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 05-27-14

SECTION 742

PRECAST MANHOLE

742.1 GENERAL:

This specification covers the requirements of precast manholes for gravity sanitary sewer. When noted on the plans or in the special provisions precast manhole shall be constructed according to this specification. All precast manhole manufacturers shall be NPCA (National Precast Association) certified and shall provide all NPCA certifications upon request. Loading criteria for the precast manholes shall meet or exceed the AASHTO H20 loading requirements. All precast manhole risers shall be monolithically cast to ensure water tightness and have a certified structural design and the manhole shall be cast in a fashion to achieve water tightness. This shall include a monolithic cast manhole or a multi section cast manhole which also shall have a certified structural design.

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.

742.4 MANHOLE PENETRATIONS:

Cut out of the precast base shall be done using a mechanical hole saw. The location of the hole 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.

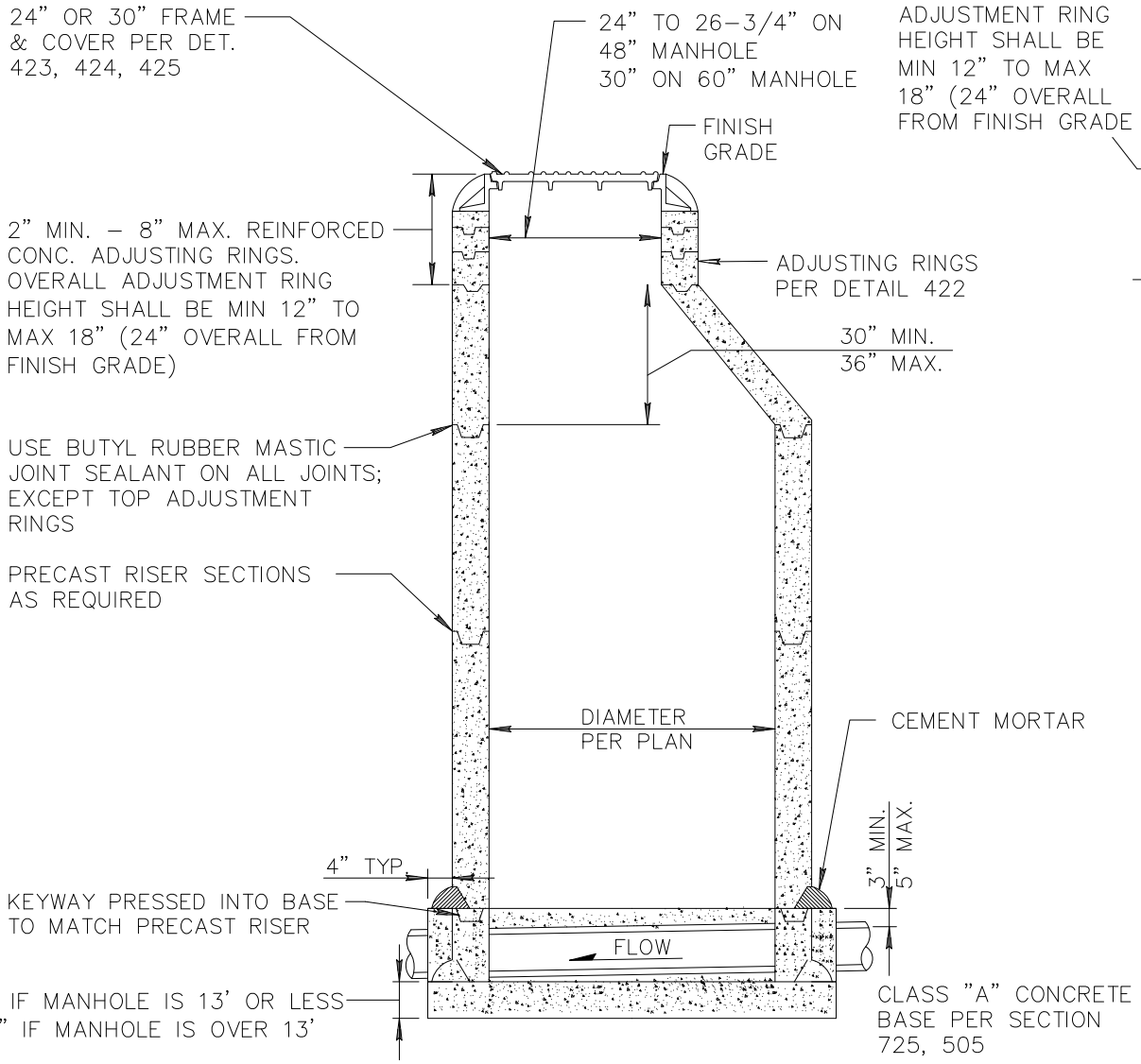
742.8 IMPERFECTIONS

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.

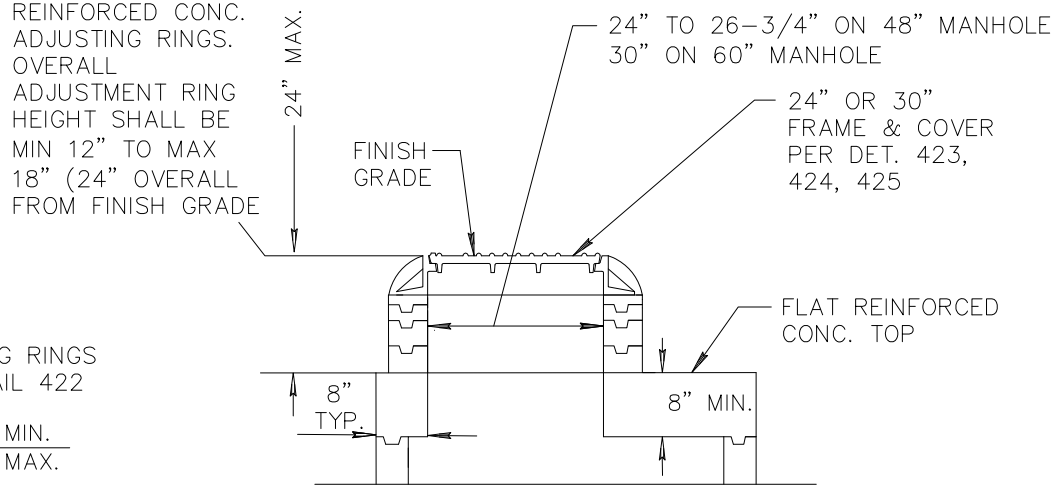
-End of Section –

TYPE 'A' TOP

(PRECAST ECCENTRIC CONICAL TOP MANHOLE)



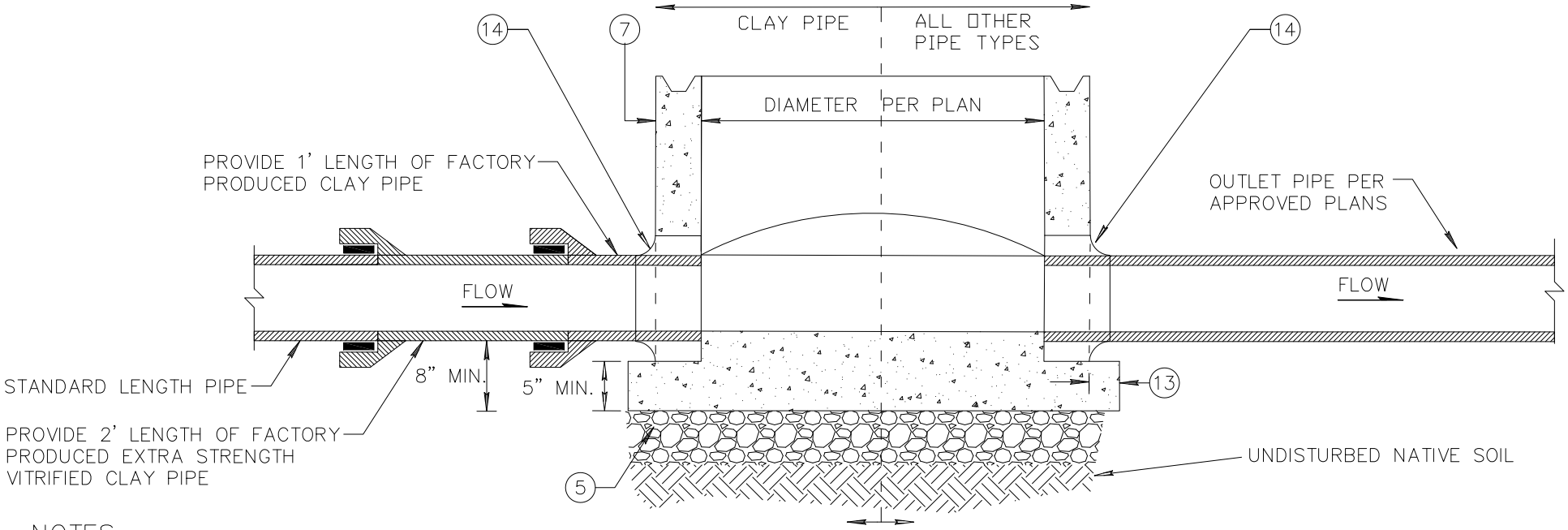
(PRECAST FLAT TOP M.H.)



NOTES:

1. PRECAST STEEL REINFORCED MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C 478 EXCEPT AS MODIFIED HEREIN.
2. CAST-IN-PLACE MANHOLE BASE TO BE CONSTRUCTED IN ONE PLACEMENT.
3. CAST-IN-PLACE MANHOLE BASE SHELF AND CHANNEL TO RECEIVE SMOOTH TROWEL FINISH.
4. MANHOLE COATINGS PER AGENCY.
5. SEE MAG DETAIL 422 FOR FINAL ADJUSTMENT TO GRADE.
6. ANY MANHOLE OVER 20' SHALL REQUIRE ENGINEER (STRUCTURAL) CALCS.
7. THE MANHOLE ACCESS POINT SHALL BE ORIENTED IN SUCH A WAY THAT THE OPENING IS DIRECTLY ABOVE THE LOWEST INVERT.
8. FOR PRECAST BASE SEE DETAIL 420-2.
9. FLAT TOPS SHALL ONLY BE USED WITH APPROVAL FROM THE ENGINEER.

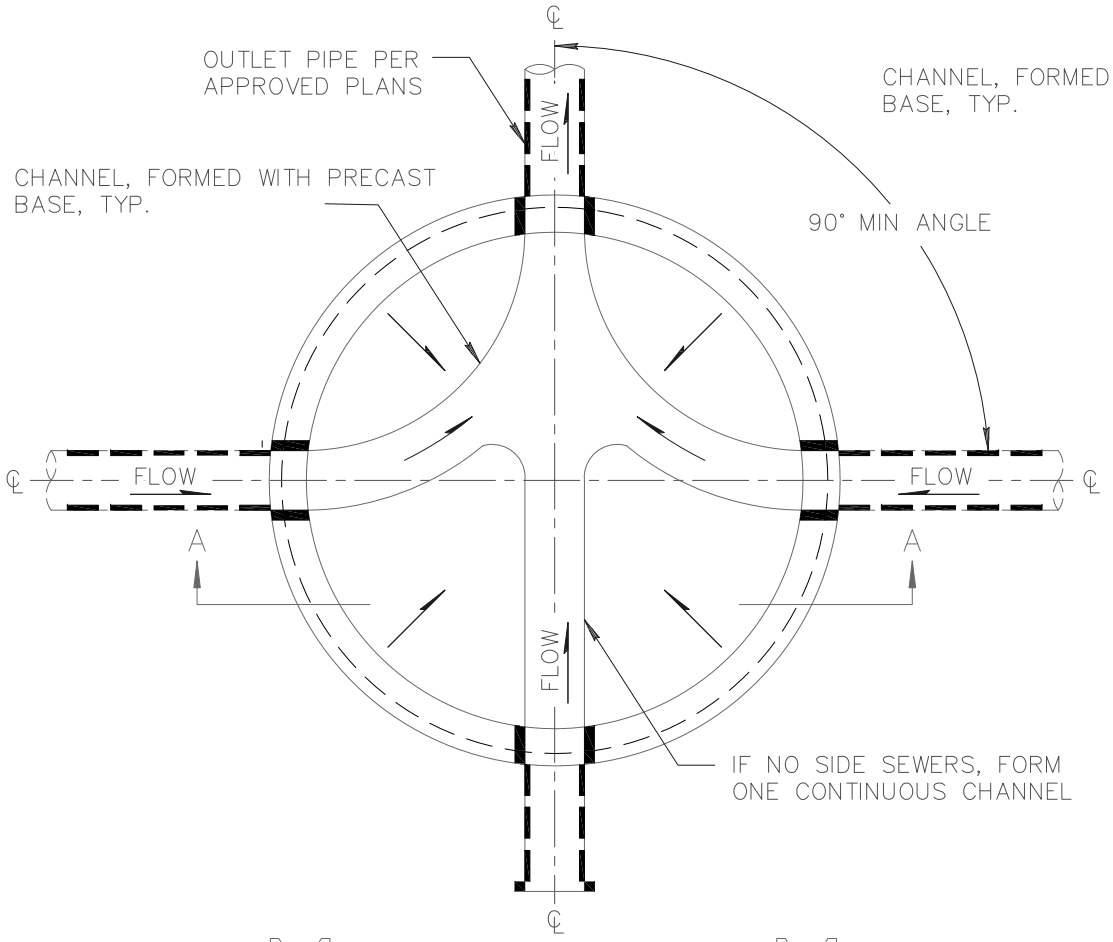
DETAIL NO.				REVISED	DETAIL NO.
420-1	MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	CONCRETE SANITARY SEWER MANHOLE	01-01-2015	420-1

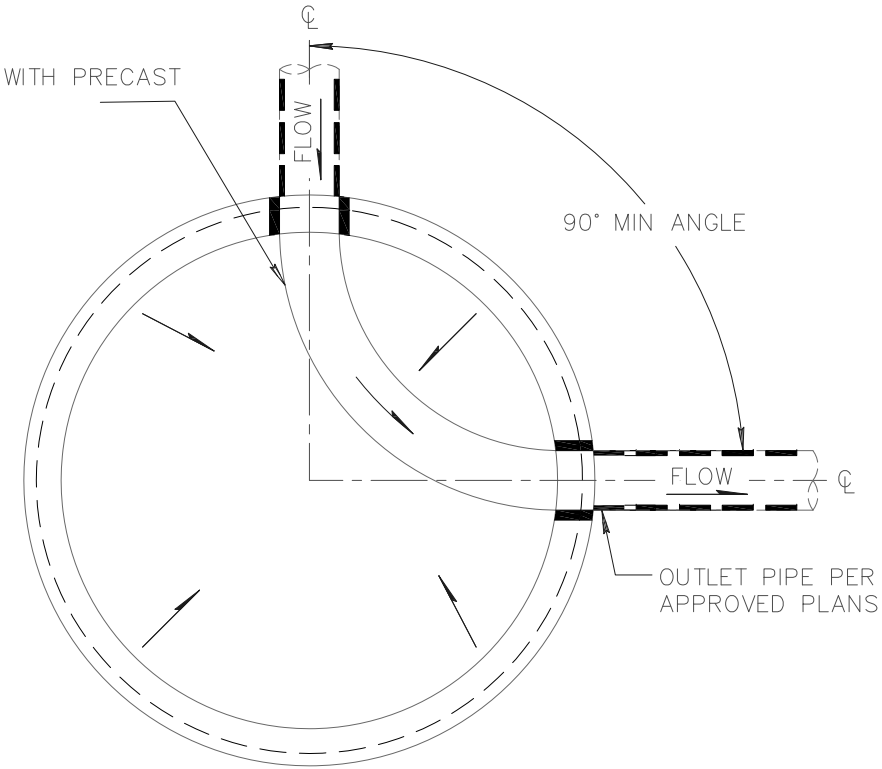


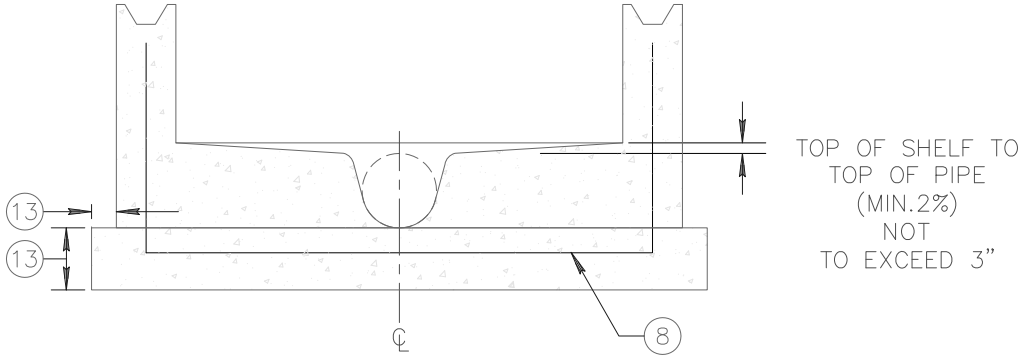
NOTES:

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 AN APPROVED COATING MATERIAL.
13. THE MANHOLE BOTTOM SHALL EXTENDED OUTSIDE THE MANHOLE WALL A MINIMUM 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.

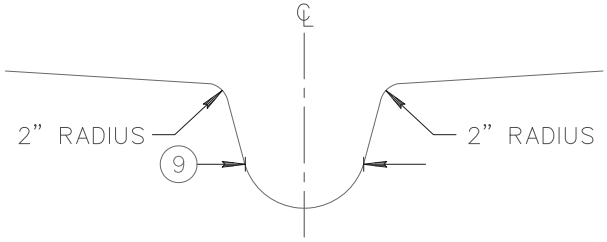
DETAIL NO.				REVISED	DETAIL NO.
420-2	MARICOPA ASSOCIATION of GOVERNMENTS	STANDARD DETAIL ENGLISH	PRECAST CONCRETE MANHOLE BASE	01-01-2015	420-2







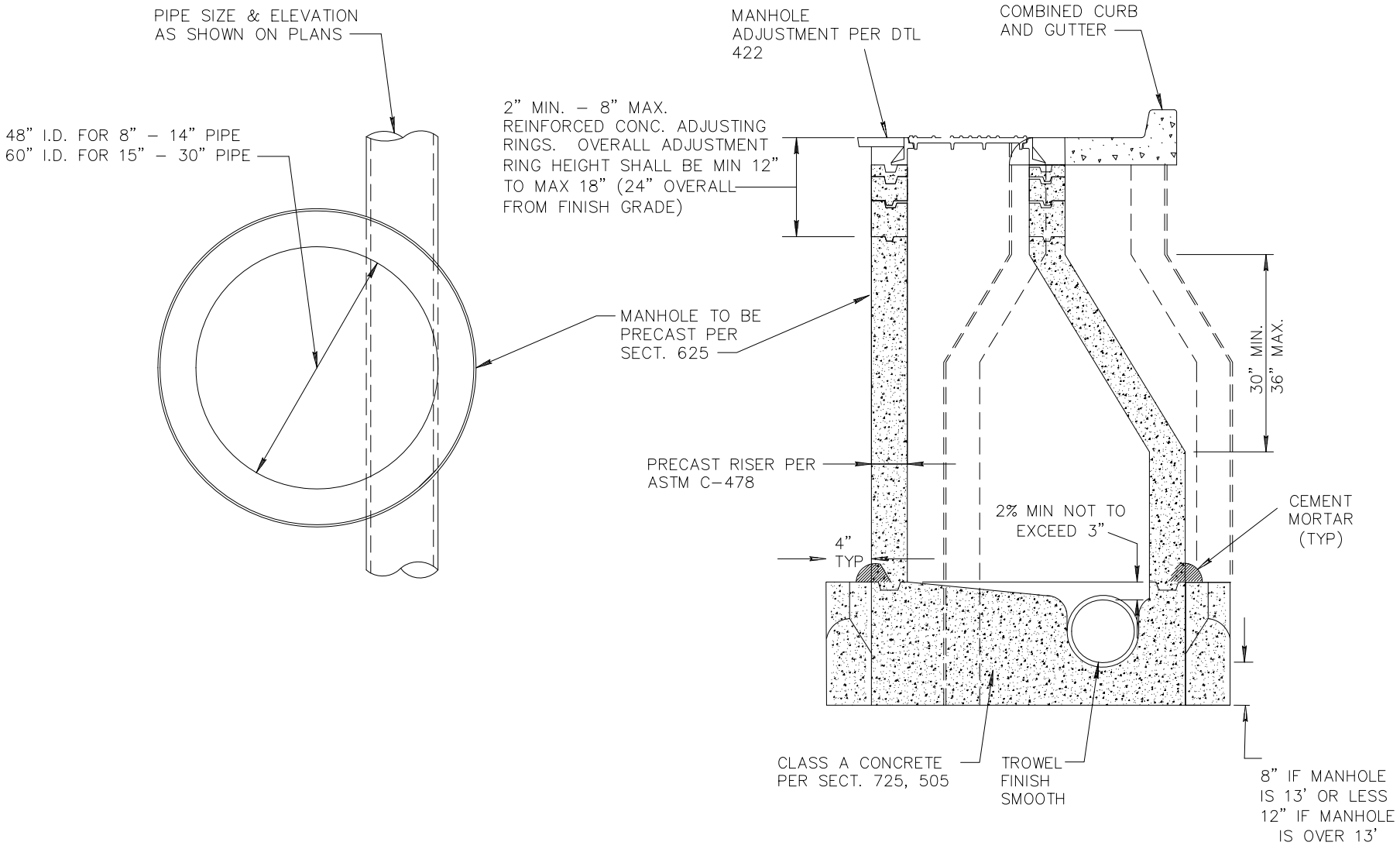
SECTION A–A



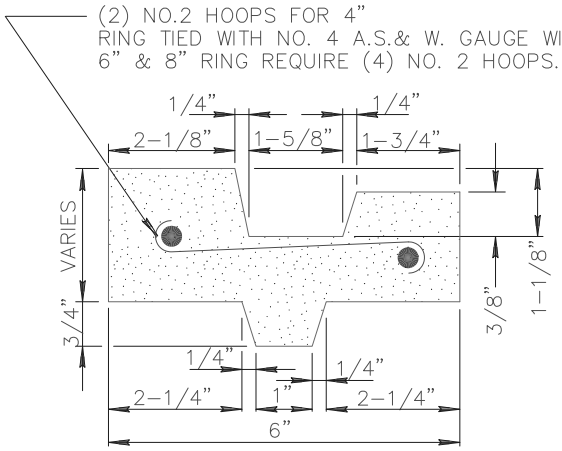
TYPICAL CHANNEL

SEE DETAIL 420–2 FOR NOTES

DETAIL NO.			REVISED	DETAIL NO.
420-3	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	PRECAST CONCRETE MANHOLE BASE	01-01-2015	420-3



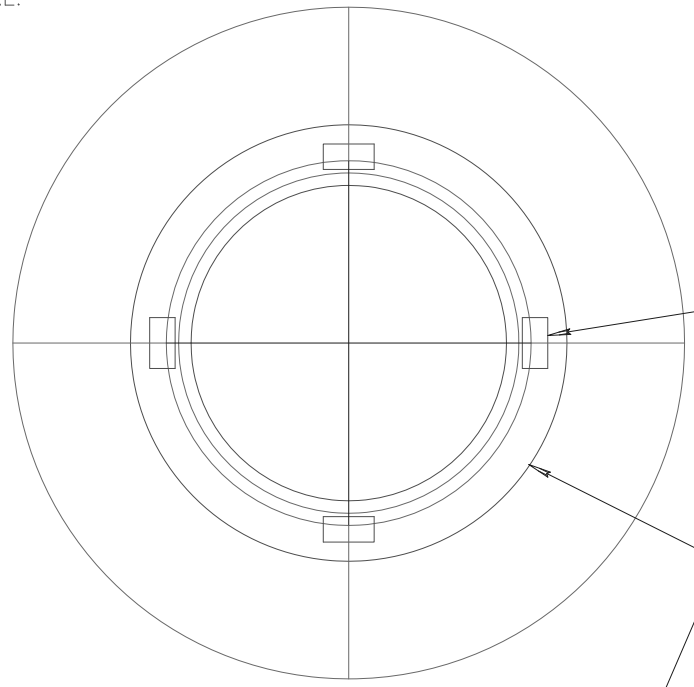
DETAIL NO.			REVISED	DETAIL NO.
421	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	OFFSET MANHOLE 8" TO 30" PIPE	01-01-2015	421

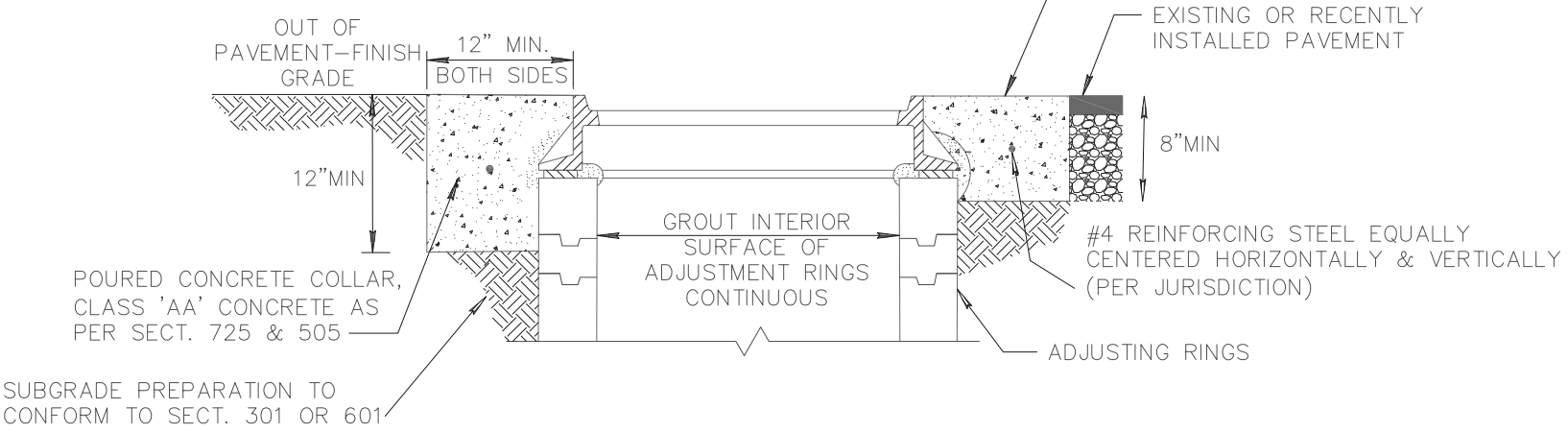


ADJUSTING RING DETAIL

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.





DETAIL NO.			REVISED	DETAIL NO.
422	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	MANHOLE FRAME AND COVER ADJUSTMENT	01-01-2015	422