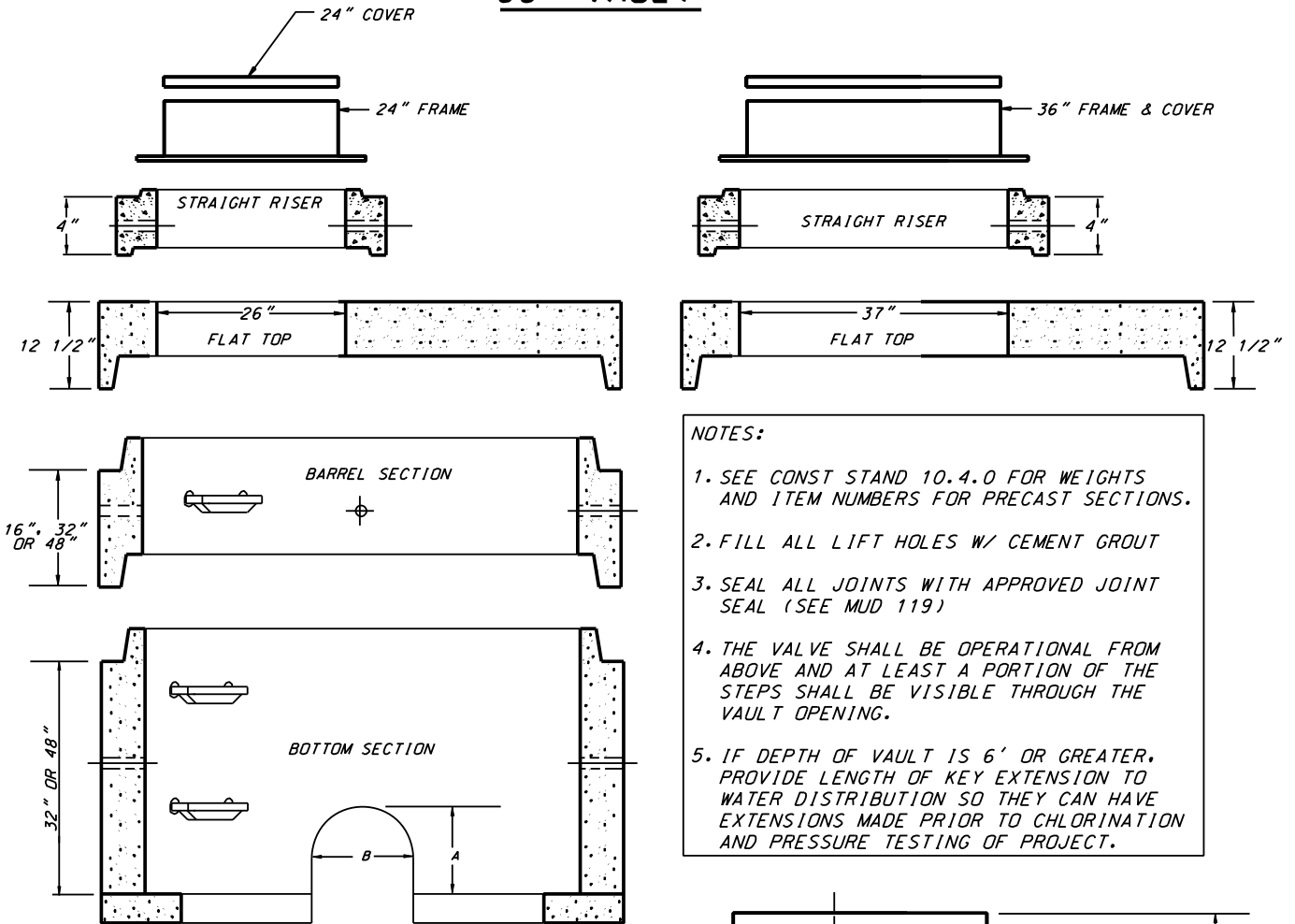


- NOTES:**
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 2. FILL ALL LIFT HOLES W/ CEMENT GROUT
 3. SEAL ALL JOINTS WITH APPROVED JOINT SEAL (SEE MUD 119)
 4. THE VALVE SHALL BE OPERATIONAL FROM ABOVE AND AT LEAST A PORTION OF THE STEPS SHALL BE VISIBLE THROUGH THE VAULT OPENING.
 5. IF DEPTH OF VAULT IS 6' OR GREATER, PROVIDE LENGTH OF KEY EXTENSION TO WATER DISTRIBUTION SO THEY CAN HAVE EXTENSIONS MADE PRIOR TO CHLORINATION AND PRESSURE TESTING OF PROJECT.

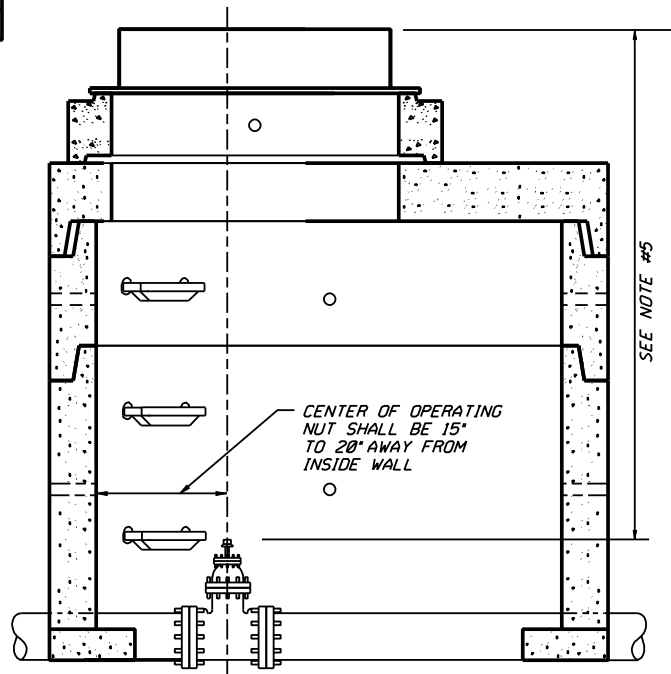


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60" VAULT

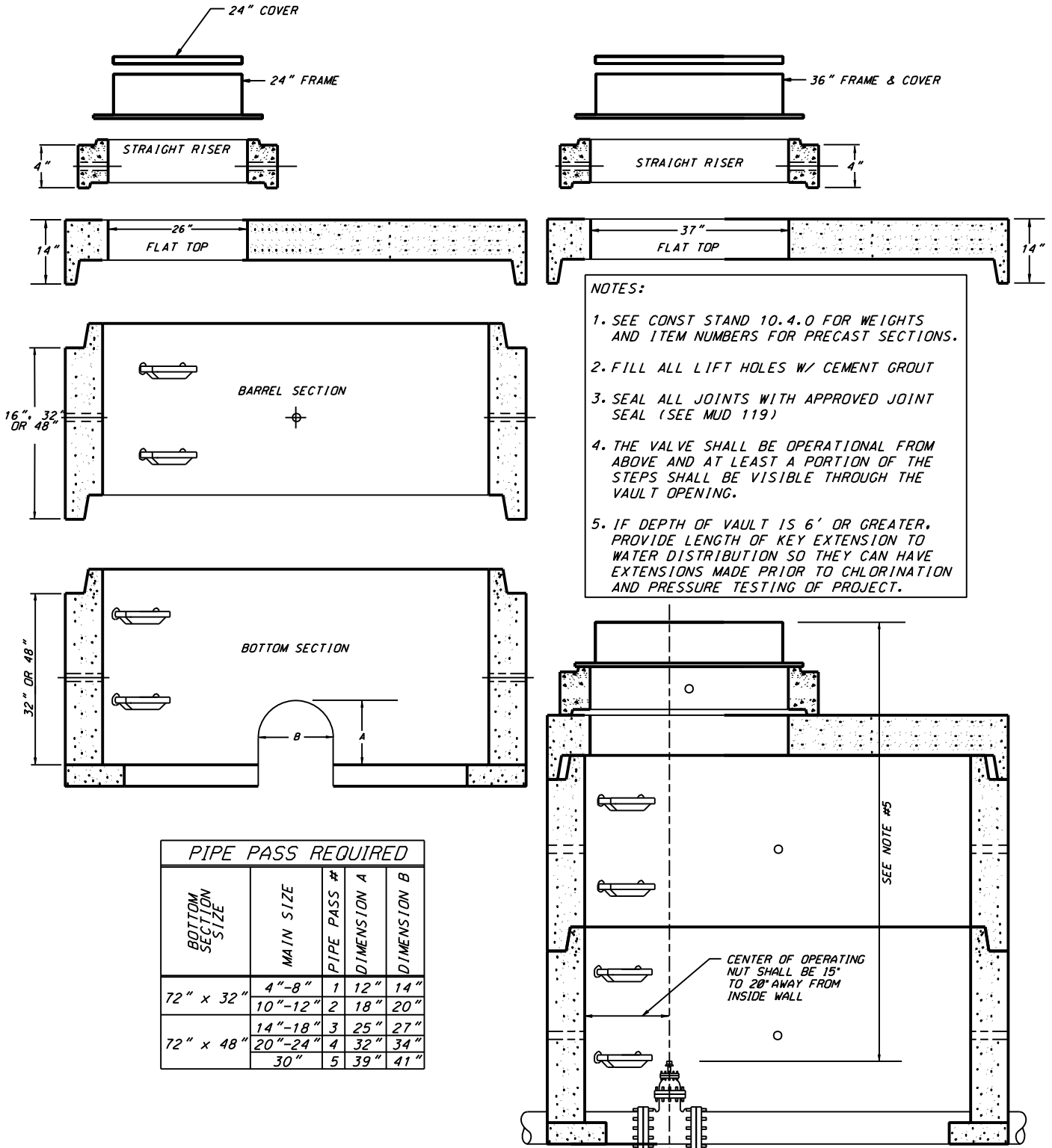


PIPE PASS REQUIRED				
BOTTOM SECTION SIZE	MAIN SIZE	PIPE PASS #	DIMENSION A	DIMENSION B
60" x 32"	4"-8"	1	12"	14"
	10"-12"	2	18"	20"
60" x 48"	14"-18"	3	25"	27"
	20"-24"	4	32"	34"
	30"	5	39"	41"



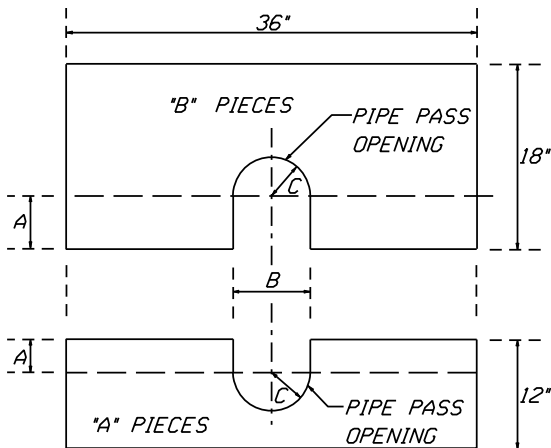
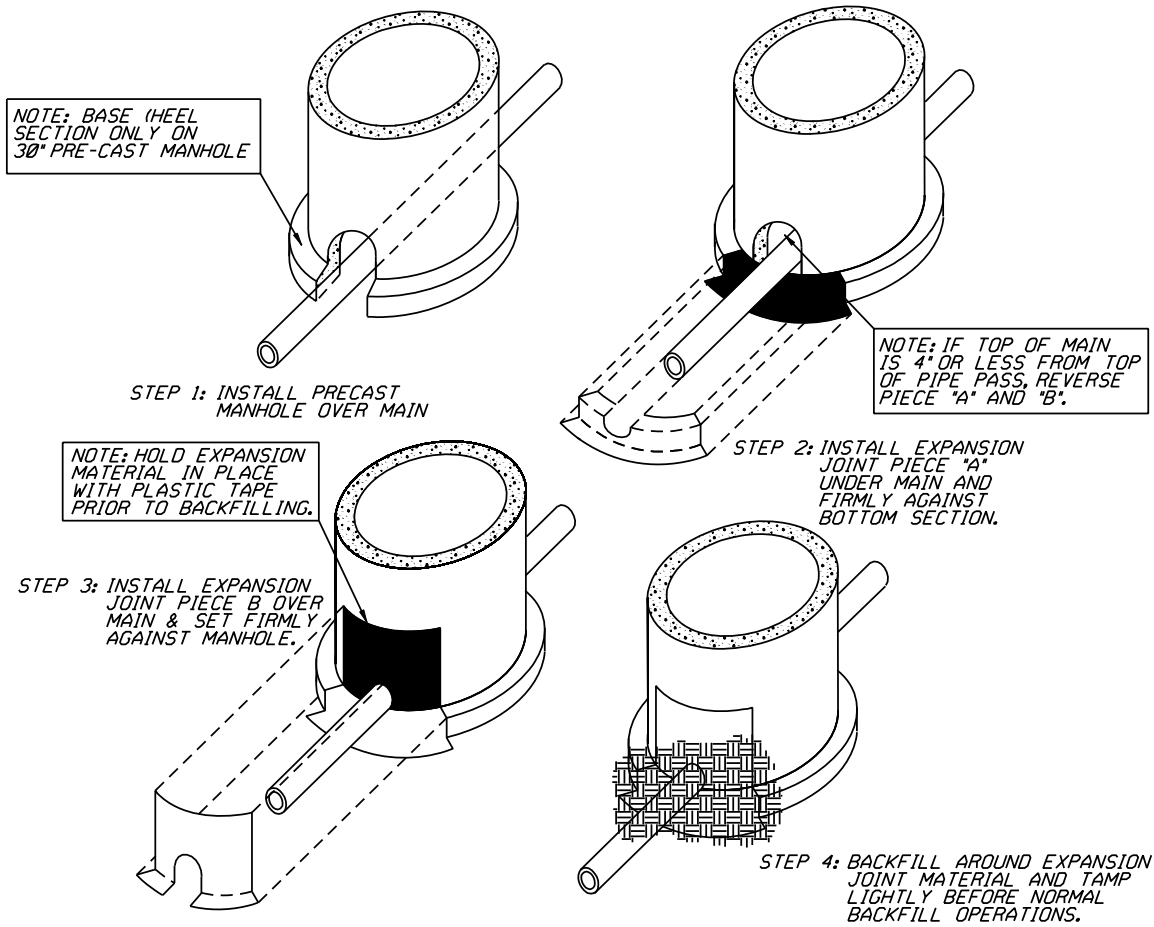
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72" VAULT



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BLOCKING PIPE PASSES WITH EXPANSION MATERIAL



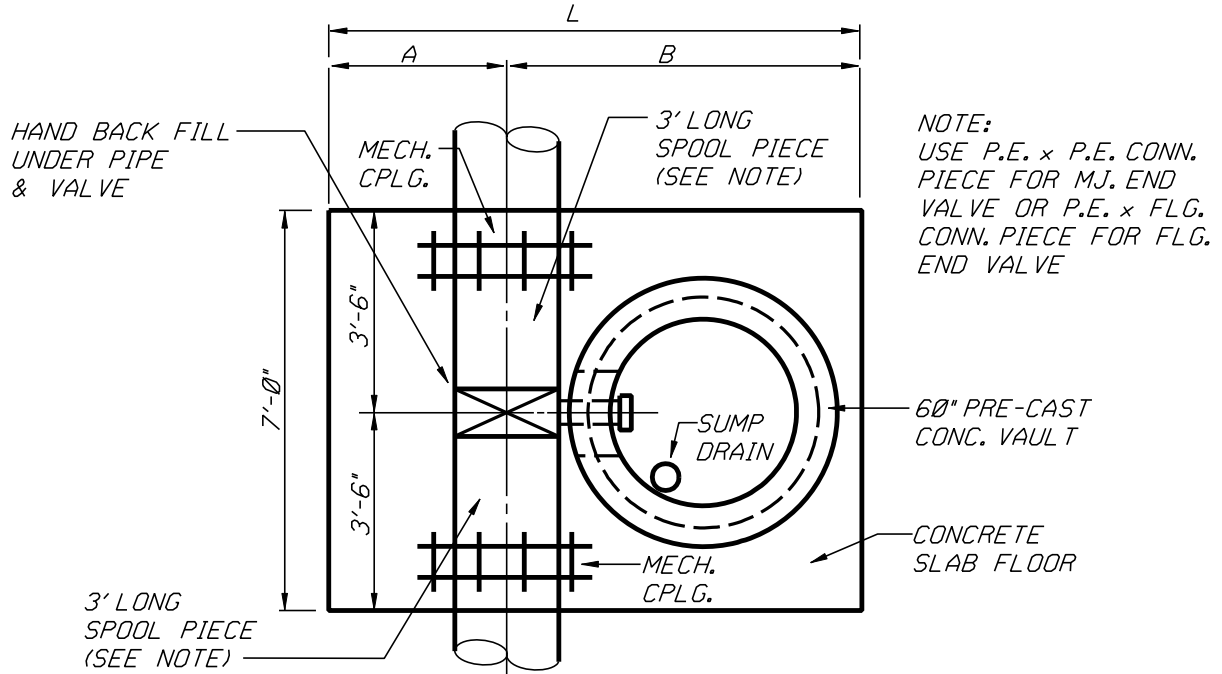
(REFERENCE MUD DWG 416216)

MATERIAL DESCRIPTION: 3/8" ASPHALT EXPANSION JOINT MATERIAL CONFORMING TO A.S.T.M. SPECIFICATION D-994-53					
PIECE NO.	OVERALL SIZE	DIMENSIONS			SAP #s
		A	B	C	
A-6	3/8" x 12" x 36"	2-1/2"	7"	3-1/2"	19-520-01
B-6	3/8" x 18" x 36"	4-1/2"	7"	3-1/2"	19-520-04
A-8	3/8" x 12" x 36"	2-1/2"	9-1/2"	4-3/4"	19-520-02
B-8	3/8" x 18" x 36"	4-1/2"	9-1/2"	4-3/4"	19-520-05
A-12	3/8" x 12" x 36"	2-1/2"	13-1/4"	6-5/8"	19-520-03
B-12	3/8" x 18" x 36"	4-1/2"	13-1/4"	6-5/8"	19-520-06

Note: The expansion joint material is used to keep as much mud and debris from entering the vault as possible and it is not intended to make the vault water-proof.

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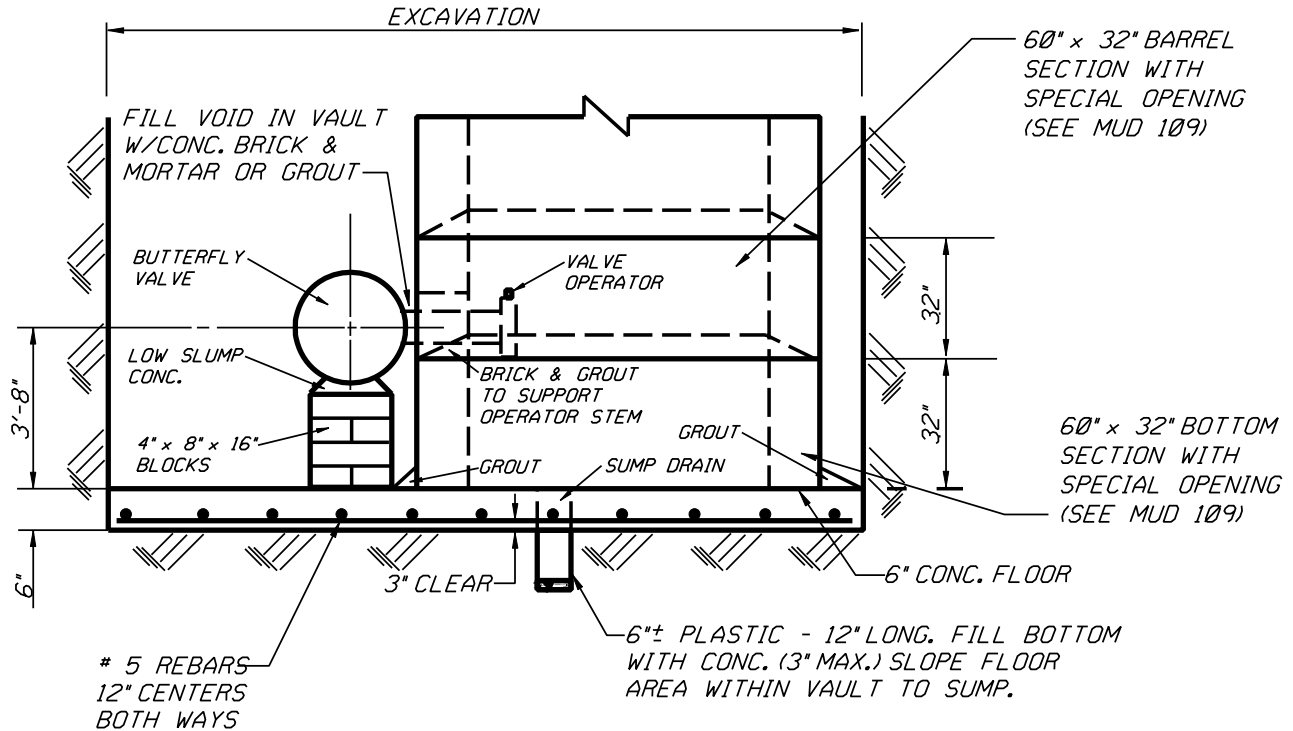
PLAN VIEW OF VAULTS FOR BUTTERFLY VALVES



<i>MINIMUM DIMENSIONS</i>			
MAIN SIZE	DIMENSION A	DIMENSION B	DIMENSION L
14"	2'-6"	7'-0"	9'-6"
16"	2'-6"	7'-0"	9'-6"
18"	3'-0"	8'-6"	11'-6"
20"	3'-0"	8'-6"	11'-6"
24"	3'-6"	9'-0"	12'-6"
30"	4'-0"	9'-0"	13'-0"
36"	4'-6"	9'-6"	14'-0"
48"	5'-0"	10'-0"	15'-0"

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ELEVATION VIEW OF VAULTS FOR BUTTERFLY VALVES



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