

# SUPPLEMENTAL STANDARDS FOR PUBLIC WORKS CONSTRUCTION



March 2008

(Revised July 2011)

New Revised Drawings include:

- RD-730 Curb Line Sidewalk Driveways or Alleys (Option M)
- SD-401 Water Service Connection 1"

City of Ontario  
444 SW 4th Street  
Ontario, OR 97914

**I. GENERAL**

1. *The City of Ontario has adopted the 2007 edition of the Idaho Standard for Public Works Construction (ISPWC), as amended including all supplements and revisions for construction and new development. The following supplemental standards include standards for acceptable materials, construction practices, and other specified requirements, which may not be covered under the ISPWC or that the City has elected to amend. Prior to any public work development or construction, the contractors and/or developers shall review the adopted ISPWC documents.*

**II. DIVISION 100:**

1. *Division 100 of the ISPWC are not applicable and shall be replaced with the Standard General Conditions of the Construction Contract as prepared by the Engineers Joint Contract Documents Committee with the following modifications:*

**SUPPLEMENTARY CONDITIONS**

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, Funding Agency Edition (EJCDC C-710, 2002) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

SC-5.04.B.1 Include as additional insured, as provided in paragraph 5.04.B.1. of the General Conditions, the following parties or entities:

OWNER: City of Ontario, 444 SW 4th Street, Ontario, Oregon 97914

PROJECT ENGINEER: (to be named by City)

SC-16 Add the following new paragraph immediately after paragraph 16.01:

SC-16.02 Mediation

16.02.1 If a dispute arises out of or relates to this contract or the breach thereof and if the dispute cannot be settled through negotiation, the parties agree first to try in good faith to settle the dispute by mediation administered by the American Arbitration Association under its Commercial Mediation Rules before resorting to arbitration, litigation, or some other dispute-resolution procedure.

Such agreement shall be in writing, and duly signed by the parties. "Parties," as used here, shall include all lenders, funding agencies, and insurance carriers interested in or connected with the Work.

16.02.2 Notice of the request for Mediation shall be filed in writing with OWNER and the American Arbitration Association, and a copy shall be filed with PROJECT ENGINEER. Request for Mediation shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

16.02.3 CONTRACTOR will carry on the work and maintain the progress schedule during any Mediation proceeding, unless otherwise mutually agreed in writing.

SC-18 Federal Requirements

Article 18 – Federal Requirements section of the General Conditions does not apply to this contract.

### **III. DIVISION 200:**

1. Section 202-3.7:

*Add the following: The City shall authorize excavation of unsuitable material or payment will not be allowed. The Contractor shall select and utilize equipment and methods to minimize pumping of soil material. Request for additional payment for unsuitable material excavation will not be considered by the City if the use of track equipment and/or modified construction procedures to remove and /or place materials could eliminate the problem.*

### **IV. DIVISION 300:**

1. Section 304-2.3.A:

*Change to state the following: Field inspection shall be performed by the Engineer or City authorized representative. Laboratory analysis and field testing reports will be provided to the City weekly during construction from the independent testing laboratory.*

2. Section 304-4.1:

*Add the following: No payment will be made without City (or authorized representative) approval and without field measurement by the City (or authorized representative) prior to placement of bedding material.*

3. Section 305-2:

*Unless otherwise approved by the City and/or required by special conditions, Type I or Type III Bedding shall be used for pipe bedding material.*

4. Section 305-3:  
*Unless otherwise approved by the City and/or required by special conditions, Class A-1 or B-2 Bedding System shall be used.*

5. Section 306-3.3:  
*Unless otherwise approved or specified by the City, Type A-1 compaction shall be used for Type A trench backfill.*

6. Section 307-3.7:  
*Delete Item C and replace with the following:*

*For local streets use 8 inches and for collectors and arterials use 12 inches of compacted base course or match existing base depth (whichever is greater) consisting of Type I Aggregate in accordance with Section 802-Crushed Aggregate.*

*Delete Item E and replace with the following:*

*Asphalt concrete pavement thickness is to match existing pavement depth to a maximum depth of 6 inches. In no case shall pavement thickness be less than 3 inches for local streets or 4 inches on designated collector and arterial streets.*

7. Section 307-3.9:  
*Delete Item E and replace with the following:*

*After base compaction, trim back existing pavement one foot behind furthest edge of undisturbed base material on both sides of the trench.*

8. Section 307-3.12:  
*Add the following to subsection B.2:*

*A two foot cutback behind furthest edge of undisturbed base material is required for curb & gutter replacement. Where asphalt pavement and concrete curb & gutters are restored there shall be a 6" (min.) offset of the cold joints of both repairs.*

9. SD-301:  
*Delete and replace with the revised detail SD-301 dated October 2007.*

10. SD-303:  
*Delete and replace with the revised detail SD-303 dated October 2007.*

V. **DIVISION 400:**

1. *The locator wire at valves shall be placed on the outside of the valve box and placed into the inside of the valve box through a drill hole with a rubber grommet at 8 inches from the top with 18 inches of wire into the box.*
2. *All tracer lines shall be tested after backfilling is complete. A low-voltage source shall be connected to the tracer contacts, and a magnetic locator shall be used at intervals not greater than 100 feet, to determine whether the pipe can be located with the magnetic locator. The contractor shall supply the necessary testing equipment and personnel at no additional cost to the City. Faulty tracer wire shall be repaired by the contractor and retested.*
3. Section 401-2:  
*All water mains, with a diameter of 4 inch through 12 inch shall be PVC Pressure pipe meeting ANSI/AWWA C 900, unless otherwise approved.*  
  
*Unless otherwise approved, all pipe fittings shall be ductile iron fittings meeting ANSI/AWWA C 110.*
4. Section 402-2:  
*Valves for water mains under 12 inches in diameter shall be resilient seated gate valves meeting ANSI/AWWA C 509. Valves for water mains 12 inches and larger shall be rubber seated butterfly valves meeting ANSI/AWWA C 504.*
5. Section 403-2:  
*Hydrants shall be Mueller 24016 and conform with ANSI/AWWA C 502. Hydrants shall be painted red with two coats of hydrant enamel, have a five and one-quarter inch (5-1/4") minimum valve opening with a six inch (6") flange, two (2) two and one-half inch (2-1/2") hose nozzles, and one and one-fourth inch (1-1/4") pentagon operating nut (open counterclockwise) and safety flange.*  
  
*Item shall be constructed per ISPWC SD-404 with the addition of a 6" thick by 30" diameter concrete collar around the hydrant barrel placed at least 12" below the finished ground surface elevation. The hydrant shall be arranged for a three and one-half foot (3-1/2') bury, minimum, unless otherwise specified.*
6. Section 404-2:  
*Water service pipe shall be Type K, annealed, seamless copper water tube meeting ASTM B 88. Polyethylene pipe may be acceptable for conditions where corrosive soils are present, with approval of the City.*

*Delete Section 2.4.B, and replace with the following:*

*Corporation stops shall be Ford FB-1000 Iron Pipe x CTS Pack Joint.*

7. SD-401:  
*Delete and replace with the revised detail SD-401 dated January 17, 2007.*
8. SD-404:  
*Delete and replace with the revised detail SD-404 dated January 16, 2007.*
9. SD-405:  
*Delete and replace with appended detail.*
10. SD-406:  
*Delete and replace with the revised detail SD-406 dated October 2007.*

**VI. DIVISION 500:**

1. *Locator wire is required for all sewer pipes and manholes. The wire shall be 12 AWG UF with green colored insulation and fastened to the top of the pipe with duct tape at intervals not exceeding ten feet. The locator wire shall be installed outside the manhole and enter the manhole at the grade ring joint.*
2. *All tracer lines shall be tested after backfilling is complete. A low-voltage source shall be connected to the tracer contacts, and a magnetic locator shall be used at intervals not greater than 100 feet, to determine whether the pipe can be located with the magnetic locator. The contractor shall supply the necessary testing equipment and personnel at no additional cost to the City. Faulty tracer wire shall be repaired by the contractor and retested.*
3. Section 501-2:  
*Unless otherwise approved, gravity sewer pipe with diameter of 4 inch to 15 inch shall be solid wall PVC conforming to ASTM D 3034 SDR 35 pipe. Gravity sewer pipe with diameter of 18 inch to 36 inch shall be solid wall PVC conforming to ASTM F 679. The type of material used for gravity sewer pipe larger than 36 inch diameter shall be as approved by the City on a project specific basis.*
4. Section 502-3:  
*Delete Section 3.7.C. and replace with the following:*

*Ensure that the top of the cone section allows for a maximum of 17 inches from top of the cone to the finished rim elevation.*

*Delete Section 3.8.A. and replace with the following:*

*Adjust frame elevations to finish grade with grade rings or by an approved cast in place adjustment method. Maximum distance from the top of the cone to finish grade shall be no more than 17 inches.*

*Delete Section 3.9.*

*Delete Section 3.13.A and replace with the following:*

*Concrete collars are required on all new manholes. Place collars per the standard drawing SD-508 and Section 703. Concrete to be Class 3000.*

5. Section 504-2:  
*Unless otherwise approved, sewer services shall be PVC conforming to ASTM D 3034 SDR 35.*
6. Section 504-5:  
*Sanitary Sewer Abandonment*
  - A. *All manholes shall be removed. The excavation shall be backfilled in accordance with applicable ISPWC requirements.*
  - B. *All pipe shall either be*
    - a. *Removed, with the excavation backfilled as described in A. above; or*
    - b. *Permanently filled with a non-settling material. At least 70 percent of the cross sectional area of the pipe shall be filled at all locations. All abandoned pipes shall be capped or plugged at both ends.*
7. Section 505-2:  
*Unless otherwise approved, pressure sewer mains shall be PVC reclaimed water pipe conforming to ANSI/AWWA C900.*
8. SD-501:  
*Delete and replace with the revised detail SD-501 dated October 2007.*
9. SD-502:  
*Delete and replace with the revised detail SD-502 dated October 2007.*
10. SD-503:  
*Delete and replace with the revised detail SD-503 dated October 2007.*
11. SD-504:  
*Delete and replace with the revised detail SD-504 dated October 2007.*
12. SD-505:  
*Delete and replace with the revised detail SD-505 dated October 2007.*

13. SD-505A:  
*Delete and replace with the revised detail SD-505A dated October 2007.*
14. SD-506:  
*Delete Detail.*
15. *Grease interceptors, when required by the City per Ontario City Code 8-7-4, Section F, shall conform to revised SD-520.*

**VII. DIVISION 600:**

1. Section 601-2:  
*Unless otherwise approved, storm drain pipe with diameter of 4 inch to 15 inch shall be solid wall PVC conforming to ASTM D 3034 SDR 35 pipe. Storm drain pipe with diameter of 18 inch to 36 inch shall be solid wall PVC conforming to ASTM F 679. The type of material used for storm drain pipe larger than 36 inch diameter shall be as approved by the City on a project specific basis.*
2. Section 602-2:  
*Unless otherwise approved, all catch basins shall be per attached revised details SD-603 and 603A dated October 2007.*
3. SD-611:  
*Delete and replace with the revised detail SD-611 dated October 2007.*
4. SD-612:  
*Delete and replace with the revised detail SD-612 dated October 2007.*
5. SD-613:  
*Delete and replace with the revised detail SD-613 dated October 2007.*
6. SD-613A:  
*Delete and replace with the revised detail SD-613A dated October 2007.*
7. SD-614:  
*Delete and replace with the revised detail SD-614 dated October 2007.*
8. SD-614A:  
*Delete and replace with the revised detail SD-614A dated October 2007.*
9. SD-615:  
*Delete and replace with the revised detail SD-615 dated October 2007.*
10. SD-615A:  
*Delete and replace with the revised detail SD-615A dated October 2007.*

11. SD-618:  
*Delete detail.*

**VIII. DIVISION 700:**

1. *Vertical curb and gutter (6") as detailed in SD-701 is required for all construction, unless otherwise approved. (i.e. - inside of new subdivisions where the developer wants to use rolled curb).*
2. *Pedestrian Ramp Standards: Use SD-712A (Revised October 2007) for vertical curbs or SD-712B for rolled curbs.*
3. *Sidewalks shall have expansion/contraction joint material every 30' or less. Contraction/expansion joint material (fiber board) is to extend full depth of thickest adjacent slab thickness. Construction joints are to be scored 3/5 of the depth of the slab thickness.*
4. SD-710, SD-710A, SD-710B:  
*Delete these details and replace with revised Oregon Standard Drawings RD730 dated October 2007.*

**IX. DIVISION 800:**

1. Section 803-2:  
*Delete Subsection 2.1.E.3. and replace with the following:*

*Thin or elongated aggregate particles (length greater than 5 times width) not to exceed 15% by weight in the coarse aggregate stockpile(s).*

*Add the following Subsection 2.1.F.:*

1. *Maximum Size: One sieve size larger than the nominal maximum size.*
2. *Nominal Maximum Size: One sieve size larger than the first sieve to retain more than 10 percent.*

*Add the following to Subsection 2.2.A.:*

*Aggregate for Class II mixes, as a minimum, shall be provided in three separate stockpiles, two coarse and one fine. When Class III mix is required, aggregate may be provided in a single stockpile if the mix meets all crushed gravel of such gradation that when combined with other required aggregate fractions and fillers, in proper proportion, the resultant mixture shall meet the gradation required under the composition of mixture for the specific class under contract.*

*Coarse Aggregate: The coarse aggregate stockpiles shall contain less than twelve percent of minus 4.75 mm (No. 4) material.*

*Fine Aggregate: The fine aggregate stockpile(s) shall contain no more than twelve percent of plus 4.75 mm (No. 4) material.*

*The coarse and fine aggregate fractions for the mixture shall be sized, graded, and combined in such proportions that the resulting composite blend meets the grading requirements set forth in Table 803A as amended herein.*

*Delete Table 803A (including NOTE) and replace with the following tables:*

**Table 803A-1**

<b>3/4" Nominal Maximum Size</b>				
<b>Sieve Size (mm)</b>	<b>Control Points</b>		<b>Restricted Zone Boundary</b>	
	<b>Minimum</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Maximum</b>
25 (1")		100		
19 (3/4")	90	100		
12.5 (1/2")		90		
9.5 (3/8")	52	80		
4.75 (No. 4)				
2.36 (No. 8)	23	49	34.6	34.6
1.18 (No. 16)			22.3	28.3
0.600 (No. 30)			16.7	20.7
0.300 (No. 50)			13.7	13.7
0.150 (No. 100)				
0.075 (No. 200)	2	8		

**Table 803A-2**

1/2" Nominal Maximum Size				
Sieve Size (mm)	Control Points		Restricted Zone Boundary	
	Minimum	Maximum	Minimum	Maximum
19 (3/4")		100		
12.5 (1/2")	90	100		
9.5 (3/8")		90		
4.75 (No. 4)				
2.36 (No. 8)	28	58	39.1	39.1
1.18 (No. 16)			25.6	31.6
0.600 (No. 30)			19.1	25.6
0.300 (No. 50)			15.5	15.5
0.150 (No. 100)				
0.075 (No. 200)	2	10		

**Table 803A-3**

3/8" Nominal Maximum Size				
Sieve Size (mm)	Control Points		Restricted Zone Boundary	
	Minimum	Maximum	Minimum	Maximum
12.5 (1/2")		100		
9.5 (3/8")	90	100		
4.75 (No. 4)		90		
2.36 (No. 8)	32	67	47.2	47.2
1.18 (No. 16)			31.6	37.6
0.600 (No. 30)			23.5	27.5
0.300 (No. 50)			18.7	18.7
0.150 (No. 100)				
0.075 (No. 200)	2	10		

2. Section 803-2:

*Delete Subsection 2.2.D. and replace with the following:*

*The aggregate to be used for plant mix shall be screened so that not more than 10 percent of the naturally occurring minus 12.5 mm (½ inch) material remains in the material used to produce coarse and fine stockpile(s).*

3. Section 803:

*For Class III mixes from a single stockpile, the nominal maximum aggregate size shall be ½ inch.*

4. Section 805:

*Unless otherwise approved, asphalt cement used for plant mix pavement shall be AC-10 or PG 58-28 grades.*

5. Section 810:

*The following classes of plant mix pavements are required for the specific road classification:*

Road Classification	Plant Mix Pavement
Local Residential	Class III
Local Industrial	Class III
Minor Collector	Class III
Minor Collector Industrial	Class II
Major Collector	Class II
Minor Arterial	Class II
Principal Arterial	Project Specific Requirement

6. Section 810:

*Add the following to subsection 3.13.B:*

*Laboratory analysis and field testing reports from the independent testing laboratory will be provided to the City weekly during construction.*

7. Section 811:  
*Add the following to subsection 1.3.A:*

*Laboratory analysis and field testing reports from the independent testing laboratory will be provided to the City weekly during construction.*

8. SD-801:  
*The minimum structural sections for the following road classifications shall be used unless determined otherwise using actual R-values obtained from laboratory testing (designs shall use the indicated traffic indices):*

*Note: Design based on R-value of 12*

Road Classification	Traffic Index	Asphalt Pavement	¾" Minus Base
Local Residential	3.1	3	8
Local Industrial	5.4	3	10
Minor Collector	6.7	3.5	16
Minor Collector Industrial	8.0	4	20
Major Collector	7.9	4	20
Minor Arterial	9.4	5	24
Principal Arterial	--	Project Specific	Project Specific

- X. **DIVISION 900:**

*No changes*

- XI. **DIVISION 1000:**

*No changes*

- XII. **DIVISION 1100:**

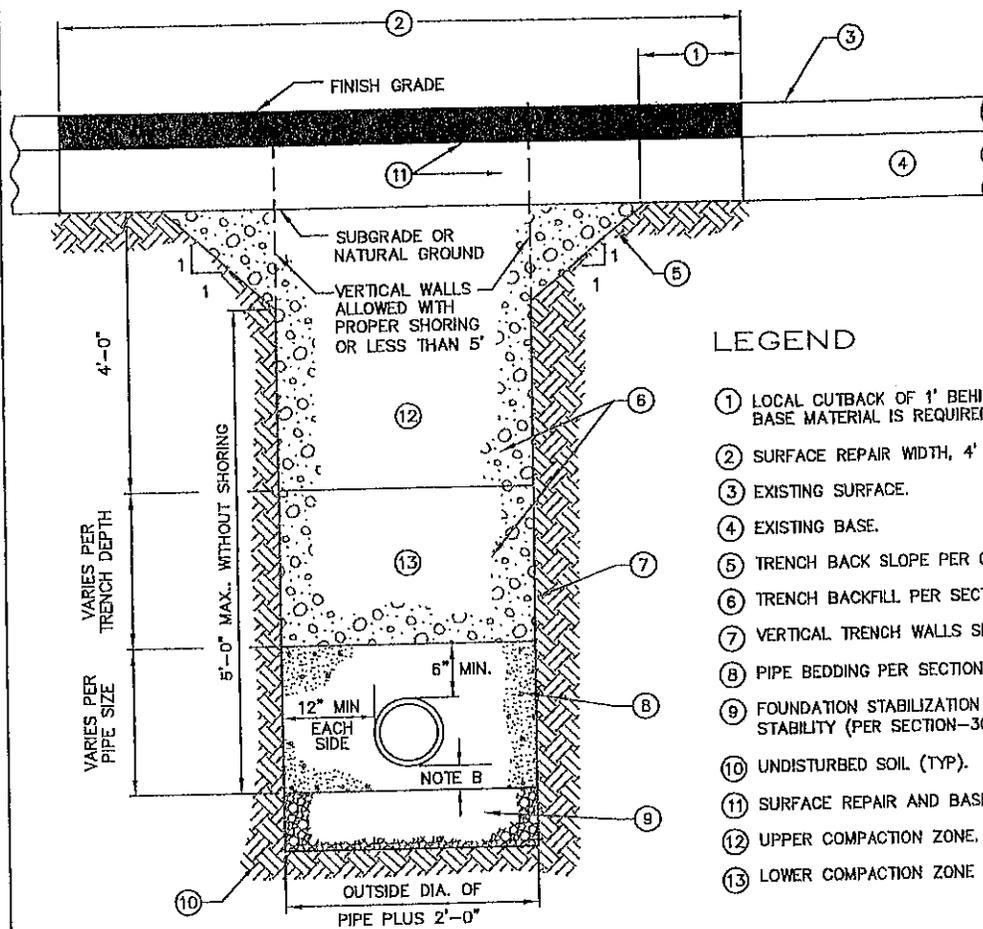
1. Delete Section 1101 (including applicable standard drawings) and replace with the applicable elements of Section 00900 of the Standard Specifications for Highway Construction as prepared by the Oregon Department of Transportation.
2. Add the following table:

Item	Type	Material	Dimension
Sign Post		Galvanized	10'-6" & 12', 2 3/8" ø, 0.095 wall thickness
Street Sign Blanks	Extruded Blade	Aluminum Alloy	6" x 24" & 6" x 30"
Street Sign Lettering			2" & 4"
Street Sign Brackets	THDW-105 & THDW-107		
Street Sign Reflective Sheeting	Hi Intensity Prismatic - Type IV		
Stop Sign Blanks	5052 H38	Aluminum Alloy	
Stop Sign Reflective Sheeting	Hi Intensity Prismatic Type IV		
Stop Sign Brackets	THDW-105		
School Sign Blanks	5052 H38		
School Sign Reflective Sheeting	(Yellow/Green) - Hi Intensity Prismatic Type IV		
Speed Signs	5052 H38		

The Oregon Department of Transportation dictates the speed limit signs.

**XIII. DIVISION 2000:**

*No changes*



**LEGEND**

- ① LOCAL CUTBACK OF 1' BEHIND FURTHEST EDGE OF UNDISTURBED BASE MATERIAL IS REQUIRED.
- ② SURFACE REPAIR WIDTH, 4' MINIMUM.
- ③ EXISTING SURFACE.
- ④ EXISTING BASE.
- ⑤ TRENCH BACK SLOPE PER O.S.H.A. OR SUITABLE SHORING.
- ⑥ TRENCH BACKFILL PER SECTION-306.
- ⑦ VERTICAL TRENCH WALLS SHORING PER O.S.H.A..
- ⑧ PIPE BEDDING PER SECTION-305 (SEE SD-302).
- ⑨ FOUNDATION STABILIZATION MAY VARY PER SOIL TYPE AND STABILITY (PER SECTION-304).
- ⑩ UNDISTURBED SOIL (TYP).
- ⑪ SURFACE REPAIR AND BASE PER SECTION-307 (SEE SD-303).
- ⑫ UPPER COMPACTION ZONE.
- ⑬ LOWER COMPACTION ZONE.

**NOTES**

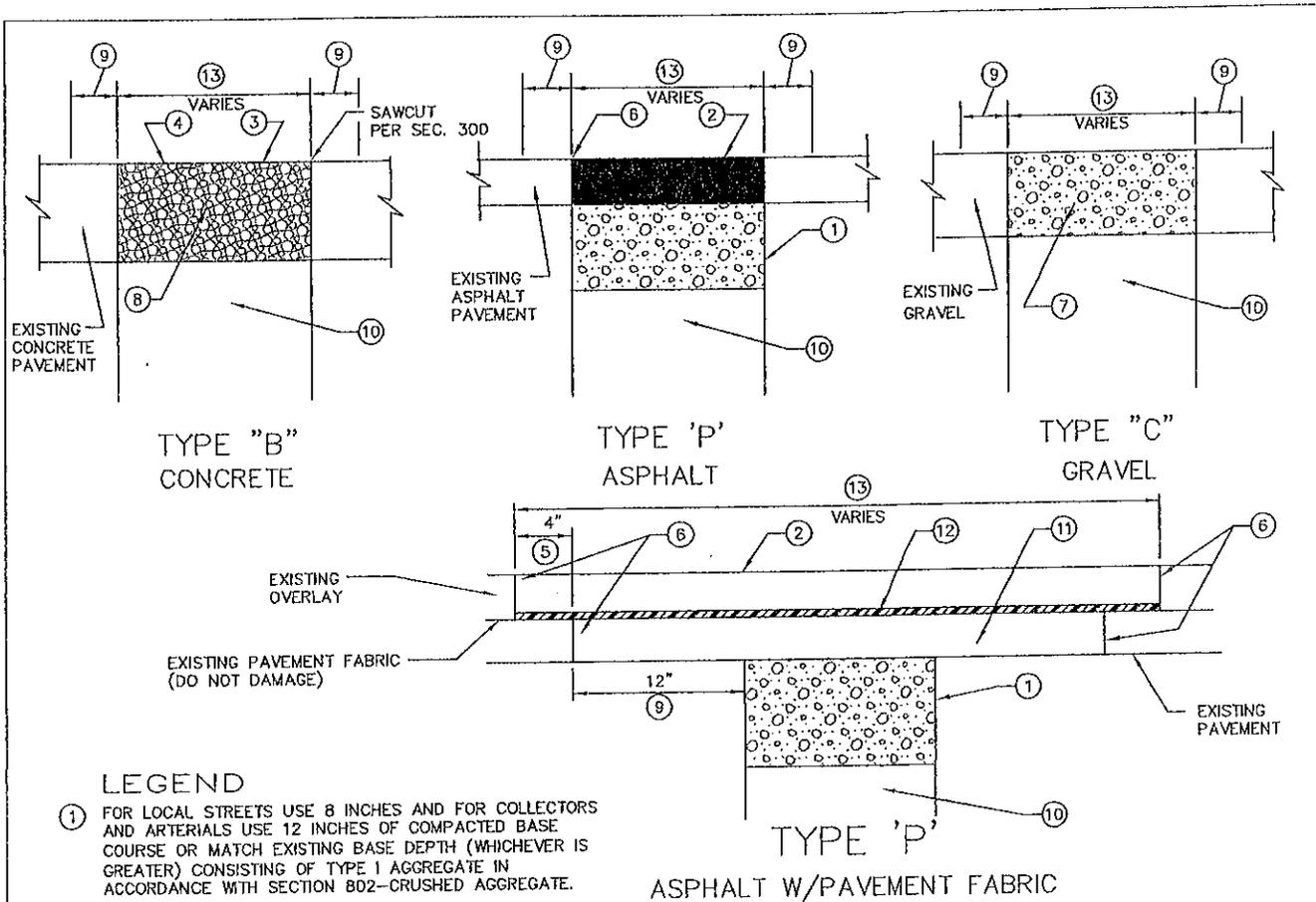
- (A) TRENCH EXCAVATION PER SECTION-301.
- (B) PIPE BEDDING PER SECTION-305.
- (C) BACKFILL AND COMPACTION PER SECTION-306.

OCTOBER 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

**TYPICAL TRENCH**

REVISED STANDARD  
DRAWING NO.  
**SD-301**



### LEGEND

- ① FOR LOCAL STREETS USE 8 INCHES AND FOR COLLECTORS AND ARTERIALS USE 12 INCHES OF COMPACTED BASE COURSE OR MATCH EXISTING BASE DEPTH (WHICHEVER IS GREATER) CONSISTING OF TYPE 1 AGGREGATE IN ACCORDANCE WITH SECTION 802—CRUSHED AGGREGATE.
- ② ASPHALT CONCRETE PAVEMENT THICKNESS IS TO MATCH EXISTING PAVEMENT DEPTH TO A MAXIMUM DEPTH OF 6 INCHES. IN NO CASE SHALL PAVEMENT THICKNESS BE LESS THAN 3 INCHES FOR LOCAL STREETS OR 4 INCHES ON DESIGNATED COLLECTOR AND ARTERIAL STREETS.
- ③ PORTLAND CEMENT CONCRETE SHALL BE CLASS 3000 psi EARLY STRENGTH, AND COMPLY WITH SECTION-706. CUT ASPHALT MAT IN NEAT STRAIGHT LINE.
- ④ KEEP TRAFFIC OFF 72 HOURS, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
- ⑤ MINIMUM DISTANCES. 4-INCH OVERLAP APPLIES WHERE FABRIC IS BETWEEN ASPHALT LAYERS.
- ⑥ CUT ASPHALT IN NEAT STRAIGHT LINE.
- ⑦ 3/4" MINUS AGGREGATE SURFACE COURSE (B") OR THICKNESS OF EXISTING GRAVEL, WHICHEVER IS GREATER.
- ⑧ THICKNESS EQUALS EXISTING PAVEMENT DEPTH PLUS 2" OF CONCRETE OF PAVEMENT.
- ⑨ LOCAL CUTBACK OF 1' BEHIND FURTHEST EDGE OF UNDISTURBED BASE MATERIAL IS REQUIRED.
- ⑩ COMPACTED TRENCH BACKFILL AS PER SD-301 AND SECTION-306 OF THESE SPECIFICATIONS.
- ⑪ ASPHALT TO EXISTING SHELF (MIN 2" THICK).
- ⑫ PLACE NEW PAVEMENT FABRIC FULL WIDTH OF ASPHALT PATCH.
- ⑬ 4' MINIMUM WIDTH FOR SURFACE RESTORATION.

### NOTES:

- (A) REFER TO SECTION-307 FOR MATERIALS AND WORKMANSHIP REQUIREMENTS.
- (B) ALL STREET CUTS WILL REQUIRE RESURFACING BY A PAVING MACHINE OR SPREADER BOX. PATCH WIDTHS ARE NEVER TO BE LESS THAN 4' IN WIDTH. LOCATE THE MATCH OF THE NEW TO EXISTING PAVEMENT OUT OF THE VEHICLE WHEEL PATH OF THE STREET.
- (C) WHERE THE STREET SURFACE INCLUDES AN OVERLAY WITH FABRIC, TAKE THE FOLLOWING ADDITIONAL STEPS:
  - A. INSTALL NEW ASPHALT TO FABRIC GRADE.
  - B. INSTALL NEW FABRIC FULL WIDTH OF CUT, IN ACCORDANCE WITH MANUFACTURE'S INSTRUCTIONS.
  - C. OVERLAY FABRIC WITH ASPHALT TO FINISH GRADE OF STREET.
- (D) TACK ALL COLD JOINT SURFACES WITH EMULSION WHICH HAS BEEN "BROKEN" PRIOR TO PATCHING.

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CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

STREET CUTS AND  
SURFACE REPAIR DETAILS

REVISED STANDARD  
DRAWING NO.  
SD-303

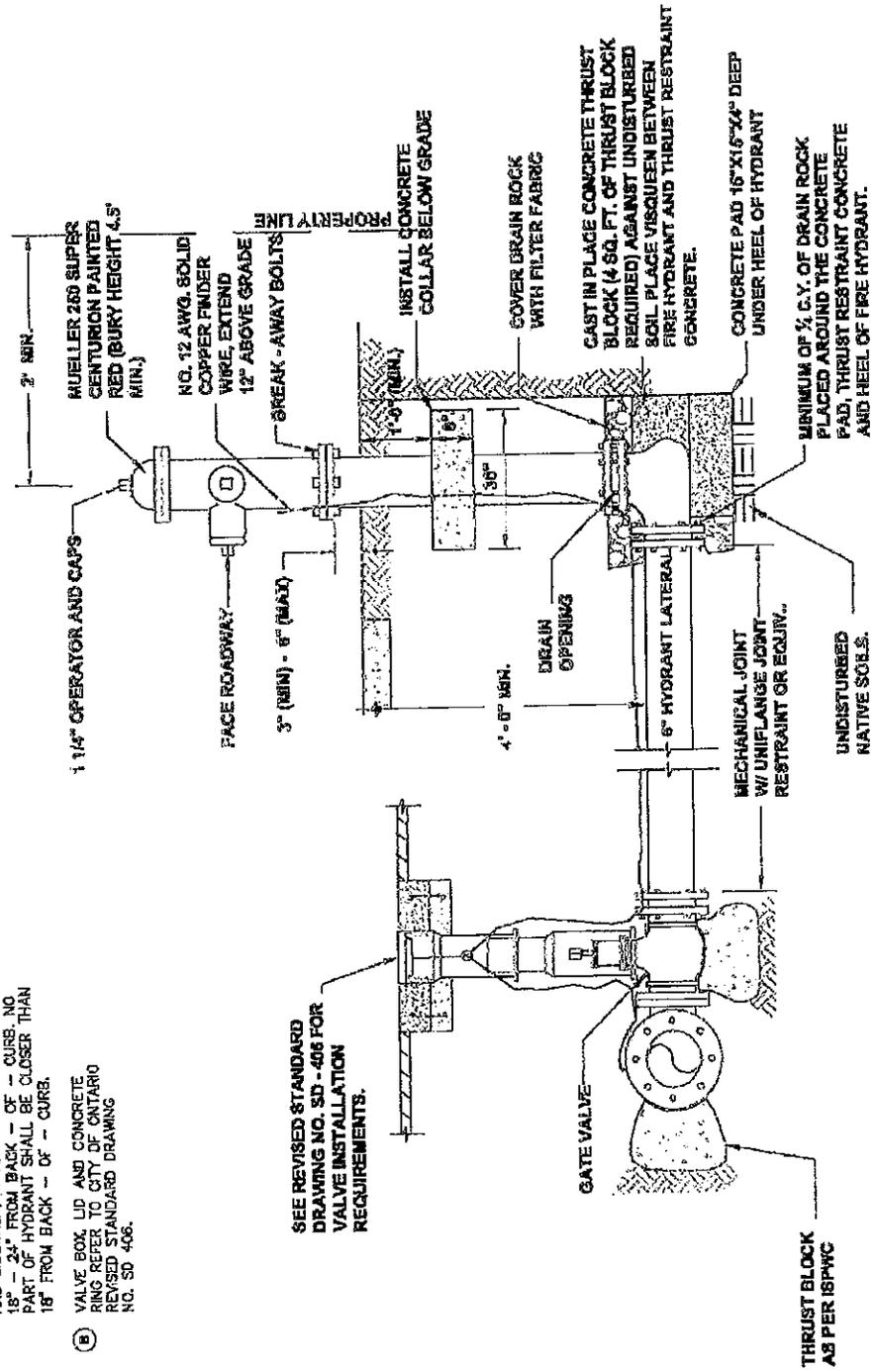


**NOTES:**

(A) IN LOCATIONS WITH NO SIDEWALK OR WHERE HYDRANT IS LOCATED BETWEEN THE CURB AND SIDEWALK, FACE OF HYDRANT SHALL BE 18" - 24" FROM BACK - OF - CURB. NO PART OF HYDRANT SHALL BE CLOSER THAN 18" FROM BACK - OF - CURB.

(B) VALVE BOX LID AND CONCRETE RING REFER TO CITY OF ONTARIO REVISED STANDARD DRAWING NO. SD-406.

SEE REVISED STANDARD DRAWING NO. SD-406 FOR VALVE INSTALLATION REQUIREMENTS.



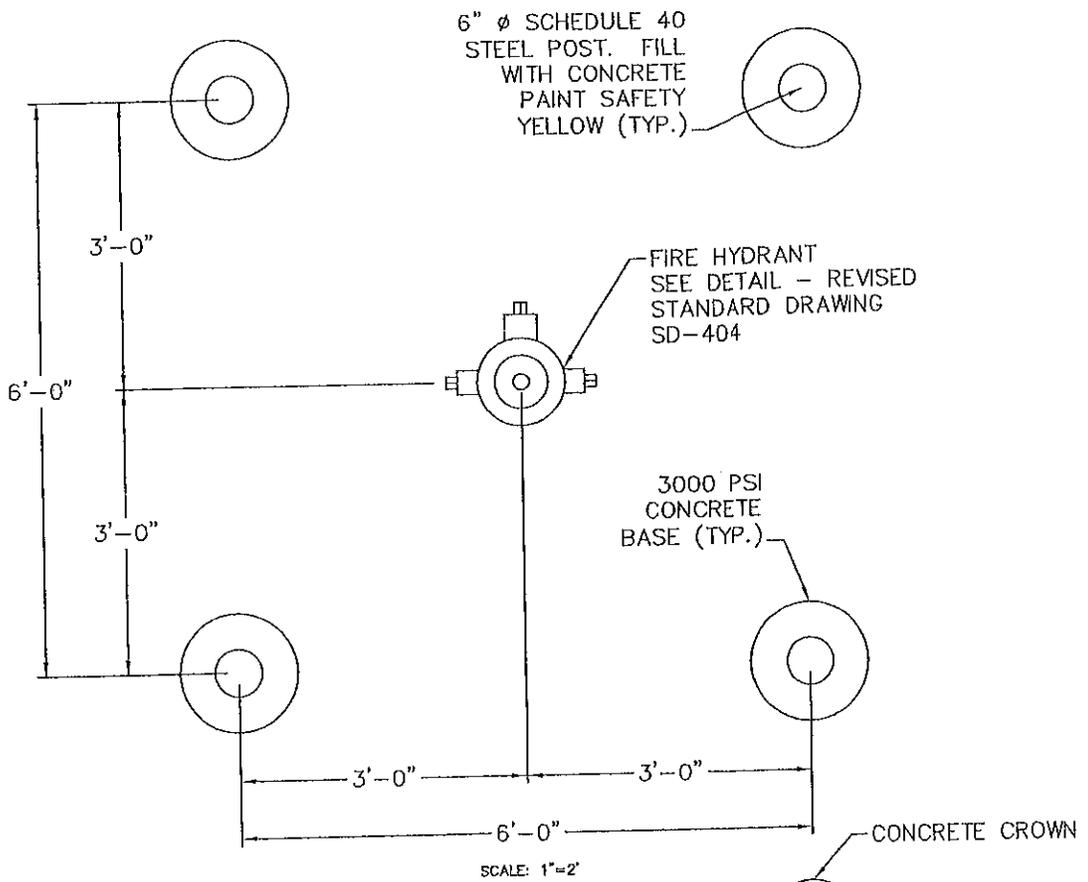
FIRE HYDRANT DETAIL  
NTS

JANUARY 16, 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

FIRE HYDRANT  
DETAIL

REVISED STANDARD  
DRAWING NO.  
SD-404



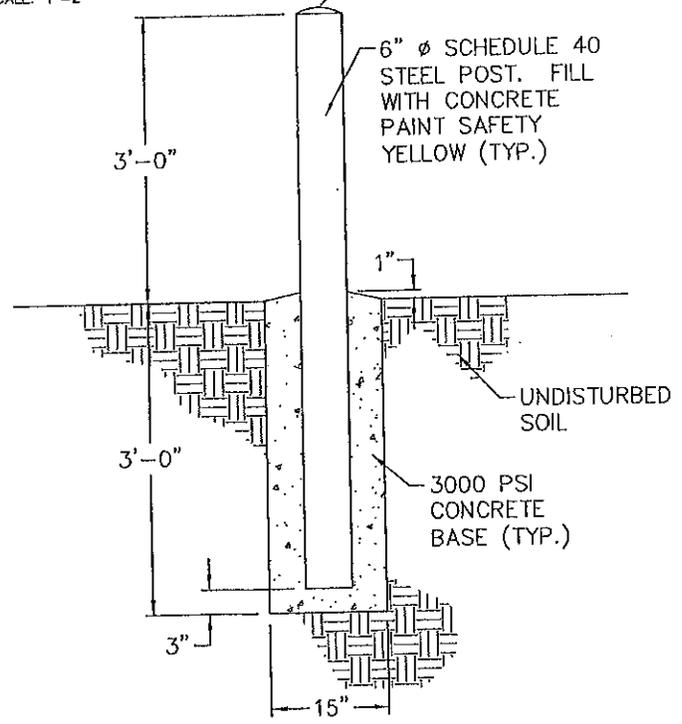
6"  $\phi$  SCHEDULE 40  
STEEL POST. FILL  
WITH CONCRETE  
PAINT SAFETY  
YELLOW (TYP.)

FIRE HYDRANT  
SEE DETAIL - REVISED  
STANDARD DRAWING  
SD-404

3000 PSI  
CONCRETE  
BASE (TYP.)

CONCRETE CROWN

SCALE: 1"=2'



SCALE: 1"=2'

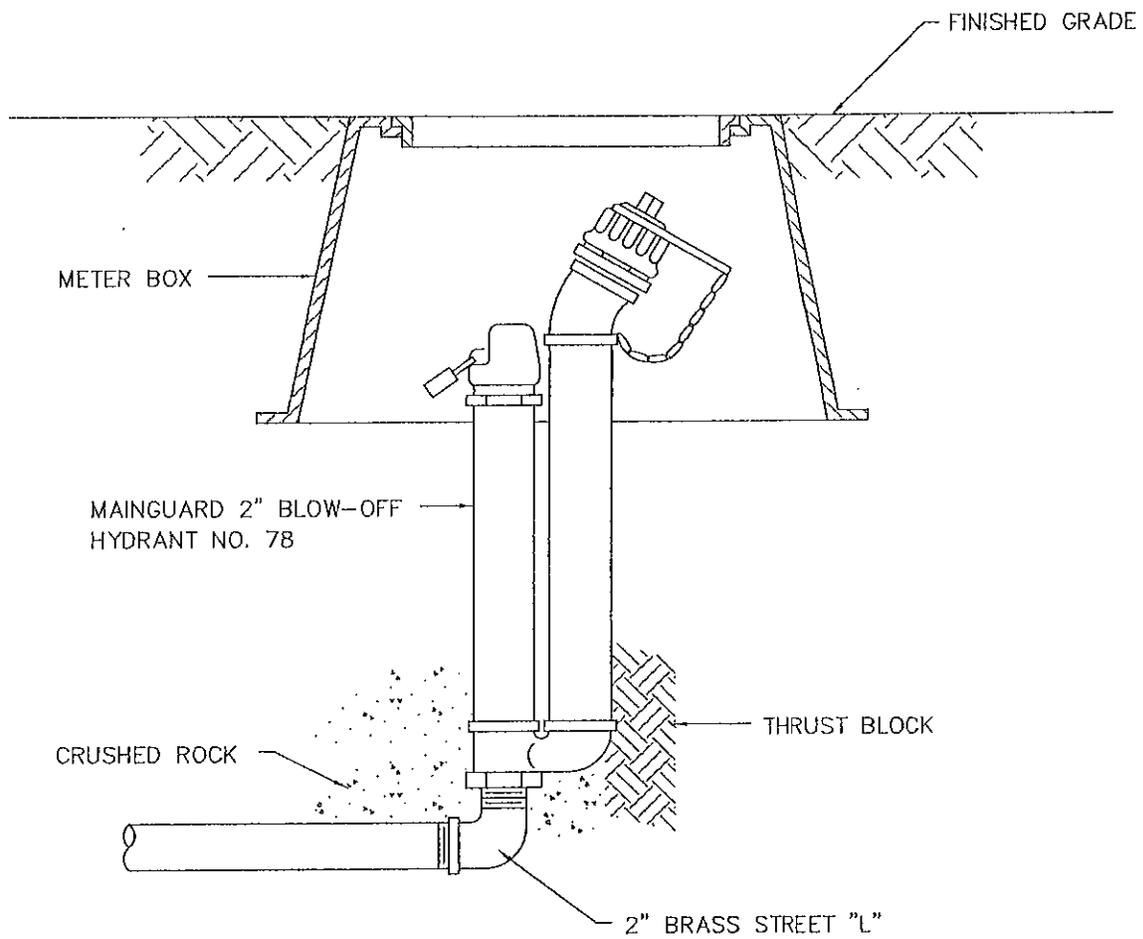
NOTE:  
BOLLARD INSTALLATION  
REQUIREMENTS ARE SUBJECT  
TO CITY APPROVAL AND  
DISCRETION ON QUANTITY OF  
BOLLARDS NEEDED.

OCTOBER 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

# FIRE HYDRANT BOLLARD DETAIL

REVISED STANDARD  
DRAWING  
SD-404A

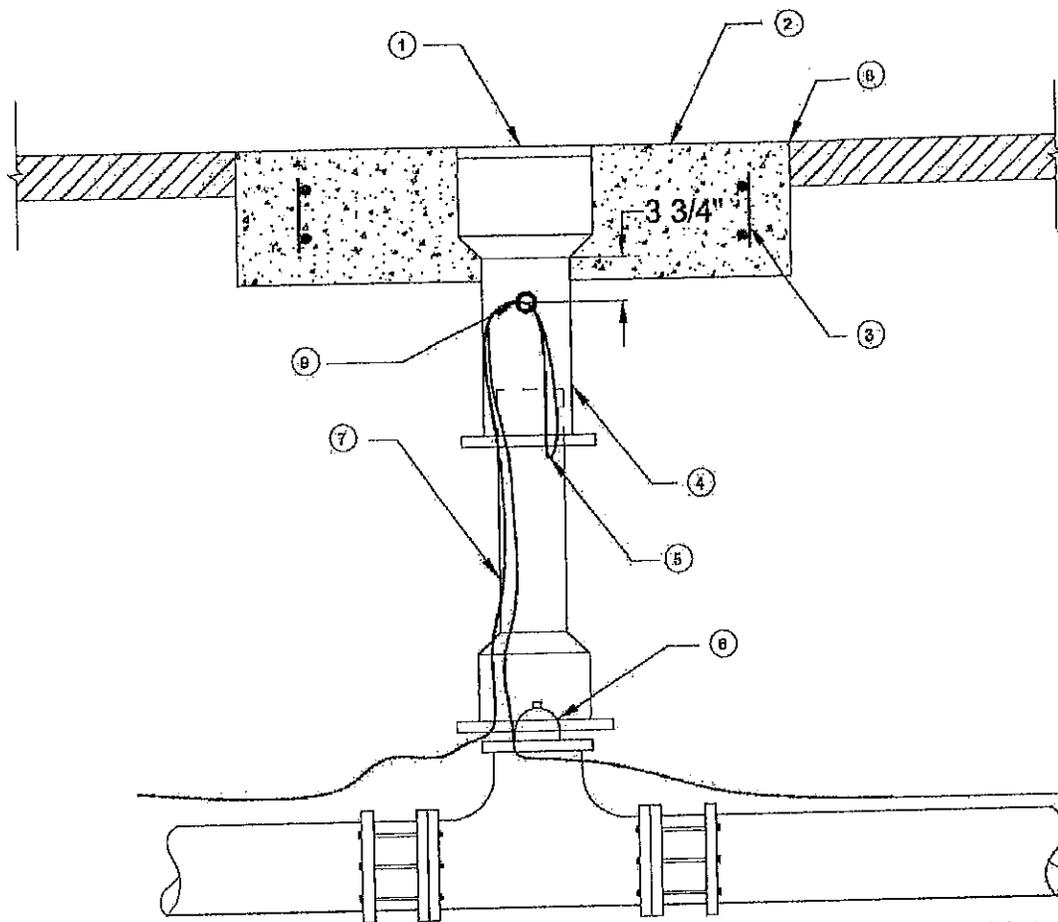


OCTOBER 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

## BLOW-OFF ASSEMBLY

REVISED STANDARD  
DRAWING NO.  
**SD-405**



## VALVE BOX AND LID

N.T.S.

### NOTE:

- (A) ALL PRODUCTS AS INDICATED OR APPROVED SUBSTITUTION.

### LEGEND

- (1) 5 1/4" LOCKING LID IF REQUIRED (TYLER NO. 6855).
- (2) 24"Ø X 6" CONCRETE COLLAR.
- (3) (2) #4 REBAR HOOPS WITH #4 VERTICALS.
- (4) PACK VOID WITH RUBBER SILICONE.
- (6) NO. 12 AWG. COPPER WIRE FINDER.
- (6) VALVE
- (7) CAST IRON VALVE RISER.
- (8) FINISHED GRADE.
- (8) DRILL 7/8" HOLE. INSERT PVC VALVE GROMMET. MANUFACTURED BY RPM ENGINEERING, OR EQUAL.

OCTOBER 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

VALVE BOX AND  
LID DETAIL

REVISED STANDARD  
DRAWING NO.

SD-406



# Rubber & Plastic



## Plastic Injection

Rubber & Plastic

Metal

Home

E-mail

### Method of Manufacturing:

Injection, Transfer & Compression.

Rubber - Prototype Tools Available

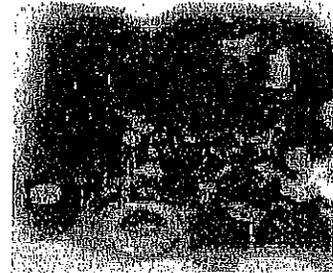
### Materials:

Viton, Silicone, EPDM, Neoprene,  
NBR, SBR, NR, TPE & Santoprene,  
PVC, PP, PE, ABS, Nylon

### Custom Parts to Your Specifications

#### Standard Molded Parts (over 600 types)

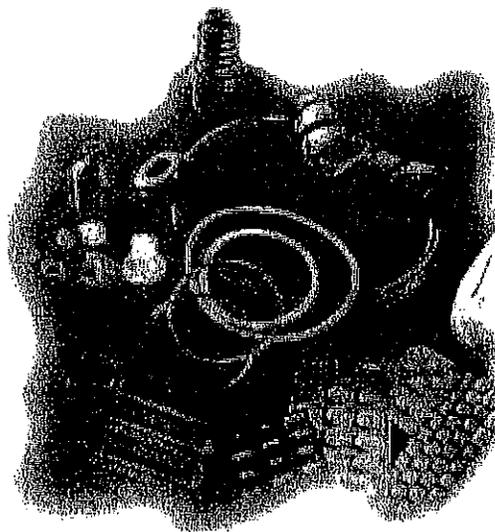
- AS-568 O-Rings
- AN931-Grommets
- End Bumpers
- Button Bumpers
- Stem Bumpers
- Recessed Bumpers
- Stoppers
- Suction Cups
- Crutch Tips
- Tack & Screw Bumpers
- Self-Adhesive Bumpers



RPM Engineering Corp.  
1515 Carterville Pike  
Suite 209  
Virginia Beach, VA 23464  
Tel: 888-467-0818  
1-757-602-6482  
Fax: 800-773-8744  
1-757-602-6485  
rpm@rpm-engineering.com



### Rubber and Metal Bonding





# Rubber & Plastic

Rubber & Plastic

Metal

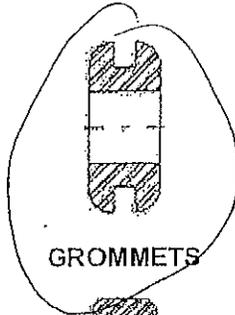
Home

E-mail

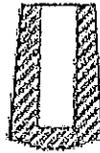
RPM Engineering Corp.  
1616 Centerville Tpke  
Suite 209  
Virginia Beach, VA 23464  
Tel: 888-467-0818  
1-757-602-6462  
Fax: 800-773-8744  
1-757-602-6465  
rpm@rpm-engineering.com



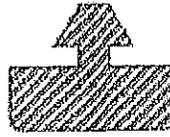
## - Rubber Molded Parts & Plastic Parts Details-



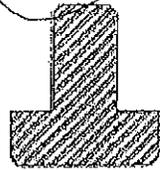
GROMMETS



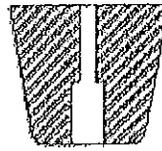
END BUMPERS



BUTTON BUMPERS



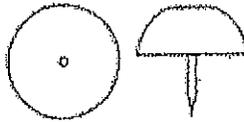
STEM BUMPERS



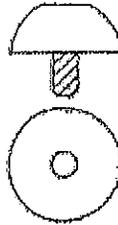
RECESSED BUMPERS



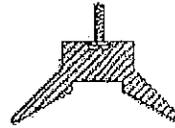
STOPPERS



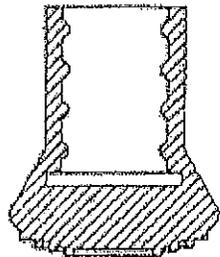
TACK BUMPER



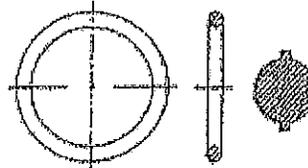
SCREW BUMPER



SUCTION CUPS



CRUTCH TIPS



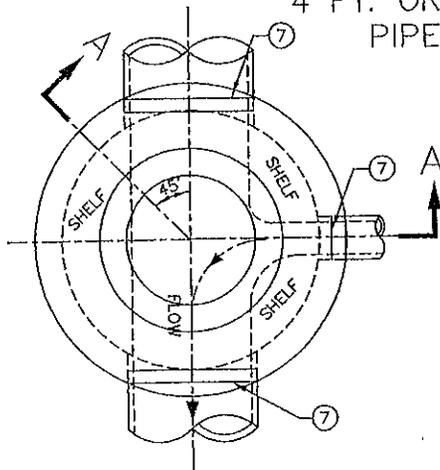
AS-568 O-RING



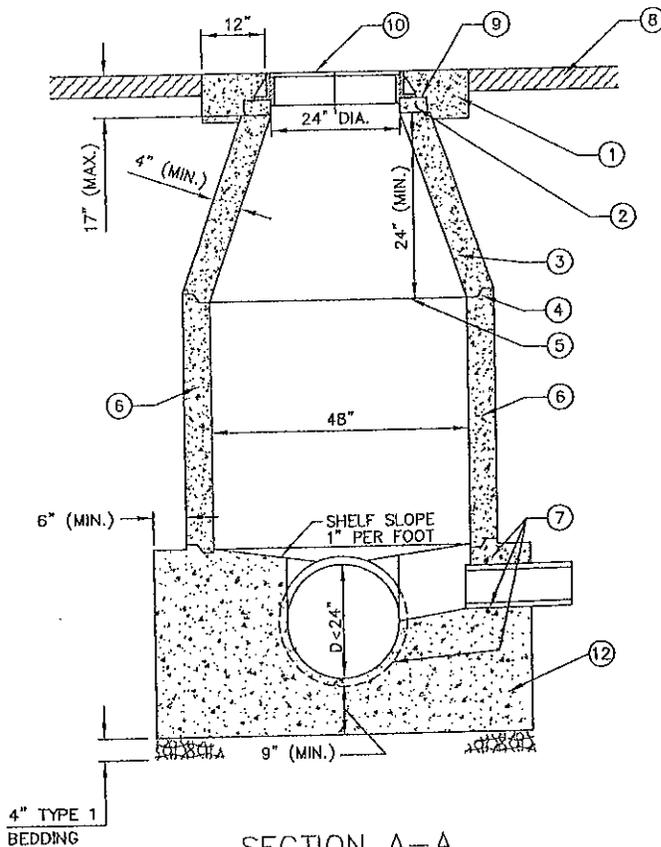
SELF-ADHESIVE BUMPERS

[BACK!](#)

4 FT. OR GREATER DEPTH,  
PIPE DIA. ≤ 24"



PLAN  
N.T.S.



SECTION A-A  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-508.
- ② GRADE RINGS GROUTED WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ PRECAST MONOLITHIC CONCENTRIC CONE SECTION. (REBAR NOT SHOWN).
- ④ RAMNEK OR APPROVED GASKETS ALL JOINTS.
- ⑤ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑥ PRECAST CONCRETE MANHOLE-BARREL SECTION (REBAR NOT SHOWN).
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR-FLEXIBLE AND WATER TIGHT.
- ⑧ REPLACEMENT SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑨ FRAME TO BE GROUTED TO GRADE RINGS.
- ⑩ FRAME AND COVER PER SD-507.
- ⑫ CAST IN PLACE MANHOLE BASE. SEE SD-501A FOR PREFABRICATED BASE.

NOTES:

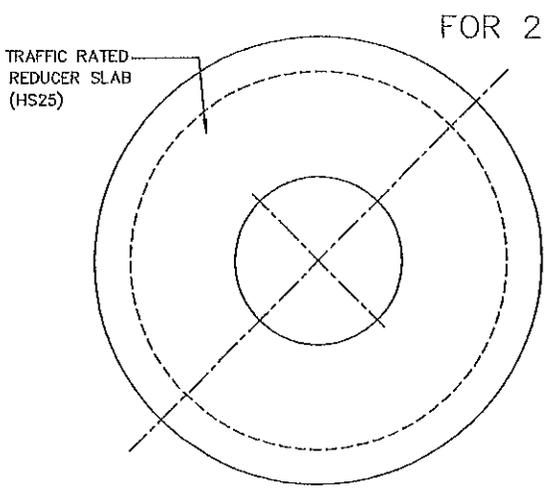
- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-501A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) FOR DIAMETER, D, GREATER THAN 24", SEE SD-502 OR SD-503.
- (D) MANHOLE FRAME AND COVER:  
A. REFER TO DRAWING NO. SD-507.  
B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
- (E) WHERE PVC PIPE IS UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (F) EITHER BASE ON SD-501 OR SD-501A MAY BE USED WITH ANY MANHOLE DESIGN.
- (G) PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADINGS.
- (H) NO MANHOLE STEPS TO BE INSTALLED.

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STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

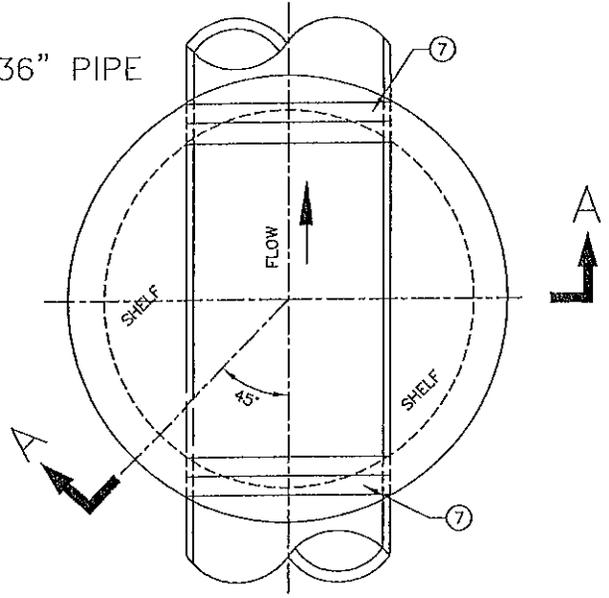
STANDARD MANHOLE  
TYPE A

REVISED STANDARD  
DRAWING NO.  
SD-501

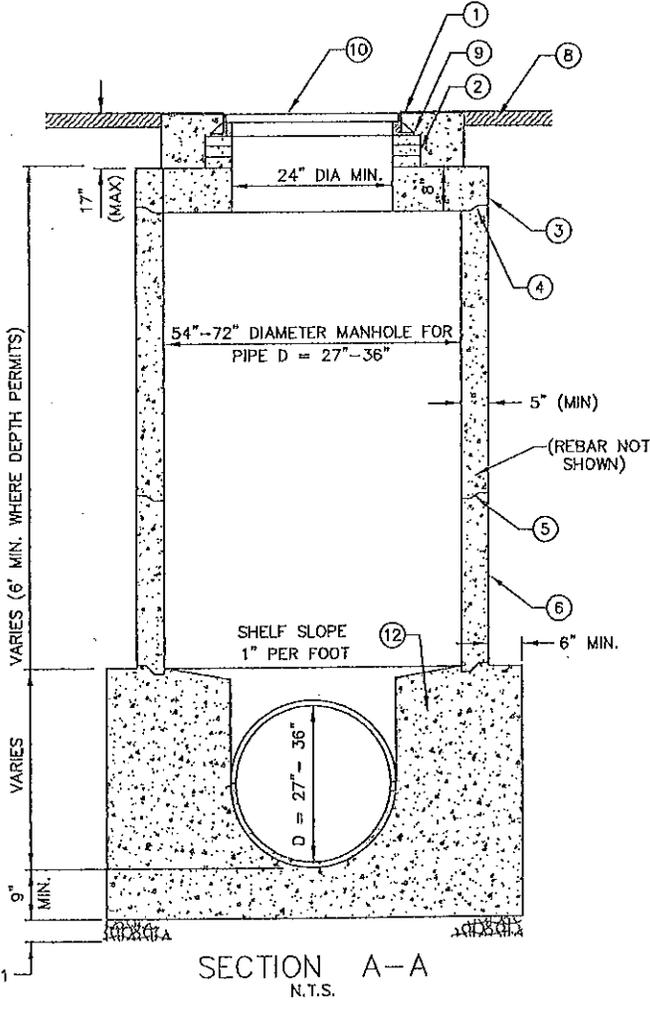


FOR 27" - 36" PIPE

STANDARD SLAB TOP DETAILS  
N.T.S.



PLAN  
N.T.S.



SECTION A-A  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-508.
- ② GRADE RINGS GROUTED WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ REINFORCED CONCRETE REDUCER SLAB WITH ACCESS HOLE IN CENTER OF SLAB.
- ④ RAMNEK OR APPROVED GASKET AT ALL JOINTS.
- ⑤ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑥ PRECAST CONCRETE MANHOLE BARREL SECTION (REBAR NOT SHOWN), 54"-72" RCP.
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR-FLEXIBLE AND WATER TIGHT.
- ⑧ REPLACEMENT SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑨ FRAME TO BE GROUTED TO GRADE RINGS.
- ⑩ FRAME AND COVER PER SD-507 OR SD-507A.
- ⑫ CAST-IN-PLACE MANHOLE BASE. SEE SD-502A FOR PREFABRICATED BASE.

NOTES:

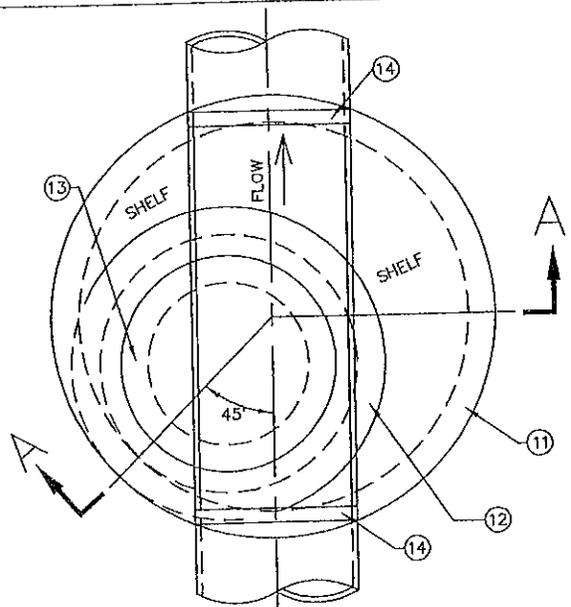
- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-502A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) FOR EXTRA DEPTH MANHOLE, SEE SD-503 "STANDARD MANHOLE TYPE B, DEEP".
- (D) MANHOLE FRAME AND COVER:  
A. REFER TO DRAWING NO. SD-507 (24" OPENING) OR SD-508 (30" OPENING).  
B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
- (E) WHERE PVC IS PIPE UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (F) PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADINGS.
- (G) NO MANHOLE STEPS TO BE INSTALLED.

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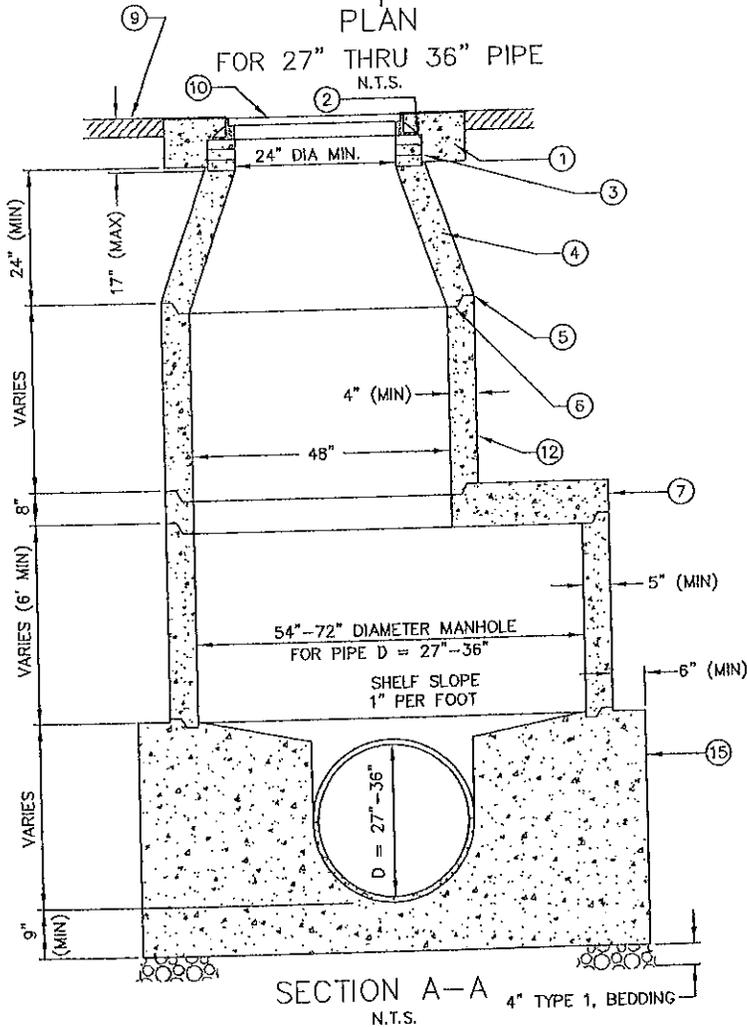
CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

STANDARD MANHOLE  
TYPE B

REVISED STANDARD  
DRAWING NO.  
SD-502



FOR 27" THRU 36" PIPE  
N.T.S.



**LEGEND**

- ① CONCRETE COLLAR PER SD-508.
- ② FRAME TO BE GROUTED TO GRADE RINGS, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ GRADE RINGS GROUT WATER TIGHT IN PLACE.
- ④ PRECAST MONOLITHIC CONCENTRIC CONE.
- ⑤ RAMNEK OR APPROVED GASKETS ALL JOINTS.
- ⑥ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑦ REINFORCED CONCRETE REDUCER SLAB AS APPROVED BY THE ENGINEER.
- ⑨ REPLACEMENT SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑩ FRAME AND COVER PER SD-507 OR SD-507A.
- ⑪ 54" RCP THRU 72" RCP PIPE.
- ⑫ 48" DIAMETER BARREL SECTION.
- ⑬ 24" DIA GRADE RINGS.
- ⑭ PREGASKETED HUB RING OR RUBBER GASKETED COLLAR--FLEXIBLE AND WATER TIGHT.
- ⑮ CAST-IN-PLACE MANHOLE BASE. SEE SD-502A FOR PREFABRICATED BASE.

**NOTES:**

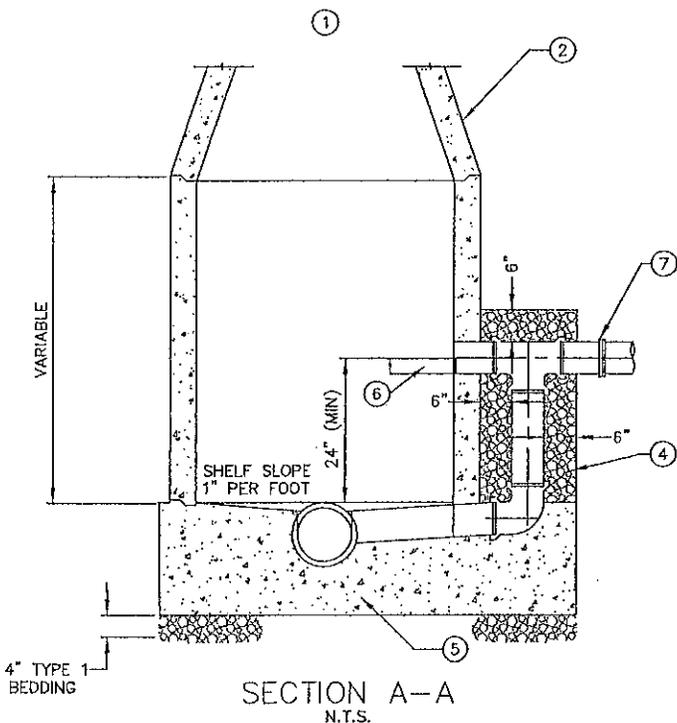
- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-502A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) MANHOLE FRAME AND COVER:  
A. REFER TO DRAWING NO. SD-507 (24" OPENING) OR SD-508 (30" OPENING).  
B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
- (D) WHERE PVC PIPE IS UTILIZED, A RUBBER RING OR GASKET COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (E) PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADINGS.
- (F) PIPE MAIN CANNOT BE INSTALLED CONTINUOUSLY THROUGH BASE.
- (G) NO MANHOLE STEPS TO BE INSTALLED.

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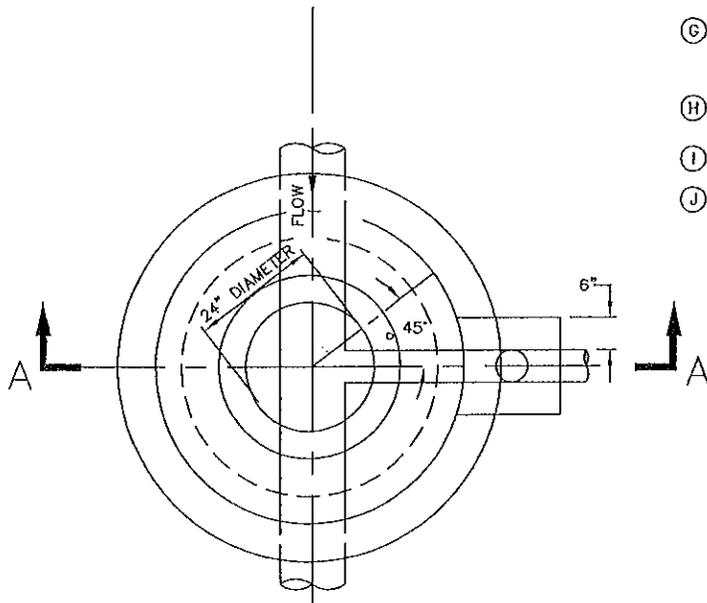
CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

STANDARD MANHOLE  
TYPE B, DEEP

REVISED STANDARD  
DRAWING NO.  
SD-503



SECTION A-A  
N.T.S.



PLAN  
N.T.S.

LEGEND

- ① FRAME AND COVER PER STANDARD DRAWING SD-507.
- ② MANHOLE PER REVISED STANDARD DRAWING SD-501, SD-502 OR SD-503.
- ④ TYPE 1 BEDDING MATERIAL.
- ⑤ CONCRETE BASE CAST IN PLACE PER SECTION 703.
- ⑥ EXTEND HALF PIPE DIAMETER INTO MANHOLE A MINIMUM OF 12".
- ⑦ FLEXIBLE JOINT.

NOTES:

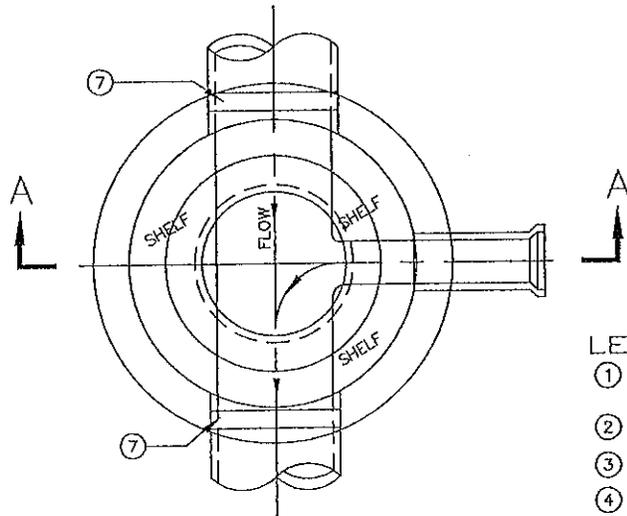
- (A) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (B) MANHOLE FRAME AND COVER  
A. REFER TO STANDARD DRAWING SD-507.  
B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
- (C) CONSTRUCT BASIC MANHOLE PER TYPE SPECIFIED.
- (D) WHERE PVC PIPE IS UTILIZED, A RUBBER RING OR GASKETED COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (E) IF THE DROP MANHOLE IS ON THE UPSTREAM SIDE, ROTATE MANHOLE 180 DEGREES SO THE VERTICAL WALL WILL BE DOWNSTREAM.
- (F) REFER TO STANDARD DRAWING NO SD-509 FOR STEP SPECIFICATIONS.
- (G) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEER'S APPROVAL, SEE SD-501A.
- (H) PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADINGS.
- (I) FITTINGS TO BE DUCTILE IRON OR PVC.
- (J) NO MANHOLE STEPS TO BE INSTALLED.

OCTOBER 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

DROP  
MANHOLE

REVISED STANDARD  
DRAWING NO.  
SD-504



PLAN

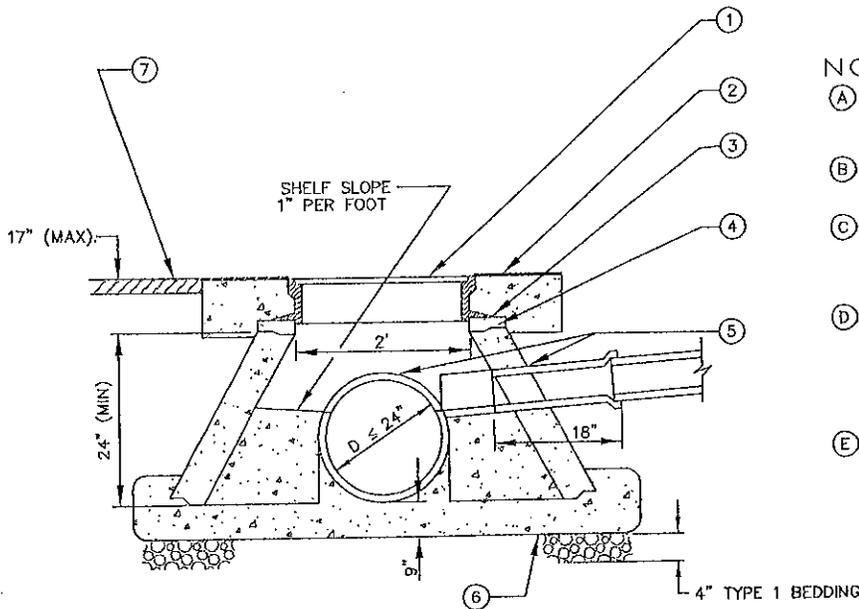
N.T.S.

LEGEND

- ① FRAME AND COVER PER STANDARD DRAWING SD-507.
- ② CONCRETE COLLAR PER SD-508.
- ③ FRAME TO BE GROUTED TO GRADE RINGS.
- ④ GRADE RINGS GROUTED IN PLACE.
- ⑤ CORE-DRILL THROUGH PRECAST SECTION.
- ⑥ CAST IN PLACE OR PRECAST CONCRETE BASE.
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR-FLEXIBLE AND WATER TIGHT.

NOTES:

- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-501A.
- (B) FOR DIAMETER, D, GREATER THAN 24", SEE SD-502" STANDARD MANHOLE TYPE B".
- (C) MANHOLE FRAME AND COVER:  
A. REFER TO DRAWING NO. SD-507.  
B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
- (D) WHERE PVC PIPE IS UTILIZED, A RUBBER RING OR GASKET COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (E) PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADING.



SECTION A-A

≥ 30" DEEP AND ≤ 48" DEEP

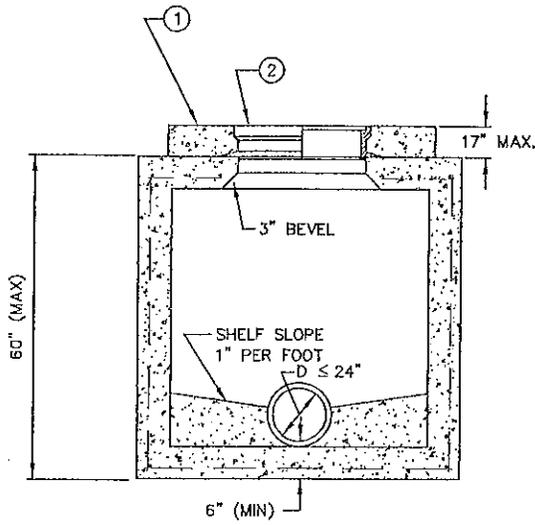
N.T.S.

OCTOBER 2007

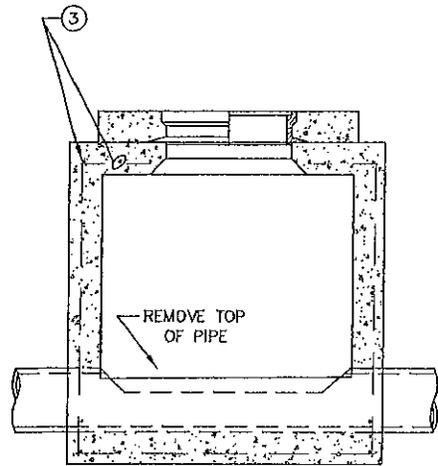
CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

STANDARD SHALLOW  
MANHOLE

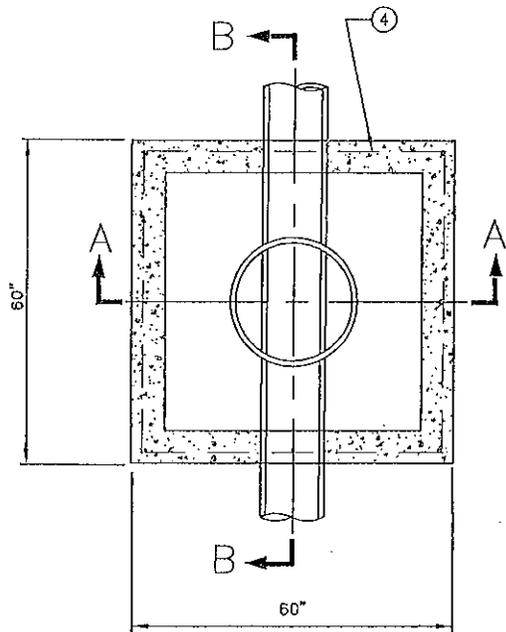
REVISED STANDARD  
DRAWING NO.  
SD-505



SECTION A-A  
N.T.S.



SECTION B-B  
N.T.S.



TOP VIEW  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-508.
- ② FRAME AND COVER WITH GRADE RINGS AS REQUIRED.
- ③ #4 BARS 6" O.C BOTH WAYS, CUT TO MISS OPENING IN TOP.
- ④ #4 BARS ALL CORNERS AND 24" O.C.

NOTES:

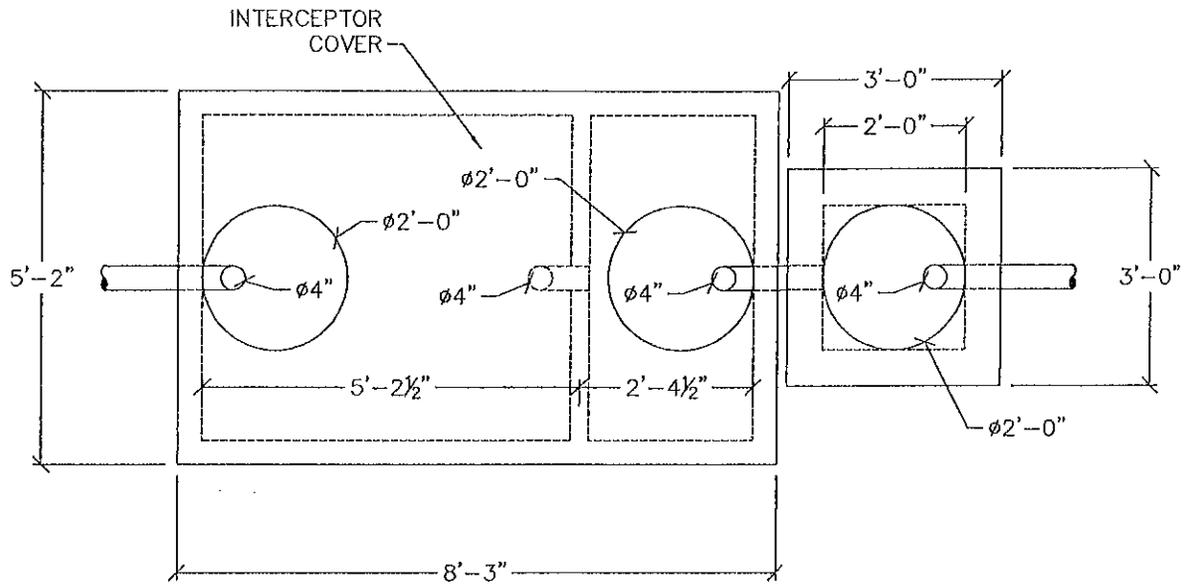
- (A) ALL WALLS AND BOTTOM MINIMUM 6" THICK.
- (B) USE WITH MANHOLES GREATER THAN 30" DEEP AND LESS THAN 48" DEEP TO FLOWLINE OF PIPE.
- (C) MANHOLE FRAME AND COVER:
  - A. PER SD-507A.
  - B. FRAME AND COVER SHALL BE FLUSH WITH FINISH GRADE OF PAVEMENT.
- (D) USE WITH 8" DIAMETER THROUGH 24" DIAMETER PIPE ONLY.
- (E) WHERE PVC PIPE IS UTILIZED, A RUBBER RING OR GASKET COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE CHANNEL, IN ORDER TO INSURE WATERTIGHT SEAL.
- (F) SHALLOW MANHOLE TYPE 1 SUBJECT TO ENGINEER'S APPROVAL.
- (G) PROVIDE MANHOLE CONCRETE REINFORCING TO ACCOMMODATE TRAFFIC LOADINGS.

OCTOBER 2007

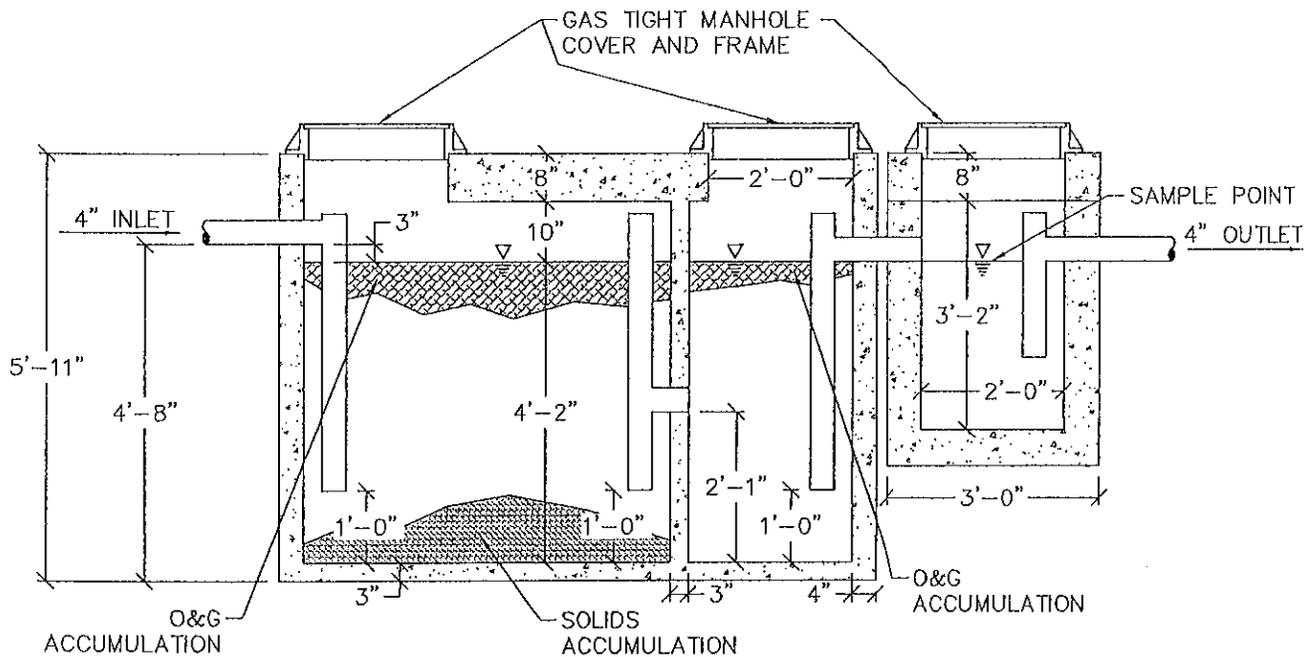
CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

SHALLOW MANHOLE  
TYPE 1

REVISED STANDARD  
DRAWING NO.  
SD-505A



PLAN VIEW



ELEVATION VIEW

GREASE INTERCEPTOR DETAIL

NOT TO SCALE

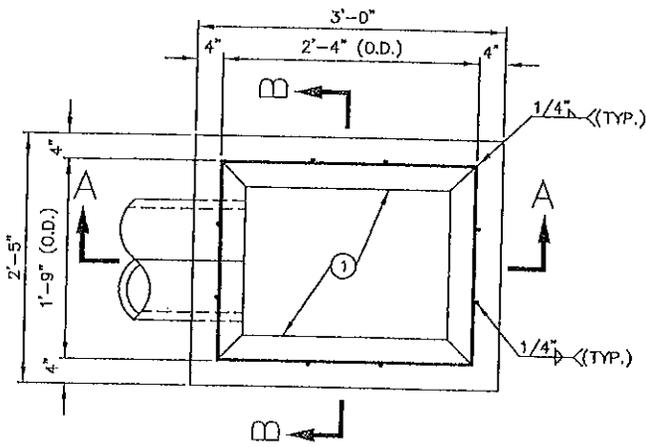
NOTE: DIMENSIONS SHOWN ARE MINIMUMS. ACTUAL SIZE TO BE DETERMINED BY PROJECT ENGINEER.

OCTOBER 2007

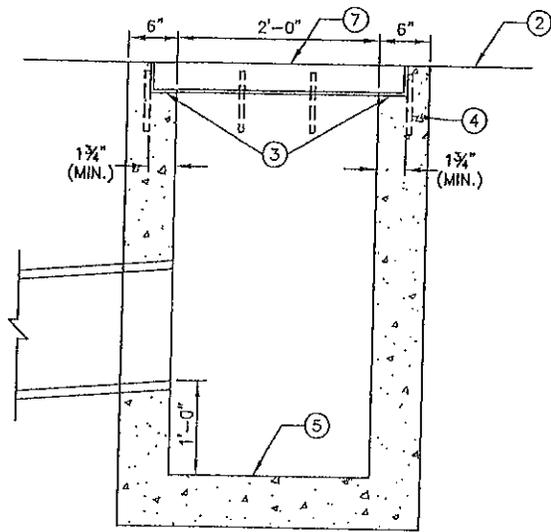
CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

GREASE INTERCEPTOR

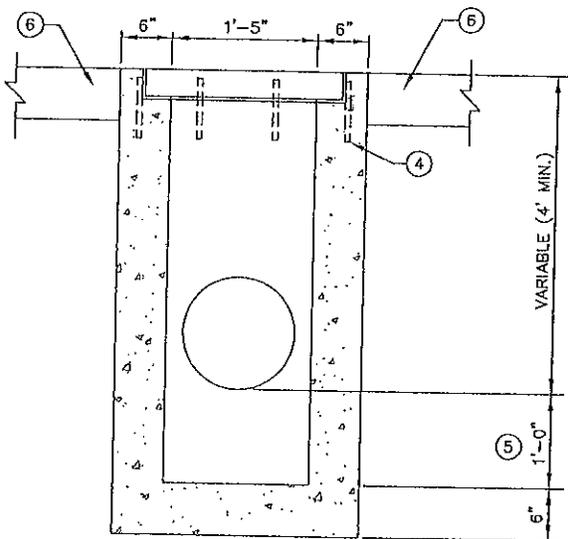
REVISED STANDARD  
DRAWING NO.  
SD-520



PLAN  
N.T.S.



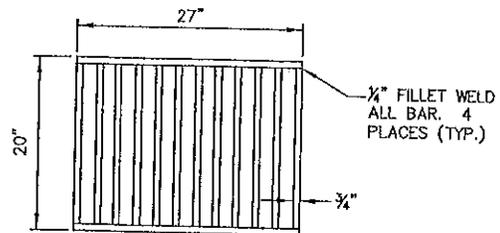
SECTION A-A  
N.T.S.



SECTION B-B  
N.T.S.

LEGEND

- ① 2 - ANGLES 1 3/4" x 1/4" x 28".
- ② FINISHED SURFACE.
- ③ 2 - ANGLES 1 3/4" x 1/4" x 21".
- ④ 2 - 7" NO. 4 BAR EACH SIDE, WELDED TO FRAME.
- ⑤ 1'-0" SUMP.
- ⑥ PAVEMENT SURFACE.
- ⑦ REVISED GRATE - 1 1/2" x 3/4" FLAT BAR  
12 - 18 1/2" EVENLY SPACED AND 2 - 27".



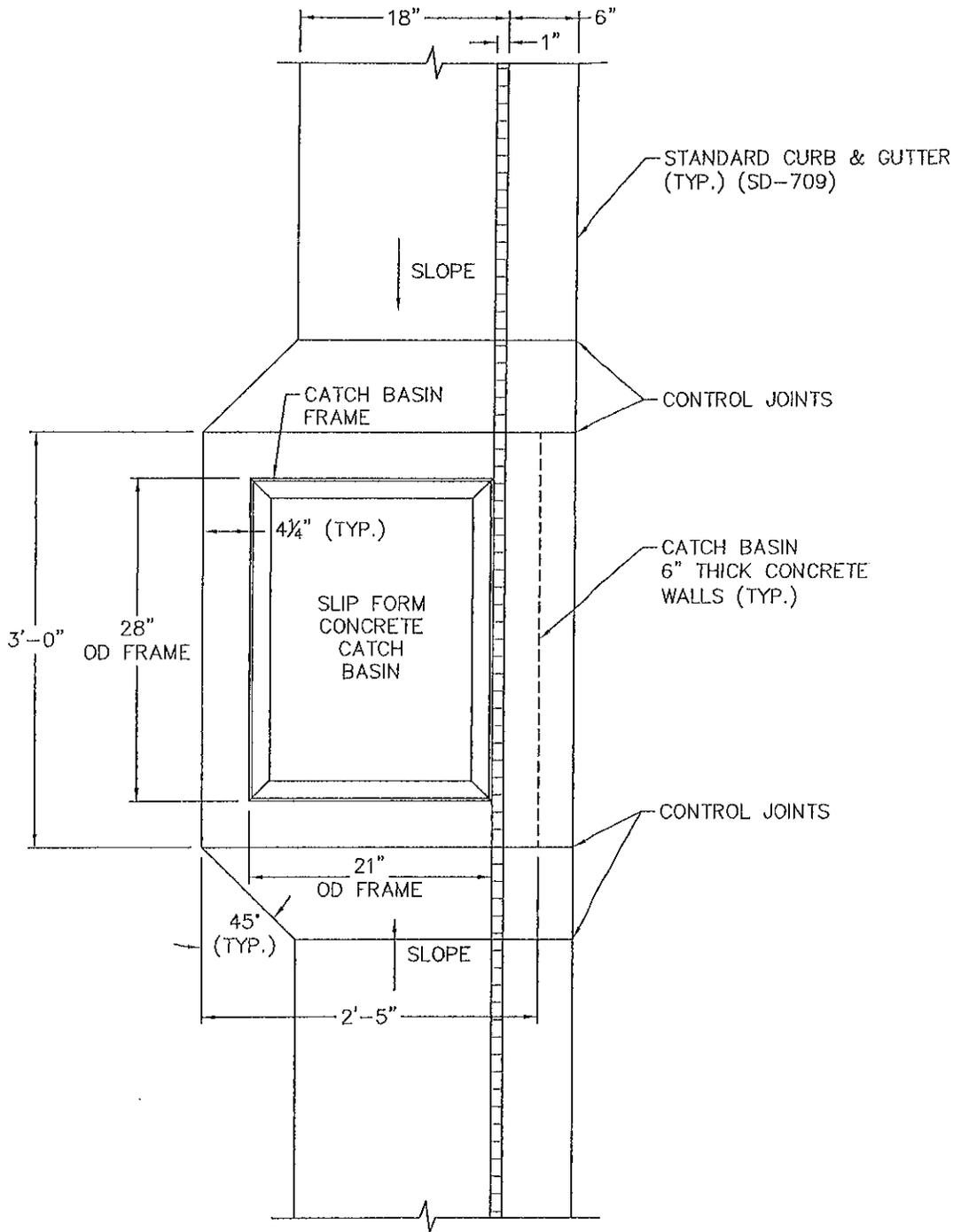
REVISED GRATE DETAIL  
N.T.S.

OCTOBER 2007

CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

INLET CATCH BASIN  
TYPE III

REVISED STANDARD  
DRAWING NO.  
SD-603



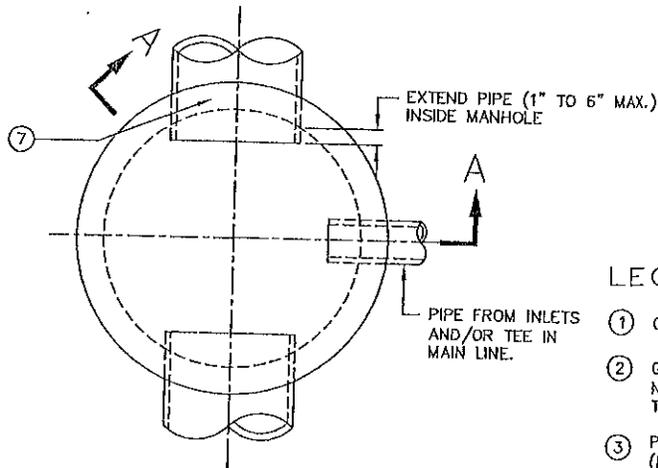
N.T.S.

OCTOBER 2007

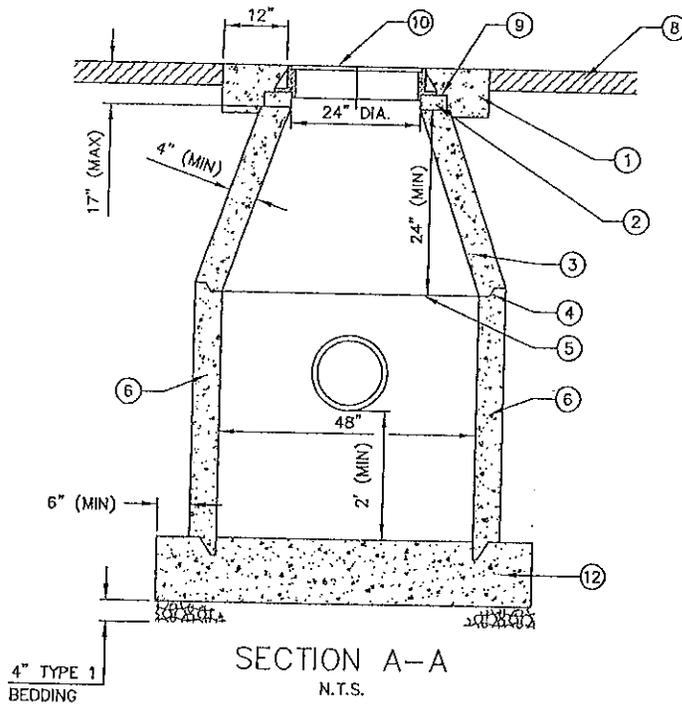
CITY OF ONTARIO  
STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

CATCH BASIN TYPE III  
INSTALLATION

REVISED STANDARD  
DRAWING NO.  
SD-603A



PLAN  
N.T.S.



SECTION A-A  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-616.
- ② GRADE RINGS GROUTED WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ PRECAST MONOLITHIC CONCENTRIC CONE SECTION. (REBAR NOT SHOWN).
- ④ RAMNEK OR APPROVED GASKETS AT ALL JOINTS.
- ⑤ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑥ PRECAST CONCRETE MANHOLE BARREL SECTION (REBAR NOT SHOWN).
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR.
- ⑧ SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AS SHOWN).
- ⑨ FRAME TO BE GROUTED TO GRADE RINGS.
- ⑩ FRAME AND COVER PER SD-617.
- ⑫ SEE SD-501 FOR CAST IN PLACE MANHOLE BASE. SEE SD-501A FOR PREFABRICATED BASE.

NOTES:

- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-501A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) FOR INLET PIPE DIAMETER, D, GREATER THAN 24", SEE SD-613 OR SD-614.
- (D) MANHOLE FRAME AND COVER:
  - A. REFER TO DRAWING NO. SD-617.
  - B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
  - C. "STORM DRAIN" ON COVER.
- (E) WHERE PVC PIPE IS UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (F) EITHER BASE ON SD-501 OR SD-501A MAY BE USED WITH EITHER MANHOLE DESIGN.
- (G) NO MANHOLE STEPS TO BE INSTALLED.

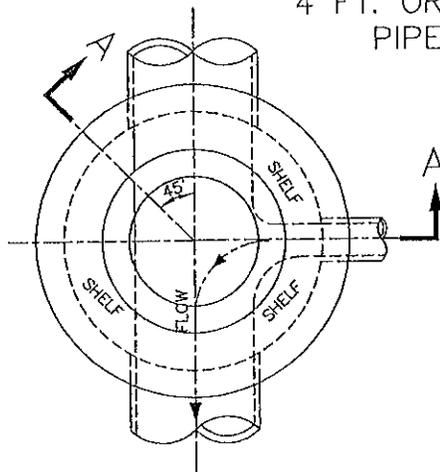
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STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

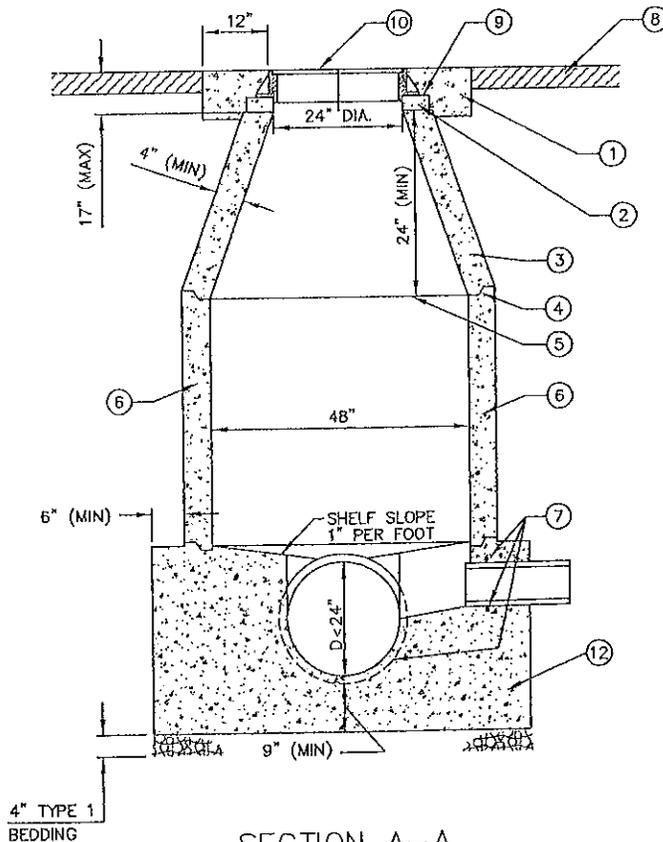
STANDARD CONCRETE  
CATCH MANHOLE

REVISED STANDARD  
DRAWING NO.  
SD-611

4 FT. OR GREATER DEPTH,  
PIPE DIA.  $\leq$  24"



PLAN  
N.T.S.



SECTION A-A  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-616.
- ② GRADE RINGS GROUTED WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ PRECAST MONOLITHIC CONCENTRIC CONE SECTION. (REBAR NOT SHOWN).
- ④ RAMNEK OR APPROVED GASKETS AT ALL JOINTS.
- ⑤ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑥ PRECAST CONCRETE MANHOLE BARREL SECTION (REBAR NOT SHOWN) 54"-72" RCP.
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR.
- ⑧ SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑨ FRAME TO BE GROUTED TO GRADE RINGS.
- ⑩ FRAME AND COVER PER SD-617.
- ⑫ CAST-IN-PLACE MANHOLE BASE. SEE SD-501A FOR PREFABRICATED BASE.

NOTES:

- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-501A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) FOR DIAMETER, D, GREATER THAN 24", SEE SD-613 OR SD-614.
- (D) MANHOLE FRAME AND COVER:
  - A. REFER TO DRAWING NO. SD-617.
  - B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
  - C. "STORM DRAIN" ON COVER.
- (E) WHERE PVC PIPE IS UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (F) EITHER BASE ON SD-501 OR SD-501A MAY BE USED WITH EITHER MANHOLE DESIGN.
- (G) NO MANHOLE STEPS TO BE INSTALLED.

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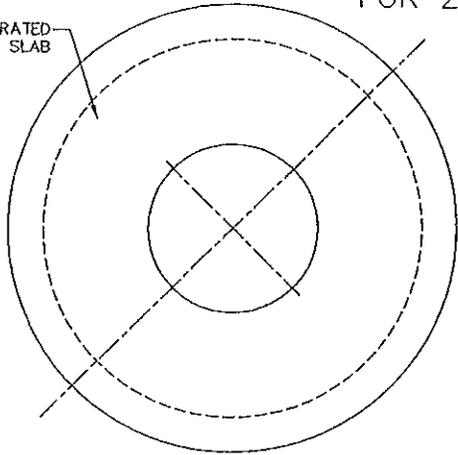
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STANDARD MANHOLE  
TYPE A

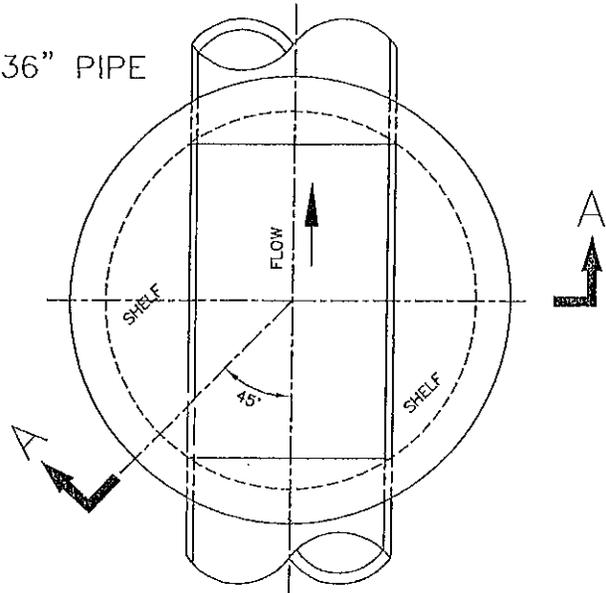
REVISED STANDARD  
DRAWING NO.  
SD-612

TRAFFIC RATED REDUCER SLAB (HS25)

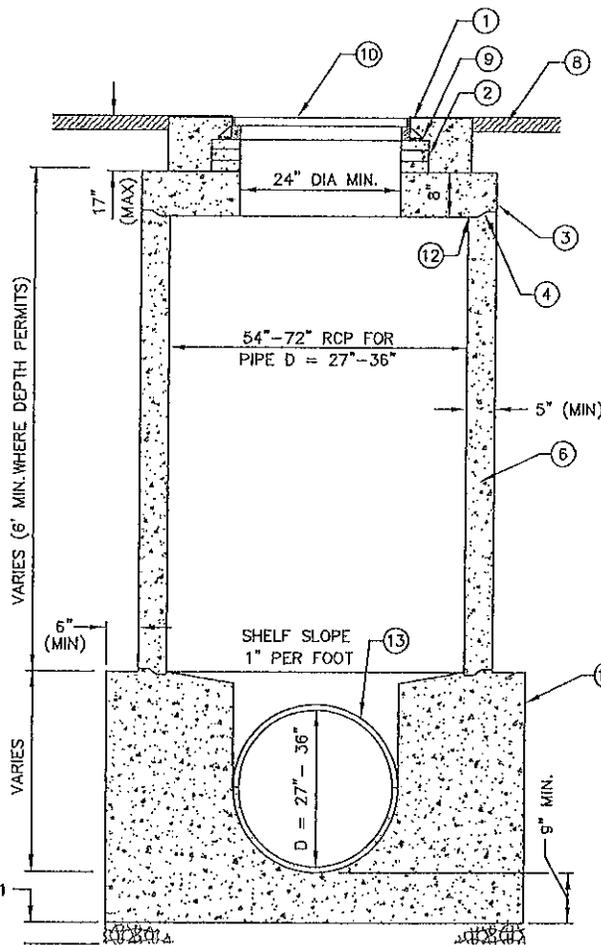
FOR 27" - 36" PIPE



STANDARD REDUCER SLAB TOP DETAILS  
N.T.S.



PLAN  
N.T.S.



SECTION A-A  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-616.
- ② GROUT GRADE RINGS WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ REINFORCED CONCRETE REDUCER SLAB WITH ACCESS HOLE IN CENTER OF SLAB.
- ④ RAMNEK OR APPROVED GASKETS AT ALL JOINTS.
- ⑤ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑥ PRECAST CONCRETE MANHOLE BARREL SECTION (REBAR NOT SHOWN) 54"-72" RCP.
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR.
- ⑧ SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑨ FRAME TO BE GROUTED TO GRADE RINGS.
- ⑩ FRAME AND COVER PER SD-617.
- ⑫ GROUT SMOOTH ALL INTERIOR JOINTS.
- ⑬ CUT OUT RCP MANHOLE TO CONFORM TO PIPE.
- ⑭ CAST-IN-PLACE MANHOLE BASE. SEE SD-502A FOR PREFABRICATED BASE.

NOTES:

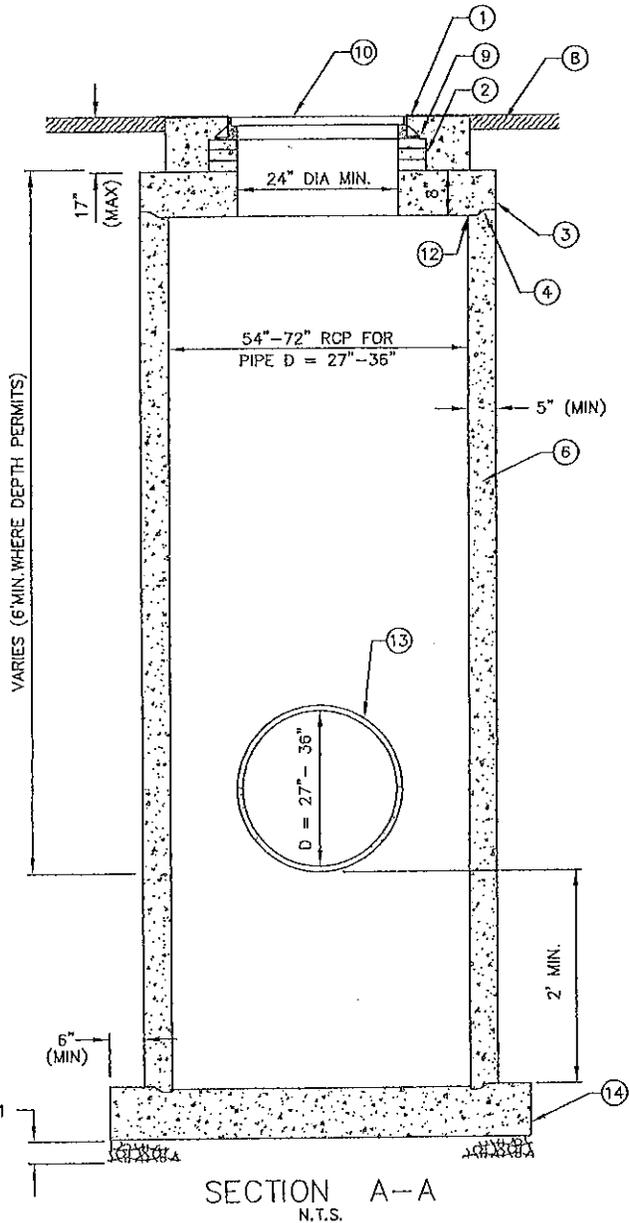
- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-502A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) FOR EXTRA DEPTH MANHOLE, SEE SD-614 "STANDARD MANHOLE TYPE B, DEEP".
- (D) MANHOLE FRAME AND COVER:  
A. REFER TO DRAWING NO. SD-617.  
B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.  
C. "STORM DRAIN" ON COVER.
- (E) WHERE PVC IS UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (F) NO MANHOLE STEPS TO BE INSTALLED.

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STANDARD MANHOLE  
TYPE B

REVISED STANDARD  
DRAWING NO.  
SD-613



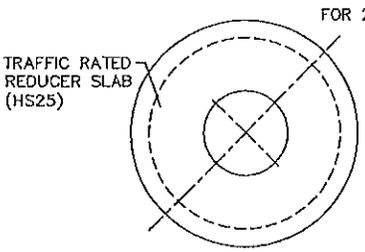
**LEGEND**

- ① CONCRETE COLLAR PER SD-616.
- ② GROUT GRADE RINGS WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ③ REINFORCED CONCRETE REDUCER SLAB WITH ACCESS HOLE IN CENTER OF SLAB.
- ④ RAMNEK OR APPROVED GASKETS AT ALL JOINTS.
- ⑤ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑥ PRECAST CONCRETE MANHOLE BARREL SECTION (REBAR NOT SHOWN) 54"-72" RCP.
- ⑦ PRECAST GASKETED HUB RING OR RUBBER GASKETED COLLAR.
- ⑧ SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑨ FRAME TO BE GROUTED TO GRADE RINGS.
- ⑩ FRAME AND COVER PER SD-617.
- ⑫ GROUT SMOOTH ALL INTERIOR JOINTS.
- ⑬ CUT OUT RCP MANHOLE TO CONFORM TO PIPE.
- ⑭ CAST-IN-PLACE MANHOLE BASE. SEE SD-502A FOR PREFABRICATED BASE FOR SANITARY SEWER ONLY. THIS DOES NOT APPLY TO STORM DRAIN MANHOLES.

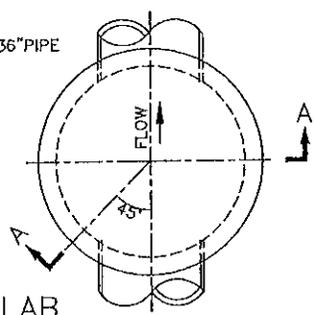
**NOTES:**

- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL. SEE SD-502A FOR SANITARY SEWER ONLY. THIS DOES NOT APPLY TO STORM DRAIN MANHOLES.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) FOR EXTRA DEPTH MANHOLE, SEE SD-614 "STANDARD MANHOLE TYPE B, DEEP".
- (D) MANHOLE FRAME AND COVER:
  - A. REFER TO DRAWING NO. SD-617.
  - B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
  - C. "STORM DRAIN" ON COVER.
- (E) WHERE PVC IS UTILIZED, INSTALL A RUBBER RING OR GASKET COLLAR WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (F) NO MANHOLE STEPS TO BE INSTALLED.

SECTION A-A  
N.T.S.



STANDARD REDUCER SLAB  
TOP DETAILS  
N.T.S.



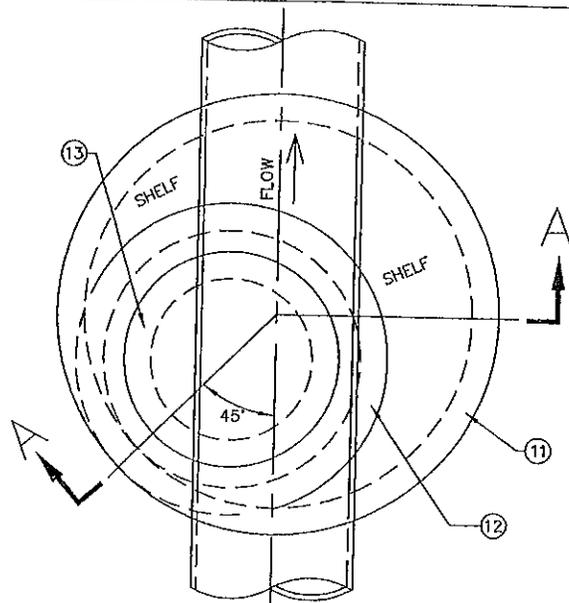
PLAN  
N.T.S.

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STANDARDS FOR  
PUBLIC WORKS  
CONSTRUCTION

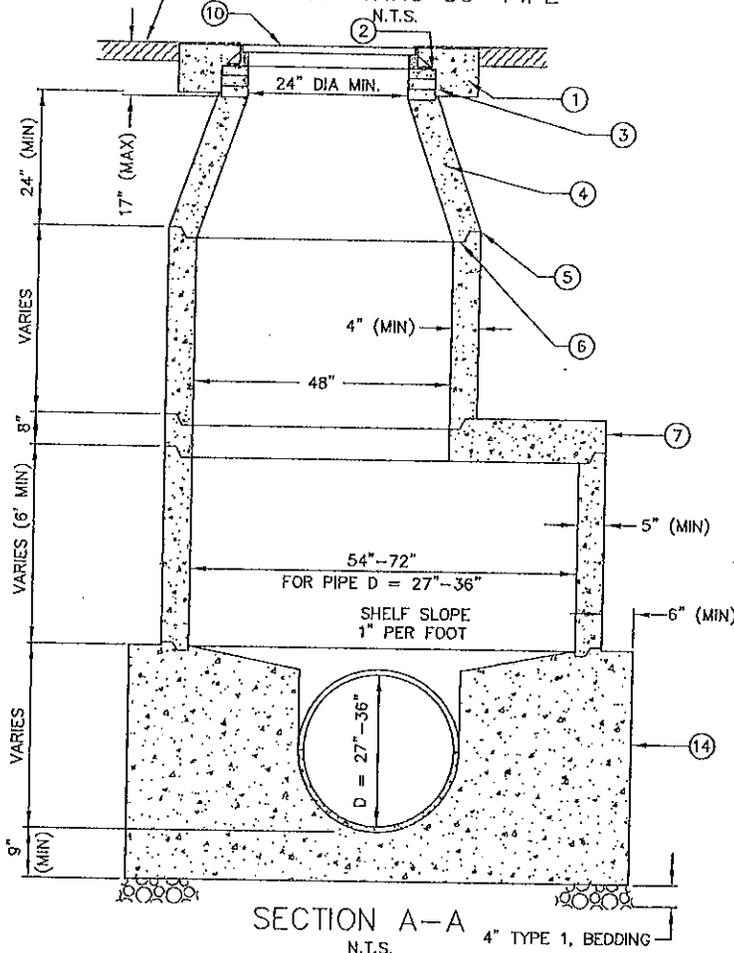
STANDARD MANHOLE  
TYPE B - RAISED INVERT

REVISED STANDARD  
DRAWING NO.  
SD-613A



PLAN

FOR 27" THRU 36" PIPE



SECTION A-A  
N.T.S.

4" TYPE 1, BEDDING

LEGEND

- ① CONCRETE COLLAR PER SD-616.
- ② FRAME TO BE GROUTED TO GRADE RINGS.
- ③ GRADE RINGS GROUT WATERTIGHT IN PLACE, NOT TO EXCEED 17" FROM FINISHED SURFACE TO TOP OF CONE.
- ④ PRECAST MONOLITHIC CONCENTRIC CONE.
- ⑤ RAMNEK OR APPROVED GASKETS AT ALL JOINTS.
- ⑥ PROPERLY ALIGN ALL INTERIOR JOINTS.
- ⑦ REINFORCED CONCRETE REDUCER SLAB AS APPROVED BY THE ENGINEER.
- ⑧ SURFACING TO MATCH FLUSH WITH EXISTING SURFACING (AC SHOWN).
- ⑩ FRAME AND COVER PER SD-617.
- ⑪ 54" RCP THRU 72" PIPE.
- ⑫ 48" DIAMETER BARREL SECTION.
- ⑬ GRADE RINGS.
- ⑭ CAST-IN-PLACE MANHOLE BASE. SEE SD-502A FOR PREFABRICATED BASE.

NOTES:

- (A) OPTIONAL PREFABRICATED MANHOLE BASE WITH APPROVED PIPE CONNECTIONS MAY BE USED WITH ENGINEERS APPROVAL, SEE SD-502A.
- (B) PLACE VERTICAL WALL ON UPSTREAM SIDE OF MANHOLE, ROTATED 45 DEGREES.
- (C) MANHOLE FRAME AND COVER:
  - A. REFER TO DRAWING NO. SD-617
  - B. FRAME AND COVER SHALL BE FLUSH WITH SLOPE OF PAVEMENT.
  - C. "STORM DRAIN" ON COVER.
- (D) WHERE PVC IS UTILIZED, A RUBBER RING OR GASKET COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE BASE AND/OR MANHOLE CHANNEL, IN ORDER TO INSURE A WATERTIGHT SEAL.
- (E) NO MANHOLE STEPS TO BE INSTALLED.

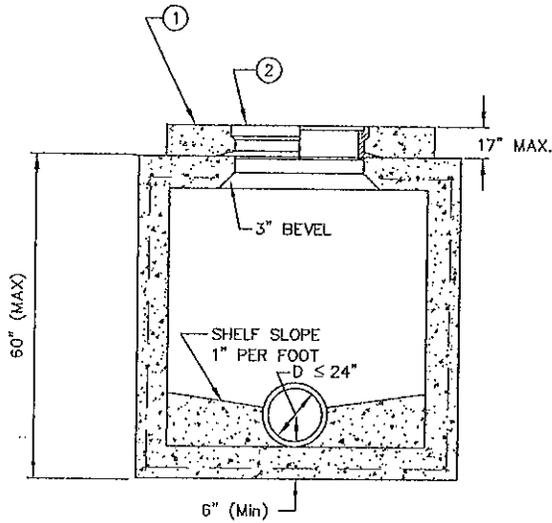
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PUBLIC WORKS  
CONSTRUCTION

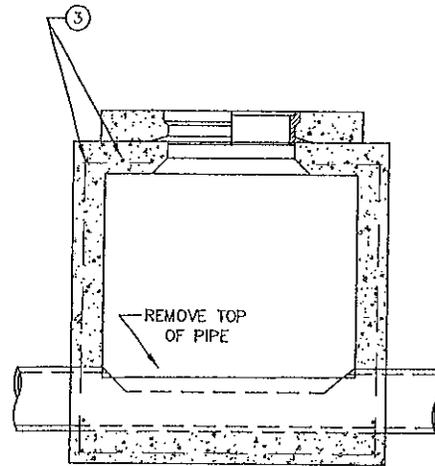
STANDARD MANHOLE  
TYPE B, DEEP

REVISED STANDARD  
DRAWING NO.  
SD-614

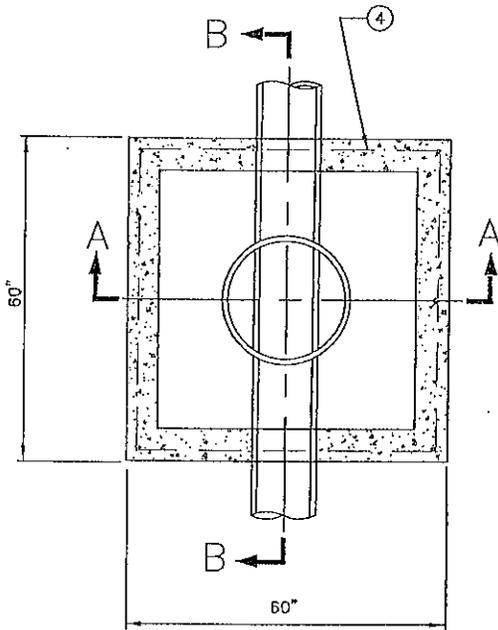




SECTION A-A  
N.T.S.



SECTION B-B  
N.T.S.



TOP VIEW  
N.T.S.

LEGEND

- ① CONCRETE COLLAR PER SD-616.
- ② FRAME AND COVER WITH GRADE RINGS AS REQUIRED.
- ③ #4 BARS 6" O.C BOTH WAYS, CUT TO MISS OPENING IN TOP.
- ④ #4 BARS ALL CORNERS AND 24" O.C.

NOTES:

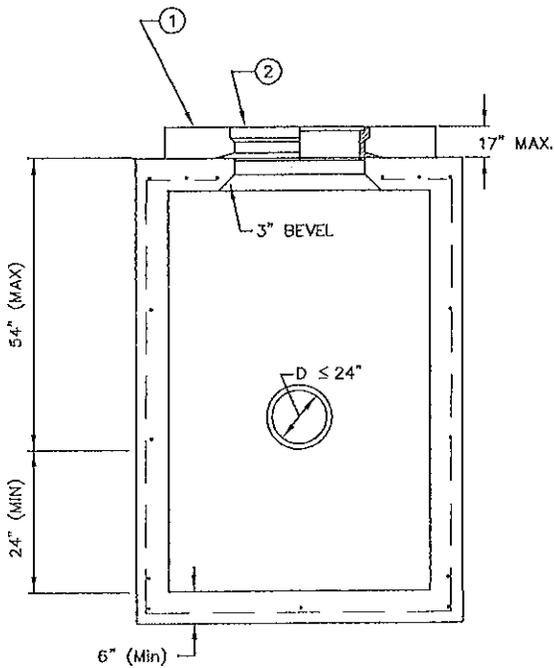
- (A) ALL WALLS AND BOTTOM MINIMUM 6" THICK.
- (B) USE WITH MANHOLES GREATER THAN 30" DEEP AND LESS THAN 48" DEEP TO FLOWLINE OF PIPE.
- (C) A CONCENTRIC CONE SECTION TO BE USED FOR STANDARD SHALLOW MANHOLES PER SD-612.
- (D) MANHOLE FRAME AND COVER:
  - A. PER SD-617.
  - B. FRAME AND COVER SHALL BE FLUSH WITH FINISH GRADE OF PAVEMENT.
  - C. "STORM DRAIN" ON COVER.
- (E) USE WITH 8" DIAMETER THROUGH 24" DIAMETER PIPE ONLY.
- (F) WHERE PVC IS UTILIZED, A RUBBER RING OR GASKETED COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE CHANNEL, IN ORDER TO INSURE WATERTIGHT SEAL.
- (G) SHALLOW MANHOLE TYPE 1 SUBJECT TO ENGINEER'S APPROVAL.

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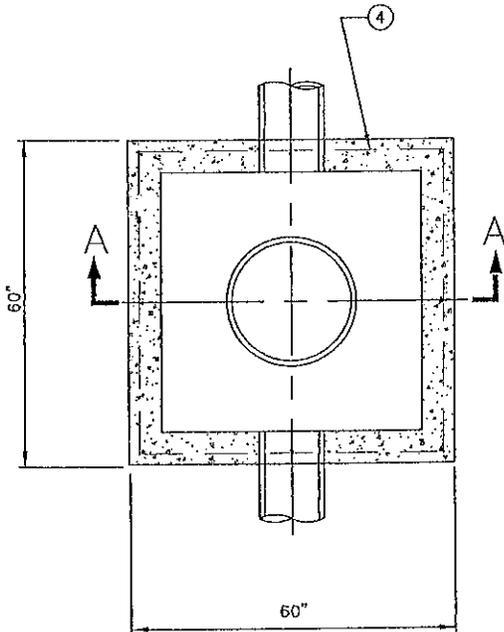
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PUBLIC WORKS  
CONSTRUCTION

SHALLOW MANHOLE  
TYPE 1

REVISED STANDARD  
DRAWING NO.  
SD-615



SECTION A-A  
N.T.S.



TOP VIEW  
N.T.S.

### LEGEND

- ① CONCRETE COLLAR PER SD-616.
- ② FRAME AND COVER WITH GRADE RINGS AS REQUIRED.
- ③ #4 BARS 6" O.C BOTH WAYS, CUT TO MISS OPENING IN TOP.
- ④ #4 BARS ALL CORNERS AND 24" O.C.

### NOTES:

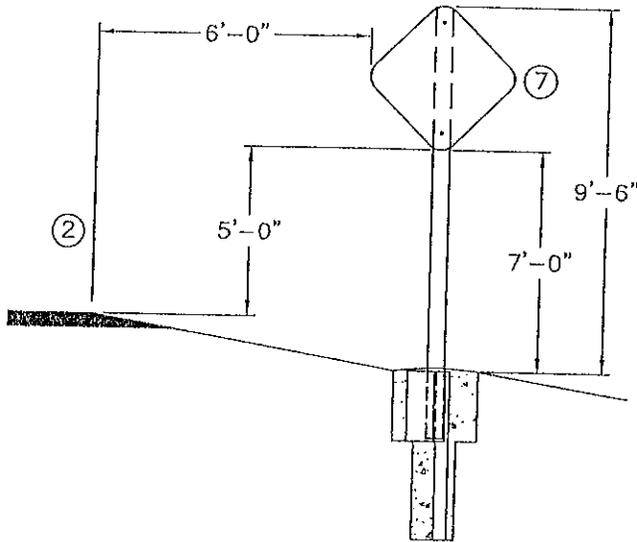
- Ⓐ ALL WALLS AND BOTTOM MINIMUM 6" THICK.
- Ⓑ USE WITH MANHOLES GREATER THAN 30" DEEP AND LESS THAN 48" DEEP TO FLOWLINE OF PIPE.
- Ⓒ A CONCENTRIC CONE SECTION TO BE USED FOR STANDARD SHALLOW MANHOLES PER SD-612.
- Ⓓ MANHOLE FRAME AND COVER:
  - A. PER SD-617.
  - B. FRAME AND COVER SHALL BE FLUSH WITH FINISH GRADE OF PAVEMENT.
  - C. "STORM DRAIN" ON COVER.
- Ⓔ USE WITH 8" DIAMETER THROUGH 24" DIAMETER PIPE ONLY.
- Ⓕ WHERE PVC IS UTILIZED, A RUBBER RING OR GASKETED COLLAR IS TO BE INSTALLED WHERE THE PIPE IS IN CONTACT WITH MANHOLE CHANNEL, IN ORDER TO INSURE WATERTIGHT SEAL.
- Ⓖ SHALLOW MANHOLE TYPE 1 SUBJECT TO ENGINEER'S APPROVAL.

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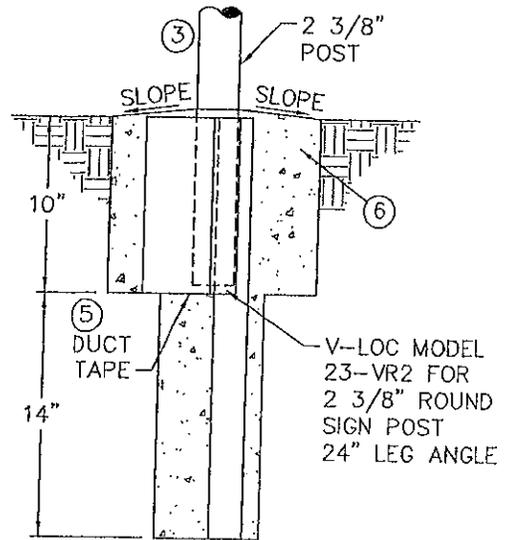
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PUBLIC WORKS  
CONSTRUCTION

SHALLOW MANHOLE  
TYPE 1 - RAISED INVERT

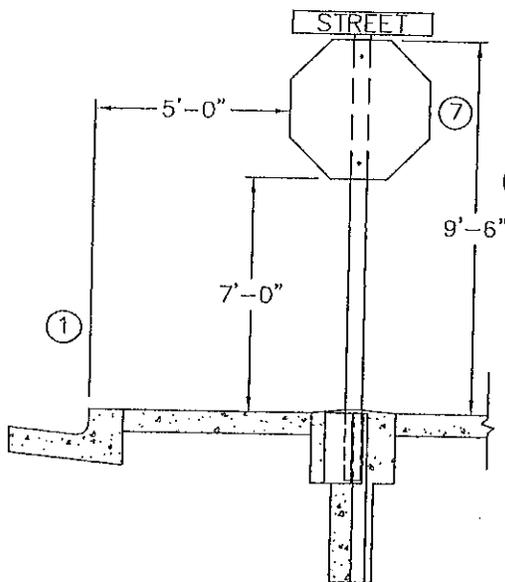
REVISED STANDARD  
DRAWING NO.  
SD-615A



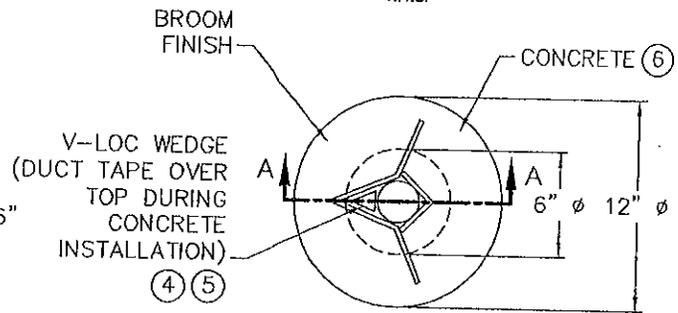
RURAL LOCATIONS  
N.T.S.



SECTION A-A  
N.T.S.



URBAN LOCATIONS WITH  
CURB AND GUTTER  
N.T.S.



SIGN BASE  
N.T.S.

NOTES:

- ① FACE OF CURB
- ② NORMAL SHOULDER LOCATION
- ③ INSTALL SIGN POST DURING BASE INSTALLATION FOR LEVELING VERTICALLY.
- ④ V-LOC WEDGE TO BE PLACED WITH REMOVAL HOLE UP.
- ⑤ USE DUCT TAPE OVER V-LOC WEDGE AND FRONT ANGLE.
- ⑥ USE 3000 PSI CONCRETE. BROOM FINISH TOP. SLOPE TO DRAIN.
- ⑦ SEE SPECIFICATION FOR SIGN MATERIAL REQUIREMENTS.

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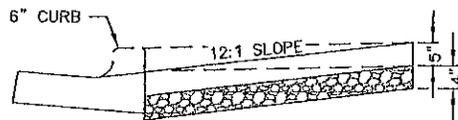
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SIGN  
INSTALLATION

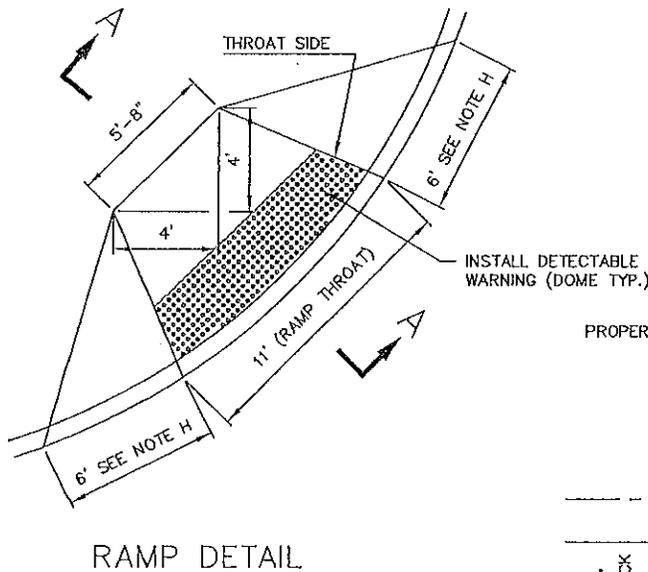
REVISED STANDARD  
DRAWING NO.  
SD-1130

NOTES:

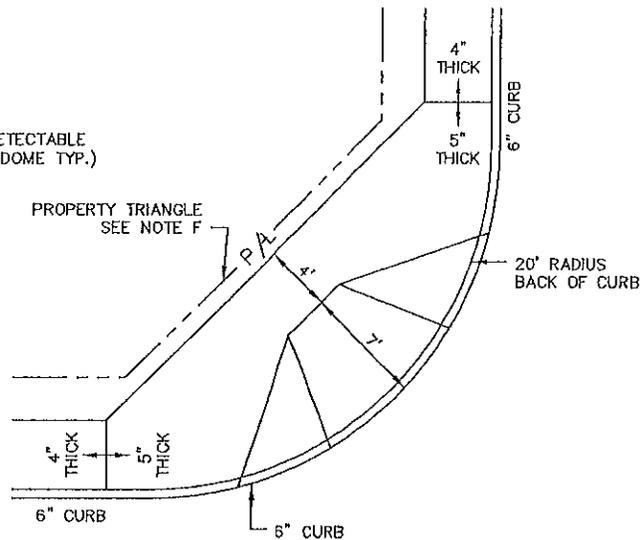
- (A) THIS TYPE OF RAMP CAN BE USED FOR ANY CORNER WITH 6" CURB WHERE LOCAL STREETS MEET.
- (B) CURB ON THE RADIUS TO BE 6" CURB FOR SHOWN DIMENSIONS.
- (C) ALL RAMP SURFACES TO BE 12 TO 1 SLOPE TO CONFORM TO A.D.A. REQUIREMENTS.
- (D) EACH CORNER TO HAVE ONE RAMP CENTERED IN RADIUS.
- (E) CORNER RADIUS IS 20' AS A MINIMUM.
- (F) PROPERTY TRIANGLE SIZE TO BE EQUAL TO THE RADIUS SIZE AS A MINIMUM. THE OWNER MAY REQUIRE LARGER TRIANGLES TO ACCOMMODATE VARIOUS TRAFFIC EQUIPMENT AND UTILITIES.
- (G) THE RAMP THROAT WIDTH TO BE 4 FEET MEASURED PERPENDICULAR TO THE THROAT SIDE. THE RAMP THROAT DEPTH TO BE 4 FEET MEASURED FROM THE FACE OF THE CURB TO THE BACK OF THE APPROACH. THE SIDE OF THE RAMP THROAT TO BE PARALLEL WITH THE EXPECTED PATH OF THE PEDESTRIAN FOR EXAMPLE: PARALLEL WITH STOP BAR.
- (H) THE RAMP WINGS TO BE 6 FEET MEASURED AT THE CURB FACE FOR 6" CURB.
- (I) ALL RAMP TO HAVE A 4 FOOT WIDE CONTINUOUS PATH BEHIND THEM FOR PEDESTRIANS.
- (J) ALL CONCRETE ADJOINING THE RADIUS WITHIN AND AROUND THE RAMP TO BE 5 INCHES THICK WITH 4 INCHES OF 3/4 INCH AGGREGATE BASE.



SECTION A-A



RAMP DETAIL



TYPICAL CORNER  
20' RADIUS MINIMUM

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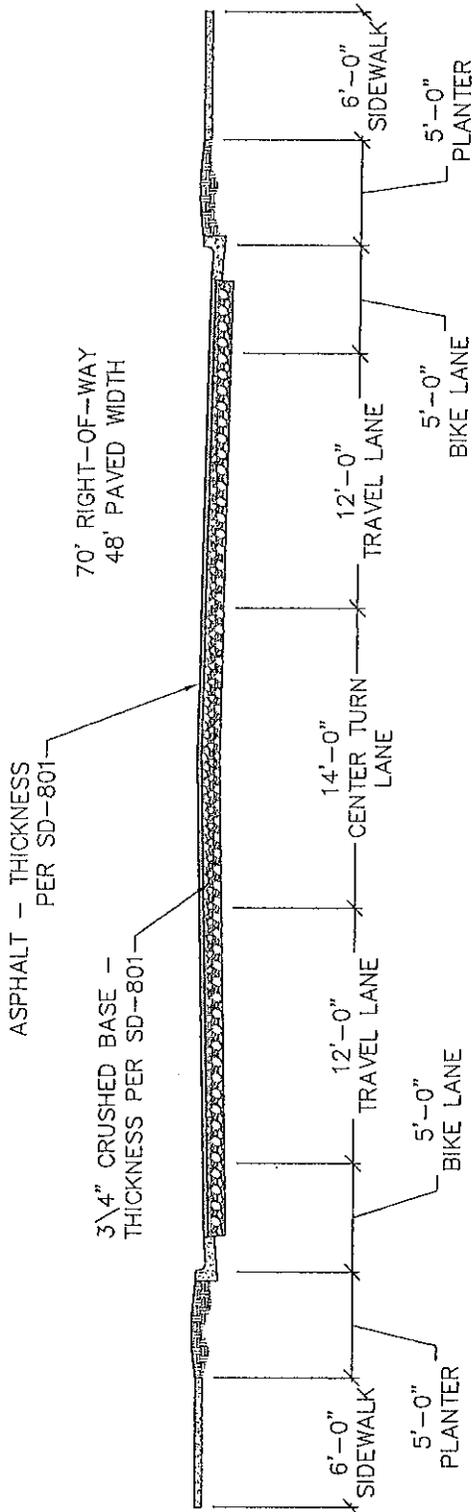
PEDESTRIAN RAMP TYPE "A"  
FOR NEW DEVELOPMENT

REVISED STANDARD  
DRAWING NO.  
SD-712A

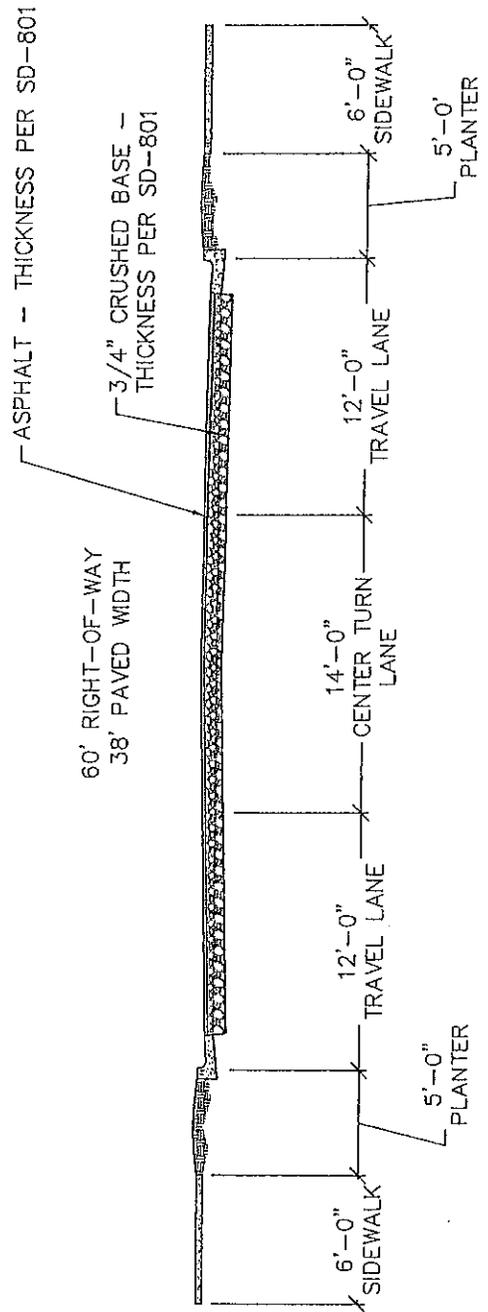
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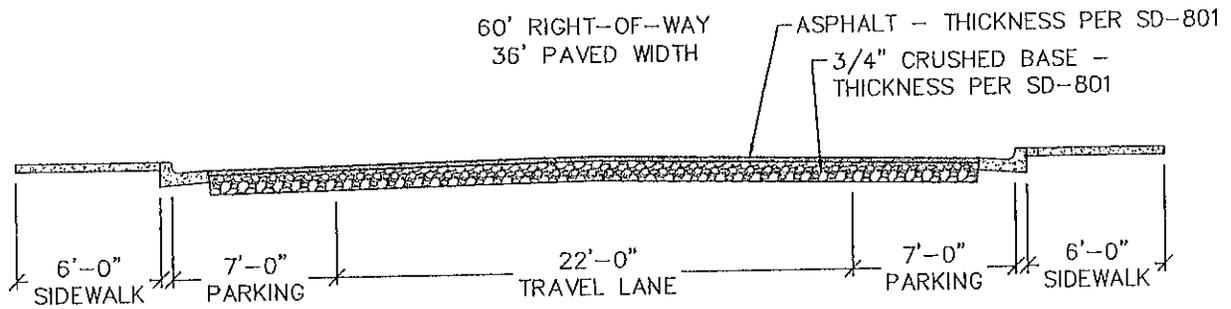
# TYPICAL ROADWAY CROSS SECTION STANDARDS COLLECTOR



COLLECTOR WITH BIKE LANES  
NOT TO SCALE



COLLECTOR WITHOUT BIKE LANES  
NOT TO SCALE



NEIGHBORHOOD COLLECTOR (PARKING 2 SIDES)  
FOR STREETS WITH GRADES GREATER THAN 2%

NOT TO SCALE

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PUBLIC WORKS  
CONSTRUCTION

TYPICAL ROADWAY CROSS SECTION  
STANDARDS — NEIGHBORHOOD  
COLLECTOR GREATER THAN 2%