



CITY OF BUCKEYE
Engineering Department

Case Number: 13-21

Date: 07-25-13

To: MAG Specifications and Details Committee

From: Craig Sharp

RE: Section 742 Precast Manhole Bases

Purpose: Creating a new section and details for precast manhole bases and modifying the existing cast in place manhole detail No. 420-1, 420-2, 421 and 422.

Revisions:

Creating a new section and details for precast manhole bases and modifying existing details.

Updated 04-29-14

SECTION 742

PRECAST MANHOLE BASES

742.1 GENERAL:

This specification covers the requirements of precast manhole bases for gravity sanitary sewer. When noted on the plans or in the special provisions precast manhole bases shall be constructed according to this specification. All precast manhole base manufacturers shall be NPCA (National Precast Association) certified and shall provide all certifications upon request. Loading criteria for the precast base shall meet or exceed the AASHTO 1120 loading requirements. All precast manhole bases and risers shall be monolithically cast to ensure water tightness and have a certified structural design. An extended bottom shall be cast with the base and riser during manufacturing.

742.2 MATERIALS:

742.2.1 Cementitious Materials: Cementitious materials shall conform to Section 725.2 and shall have a minimum compressive strength after 28 days of 4000 PSI.

742.2.2 Precast Sections: Precast sections shall conform to ASTM C478, AASHTO M199

742.2.3 Joints and Connections: Joints and connections shall conform to ASTM C425, C990 and C923.

742.3 CASTING TYPES:

All precast manhole bases shall be cast using either a dry cast or a wet cast system. Each manufacturer shall be proficient in their manner of casting and shall monitor and test the materials being used in the casting. The test results shall be available upon request by the contracting agency.

742.3.1 Wet Castings: Wet casting shall consist of pouring thoroughly mixed cementitious materials in its plastic form into a pre determined mold the size and shape required per the drawings or special provisions. Concrete shall be placed in forms and vibrated in such a manner to make a dense uniform product conforming to the plans and specifications.

742.3.2 Dry Castings: Dry casting shall consist of casting the base utilizing mechanized equipment with a zero (0) slump concrete between the core and jacket. Curing shall be by a kiln or a combination of tarps and moisture curing.

742.4 MANHOLE PENETRATIONS:

Cut out of the precast base shall be done using a mechanical hole saw. The location of the whole shall be determined by the plans and specifications. After the core is removed from the casting the manufacturer shall coat all reinforcing with a corrosion inhibiting epoxy suitable for end use application. The thickness of the epoxy shall be per the manufacturer recommendation suitable for the end use application. Knock outs shall be formed in the location noted on the plans or specifications.

742.5 REINFORCING

Reinforcing for the base shall meet the following specifications:

- Wire ASTM A82 or A496
- Wire fabric A185 or A497

Design of the reinforcing shall be in accordance with ACI 318 and ASTM C890

742.6 GASKETS

A flexible pipe to manhole connector shall be used whenever a pipe penetrates into a precast concrete manhole or structure. The design of the connector shall provide a flexible, watertight seal between the pipe and the concrete. The connector shall assure that a seal is made between the structure wall and the pipe by:

- Casting the connector integrally with the structure wall during the manufacturing process in a manor that will not pull out during pipe coupling.
- compressing the connector against the inside circumference of the structure by means of wedge or toggle style connection, expansion ring or other means approved by the engineer.

The connector shall be made of from materials that conform to the physical and chemical requirements outlined in the ASTM C923, and C425.

The connector shall be sized specifically for the type of pipe being used and shall be installed in accordance with the recommendations of the manufacturer.

The connection hardware shall be constructed of a 316 stainless steel meeting ASTM A480. The hardware shall ensure a water tight connection between the concrete and the pipe material and shall provide an adequate seal enough to withstand the negative air pressure test per ASTM C-1244.

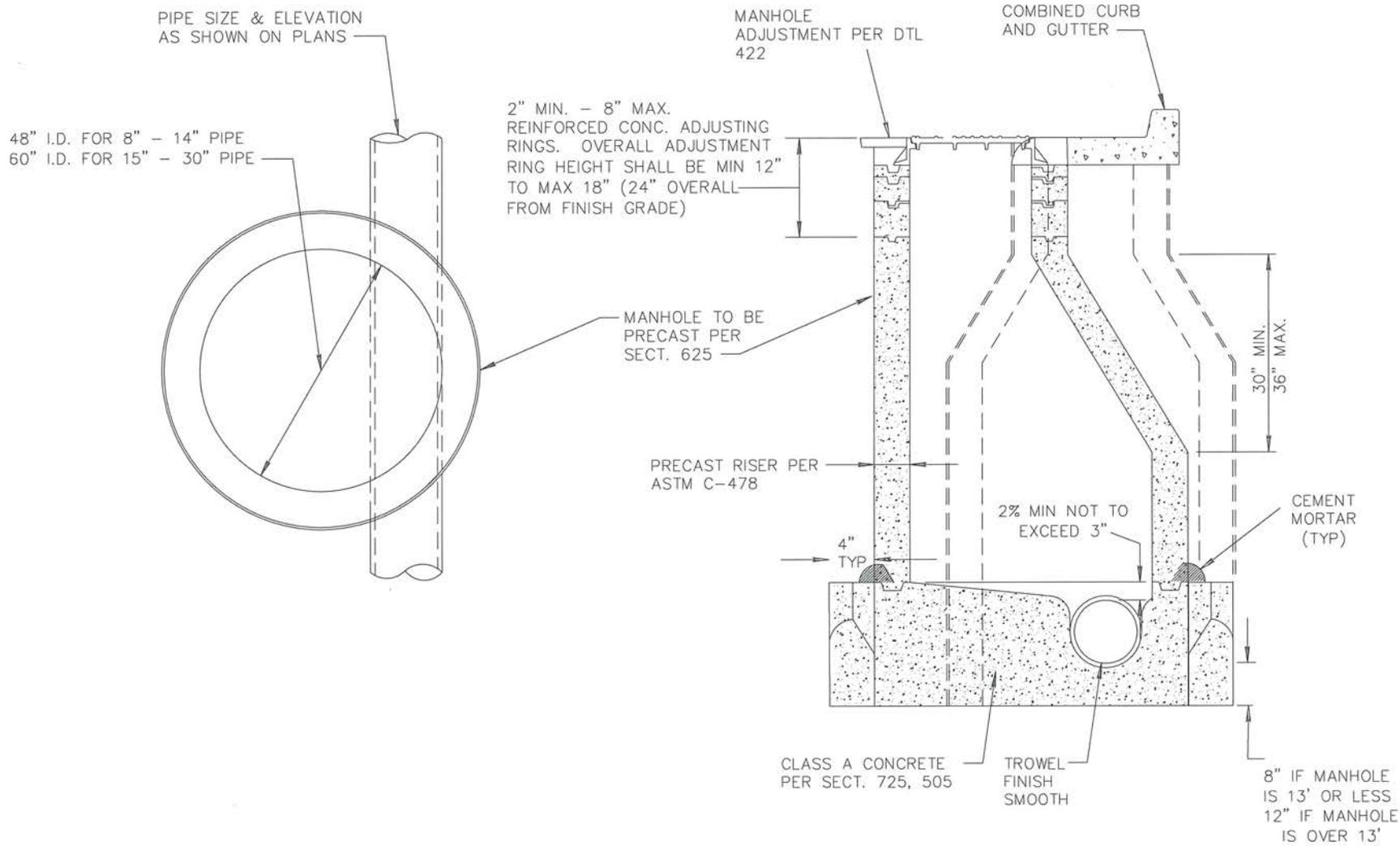
742.7 LIFTING POINTS

Lifting points shall be designed and evaluated by a registered professional engineer and have a minimum safety factor of 4. There shall be a minimum of 2 lifting points on every precast manhole base. After base installation, the lifting holes shall be thoroughly packed with a pre-packaged non-shrink grout. Bent reinforcing steel bars shall not be used as lifting devices. Through lifting holes will not be allowed.

742.8 IMPERFECTIONS

742.8.1 Imperfections: Any imperfections which in the opinion of the engineer may adversely affect the performance of the precast base shall be cause for rejection.

-End of Section -

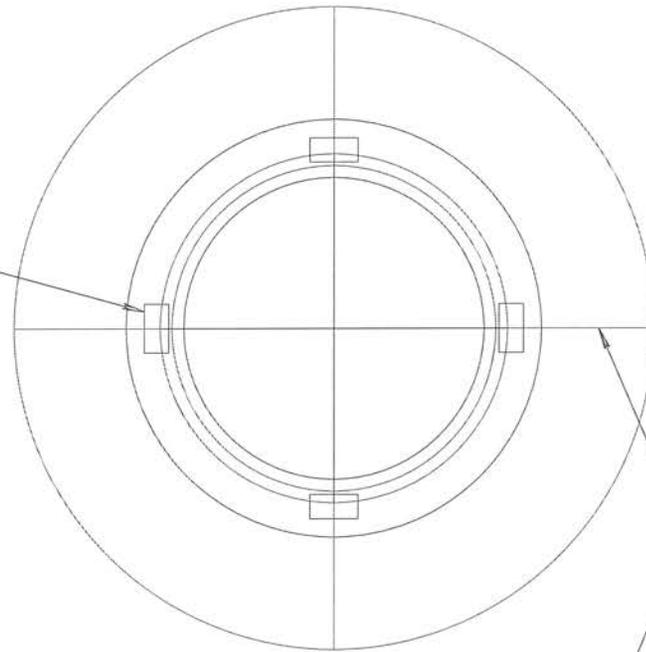


DETAIL NO. 421	 MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	OFFSET MANHOLE 8" TO 30" PIPE	REVISED 01-01-2015	DETAIL NO. 421
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NOTES:

1. CONTRACTORS SHALL ADJUST ALL MANHOLE RINGS AND COVERS, INCLUDING MANHOLES OUTSIDE OF THE PAVEMENT.
2. ADJUSTMENT SHALL BE CONSTRUCTED PER MAG SECTION 345.
3. MANHOLE COATINGS PER AGENCY.

ADJUSTMENT SUPPORTS
PER SECTION 345



MEDIUM BROOM FINISH
WITH RADIALLY SCORED
MARKS (4 MIN.)

EXISTING OR RECENTLY
INSTALLED PAVEMENT

OUT OF
PAVEMENT-FINISH
GRADE

12" MIN.
BOTH SIDES

12" MIN

8" MIN

POURED CONCRETE COLLAR,
CLASS 'AA' CONCRETE AS
PER SECT. 725 & 505

GROUT INTERIOR
SURFACE OF
ADJUSTMENT RINGS
CONTINUOUS

#4 REINFORCING STEEL EQUALLY
CENTERED HORIZONTALLY & VERTICALLY
(PER JURISDICTION)

ADJUSTMENT RINGS

SUBGRADE PREPARATION TO
CONFORM TO SECT. 301 OR 601

DETAIL NO.

422



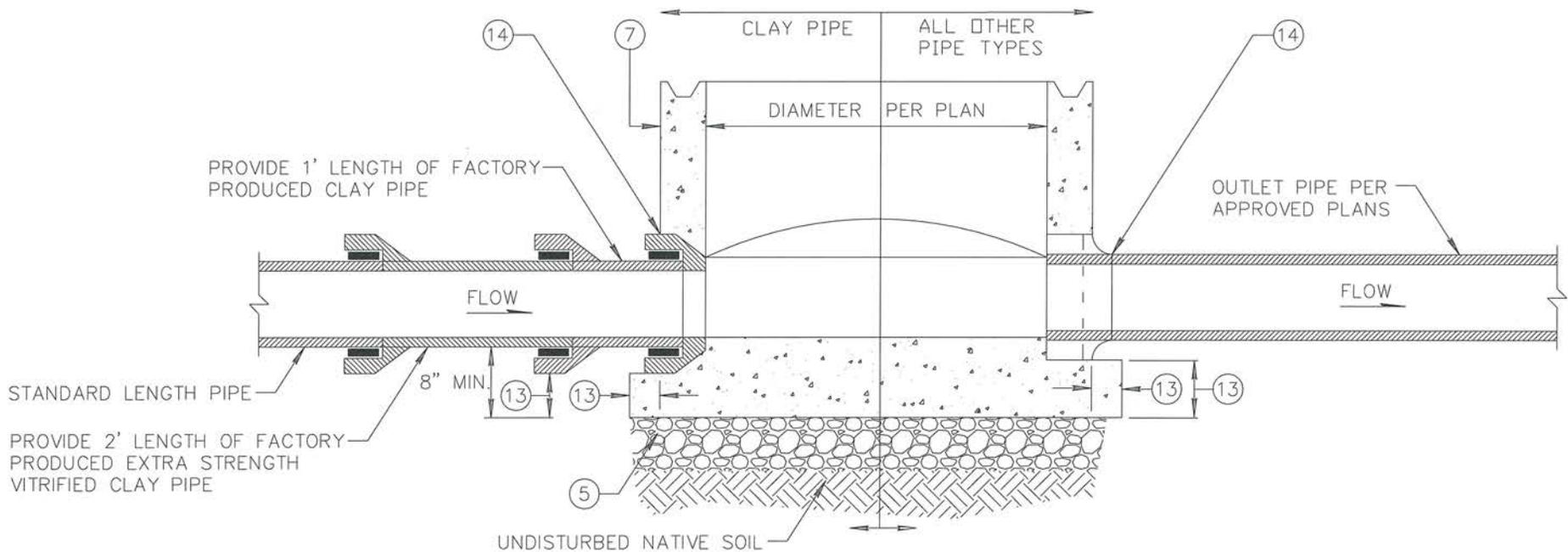
STANDARD DETAIL
ENGLISH

MANHOLE FRAME
AND COVER ADJUSTMENT

REVISED
01-01-2015

DETAIL NO.

422



NOTES:

- ① PRECAST, MANUFACTURER SHALL BE AN NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA) CERTIFIED PLANT. ENTIRE PRECAST BASE SHALL BE MANUFACTURED AT THE PLANT PER ASTM C478.
- ② MAG "AA" 4000 PSI CONCRETE SHALL BE USED FOR PRECAST MANHOLE BASES.
- ③ SPRING LINE OF CAST-IN-PLACE BELL SHALL STOP AT INSIDE FACE OF MANHOLE.
- ④ JOINTS FOR BARREL SECTION SHALL BE TONGUE AND GROOVE TYPE. ALL LIFTING HOLES SHALL BE SEALED WITH GROUT.
- ⑤ ALL PRECAST MANHOLE BASES SHALL BE PLACED ON 10" MINIMUM #57 ROCK PER ASTM D448 WITH AT LEAST 50% ONE FRACTURED FACE WHEN TESTED IN ACCORDANCE WITH ARIZ 212 OR 8" ABC PER SECTION 702 COMPACTED TO 100% RELATIVE DENSITY.
- ⑥ ALL MODIFICATIONS SHALL BE APPROVED BY THE ENGINEER.
- ⑦ MINIMUM WALL THICKNESS SHALL BE PER ASTM C478 (MIN 5").
- ⑧ REINFORCEMENT SHALL BE DESIGNED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER.
- ⑨ CHANNEL TRANSITION SHALL BE CONSTANT FROM INLET TO OUTLET OF MANHOLE.
- ⑩ THERE SHALL BE NO HARD CONNECTIONS (GROUTED) INTO THE MANHOLE BASE UNLESS APPROVED BY THE ENGINEER.
- ⑪ ALL SEWER SERVICE CONNECTIONS SHALL HAVE THE SAME CONNECTION TYPES IN THE PRECAST MANHOLE BASE.
- ⑫ ALL CORE HOLES INTO THIS STRUCTURAL PRECAST BASE SHALL BE COATED WITH APPROVED COATING MATERIAL.
- ⑬ THE MINIMUM EXTENDED BOTTOM SHALL BE 6" WIDE ON 48" BASES, 7" WIDE ON 60" BASES, AND 8" WIDE ON 72" BASES. EXTENDED BOTTOM SHALL BE A MINIMUM OF 5" THICK.
- ⑭ ALL PIPE CONNECTIONS SHALL BE ELASTOMERIC GASKET/BOOT PER ASTM C425 AND ASTM F477. ADDITIONALLY, A POLYURETHANE JOINT MAY BE USED ON EXTRA STRENGTH VITRIFIED CLAY PIPE.

DETAIL NO.
420-2

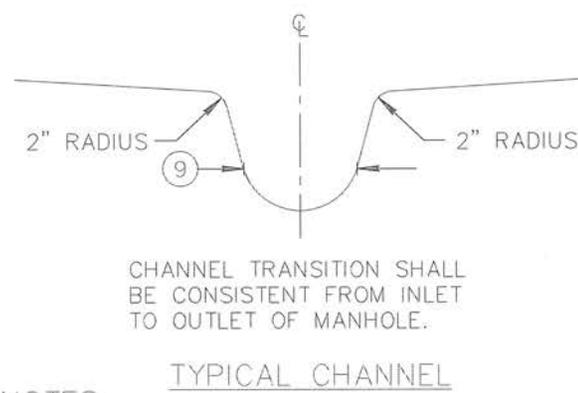
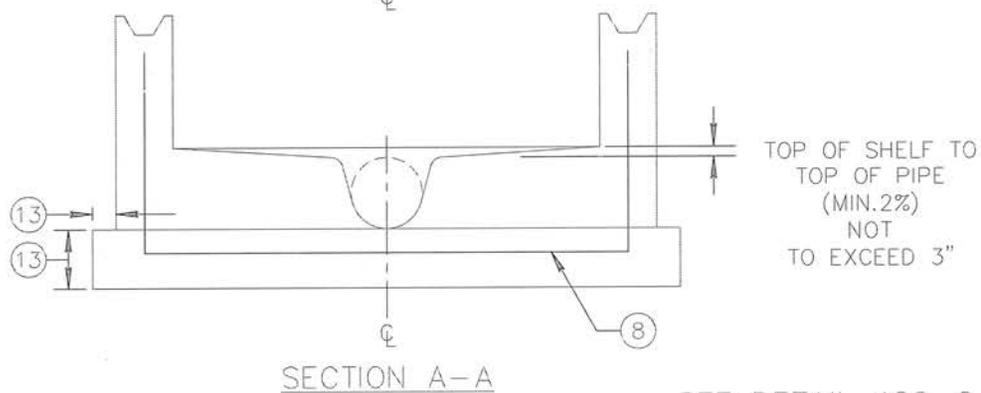
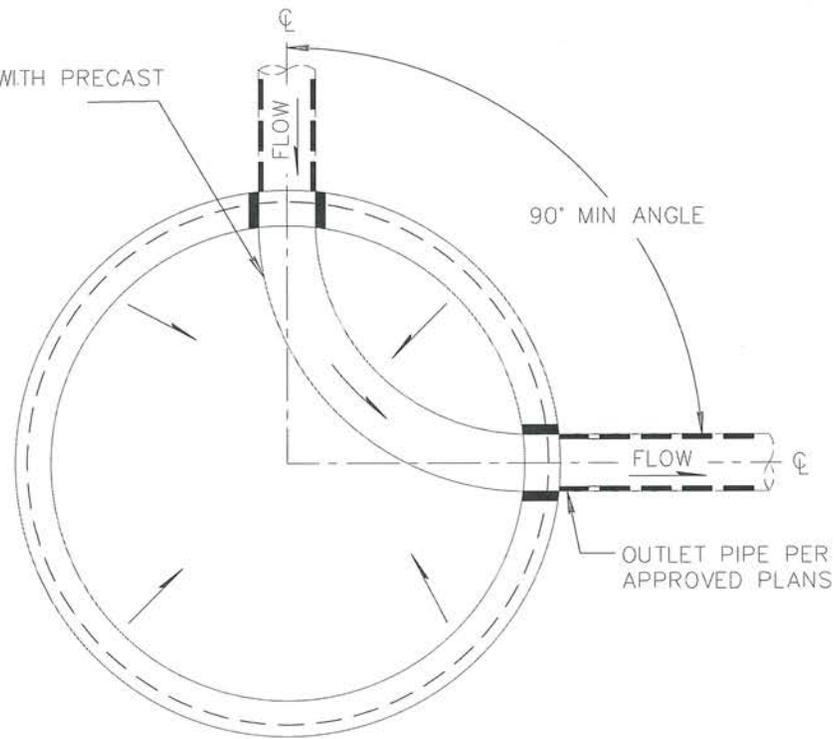
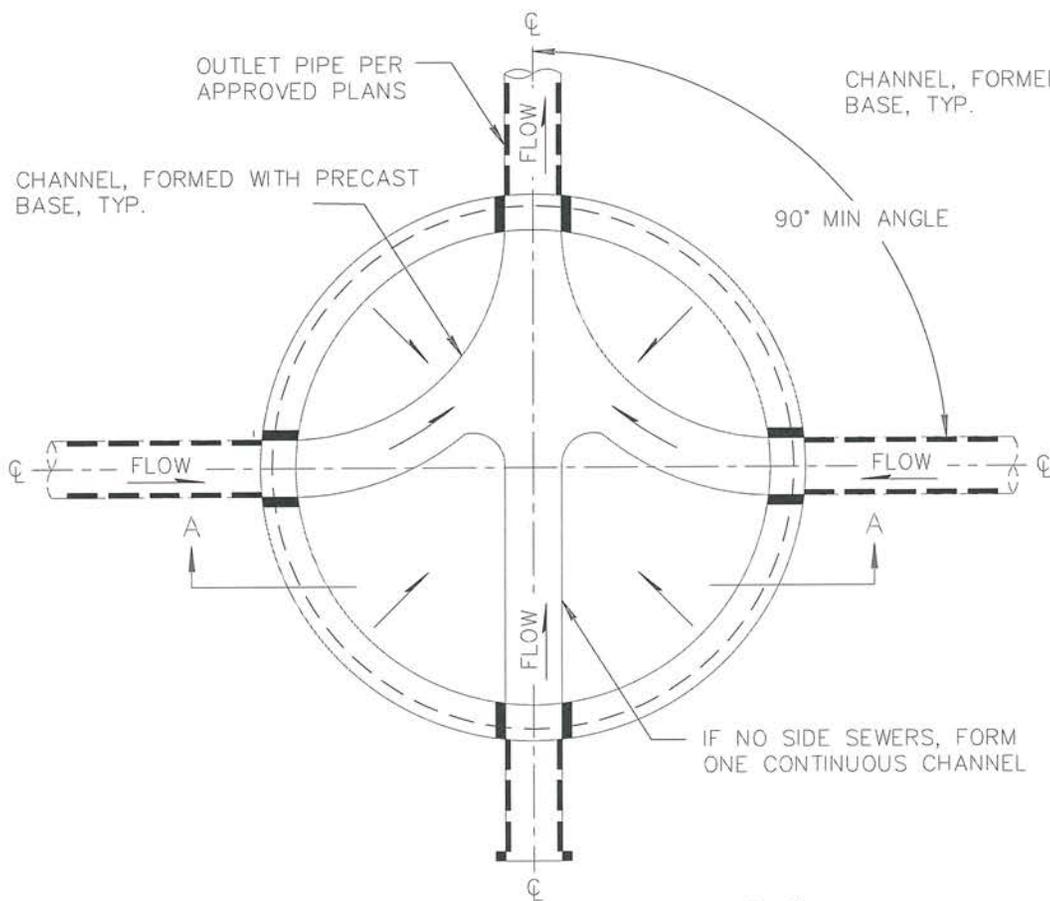


STANDARD DETAIL
ENGLISH

PRECAST CONCRETE MANHOLE BASE

REVISED
01-01-2015

DETAIL NO.
420-2



SEE DETAIL 420-2 FOR NOTES

DETAIL NO.
420-3



STANDARD DETAIL
ENGLISH

PRECAST CONCRETE MANHOLE BASE

REVISED
01-01-2015

DETAIL NO.
420-3