

# SEWER SYSTEMS

**SUPPLEMENT TO REGIONAL STANDARD DRAWINGS ("S" SERIES)**

**NOTES** All material used must be on the City of San Diego MWWD "Approved Materials List."


**DRAWING S-4**

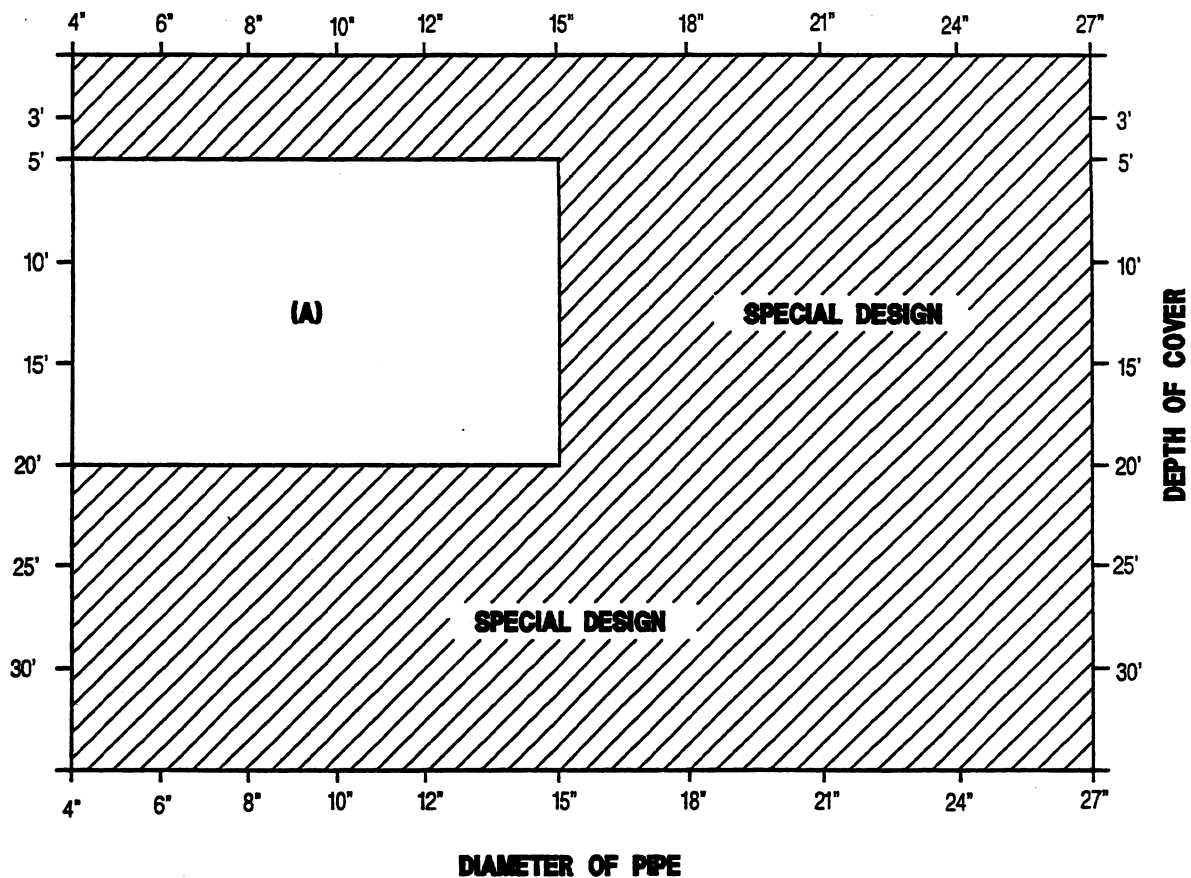
**NOTES** Amend note 1 to read: "For trenching in improved streets, use Standard Drawings SDG-107 and SDG-108 for trench resurfacing."

Add: 5. "All sanitary sewer pipes shall be bedded using a Type C rock envelope with 3/8 inch max. crushed rock (in lieu of 3/4 inch max.). Side wall clearance for pipe size encasement larger than 15 inches shall be 12 inches maximum or as specified on plans."

**DRAWING S-10**

Unless otherwise noted, Type "A" shall be used.

REVISION	BY	APPROVED	DATE	<b>CITY OF SAN DIEGO - STANDARD DRAWING</b>	CITY OF SAN DIEGO STANDARDS COMMITTEE  Chairperson R.C.E. 64572
ORIGINAL		M. Rollinger	5-20-92		
NOTES	SM	Oskoui	12/03	<b>SUPPLEMENT TO REGIONAL STANDARD DRAWING ("S" SERIES)</b>	DRAWING NUMBER <b>SDS-100</b>



**(A) SDR - 35 or pipe stiffness of 46 PSI per ASTM D2412**

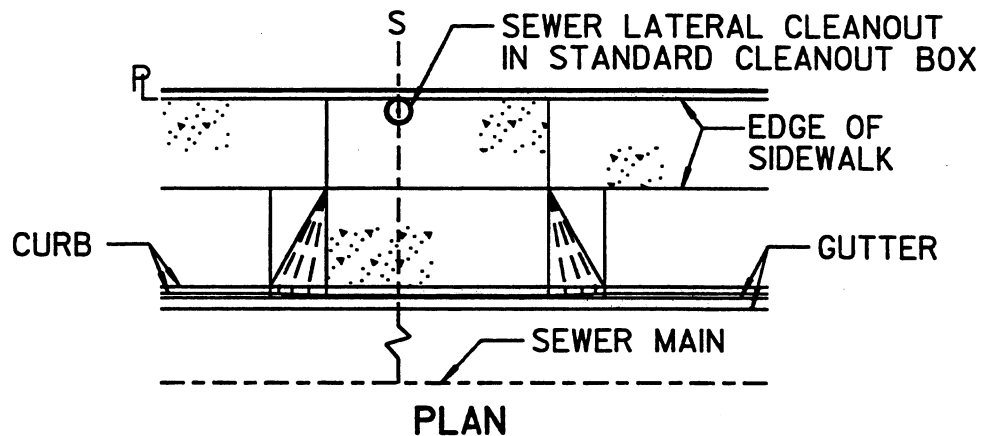
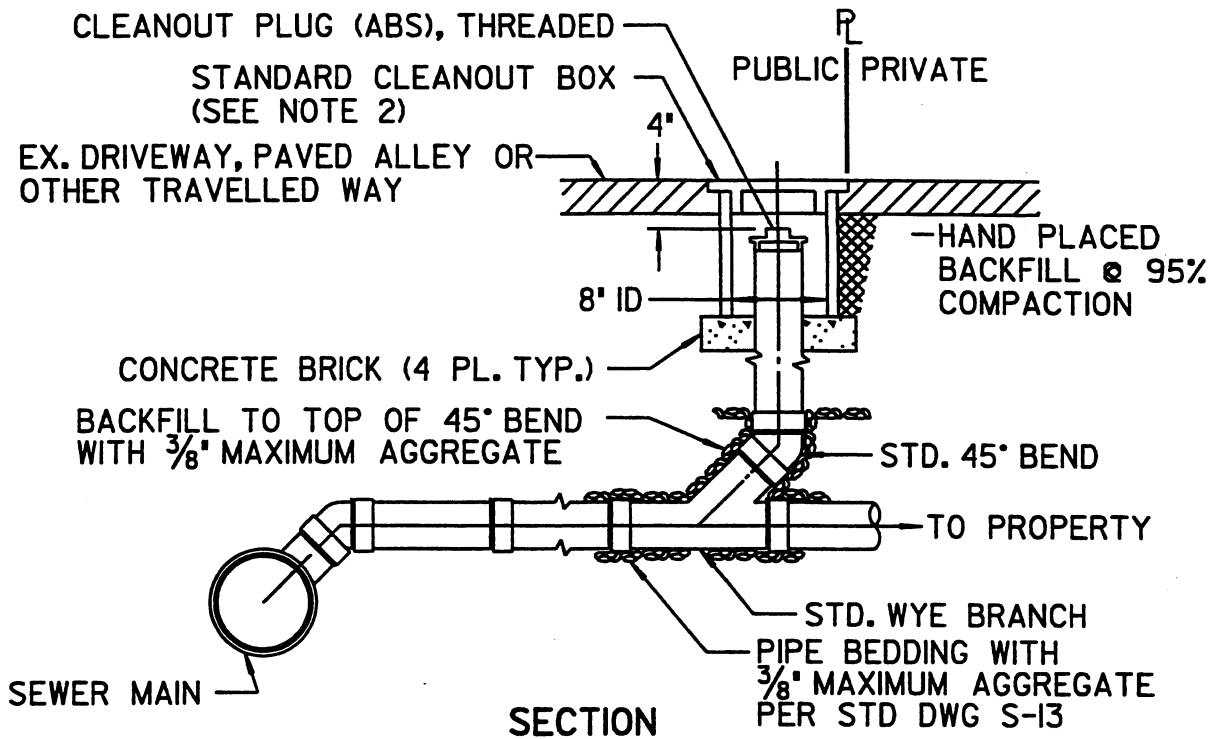
**NOTE:**

1. This standard drawing shall be used only where existing soil conditions are stable. Stable soil is defined as standard penetration test blow count equal to or greater than 13 blows per foot or shear strength greater than 750 psf. Obtained from unconfined compression test.
2. Standard design assumption :  $K_b = .110, D_L = 1.0, E' = 750 \text{ psi}$   
 $W_c = \text{Prism load @ } W = 125 \text{ lbft}^3$
3. Bedding requirements per Regional Drawing S-4 Type C and SDS-100
4. Installations in ground water shall require a special design.

**Design Ref. : ASCE Manuals and reports on Engineering Practice - No. 60 "Gravity Sanitary Sewer Design and Construction."**

REVISION	BY	APPROVED	DATE	CITY OF SAN DIEGO - STANDARD DRAWING	CITY OF SAN DIEGO STANDARDS COMMITTEE
ORIGINAL		J. Mueller	6-15-83		
		J.P. Casey	8-25-86		
		J.P. Casey	11-9-88		
					DRAWING NUMBER <b>SDS-101</b>

REVISED 9/30/94



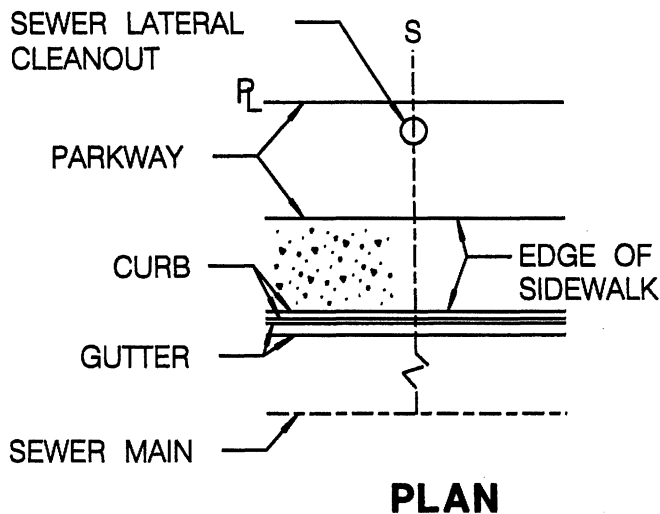
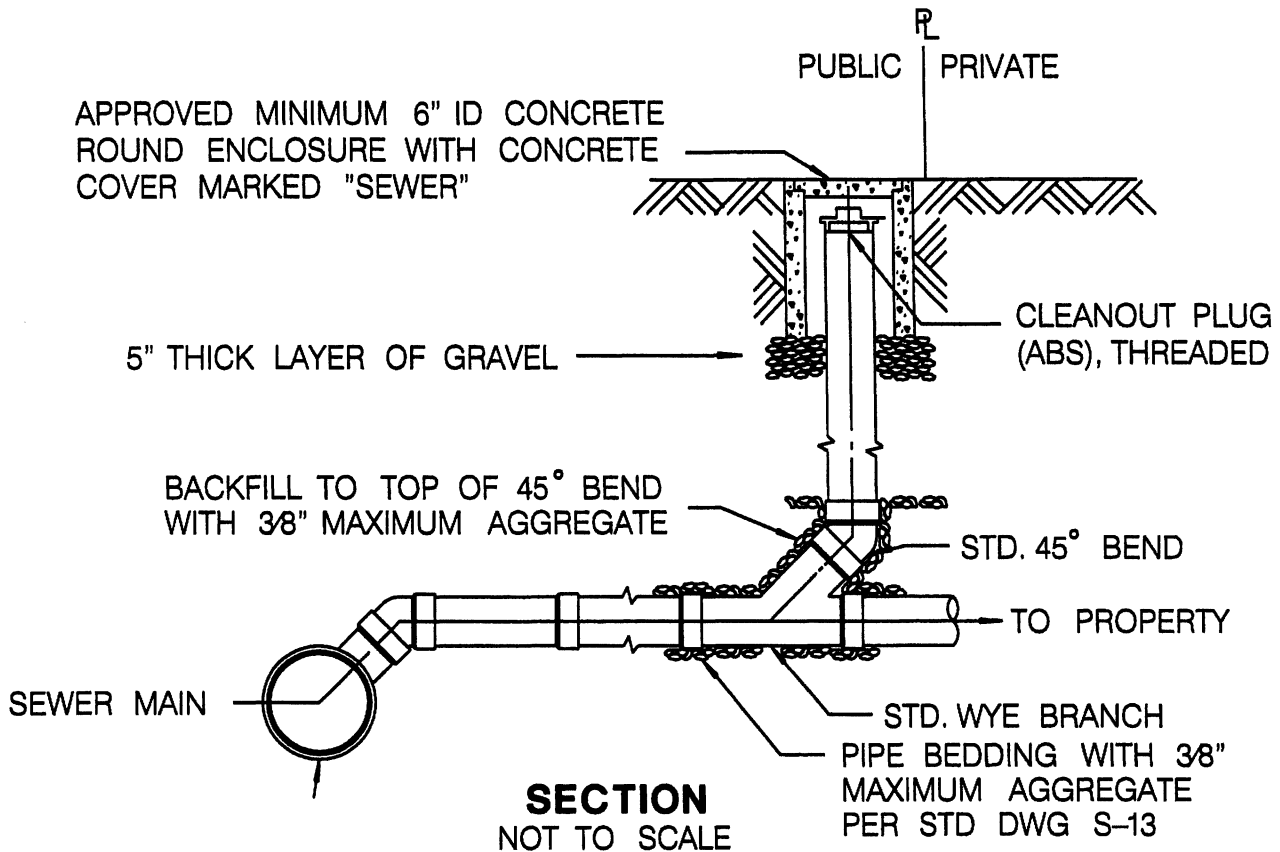
**NOTES:**

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE PLACED INSIDE A STANDARD CLEANOUT BOX (SEE S-3, TYPE B CLEANOUT BOX) WITH CAST IRON LID MARKED 'CLEANOUT', OR EQUAL. EQUAL.

(NO SCALE)

Revision	By	Approved	Date	CITY OF SAN DIEGO - STANDARD DRAWING SEWER LATERAL CLEANOUT (IN DRIVEWAY, PAVED ALLEY, SIDE WALK, OR OTHER AREA SUBJECT TO TRAFFIC)	CITY OF SAN DIEGO STANDARDS COMMITTEE <i>Henri Rubin</i> 8/10/00 Chairman, RCE Date 25390

APPROVED MINIMUM 6" ID CONCRETE ROUND ENCLOSURE WITH CONCRETE COVER MARKED "SEWER"



NOTES:

1. RISER AND CLEANOUT PLUG SHALL BE SAME DIAMETER AS SEWER LATERAL.
2. CLEANOUT SHALL BE LOCATED WITHIN CITY RIGHT OF WAY, BEHIND THE SIDEWALK.

Revision	By	Approved	Date
DETAIL	SMS	Oskoui	12/03

CITY OF SAN DIEGO - STANDARD DRAWING

**SEWER LATERAL CLEANOUT  
OUTSIDE TRAVELED WAY**

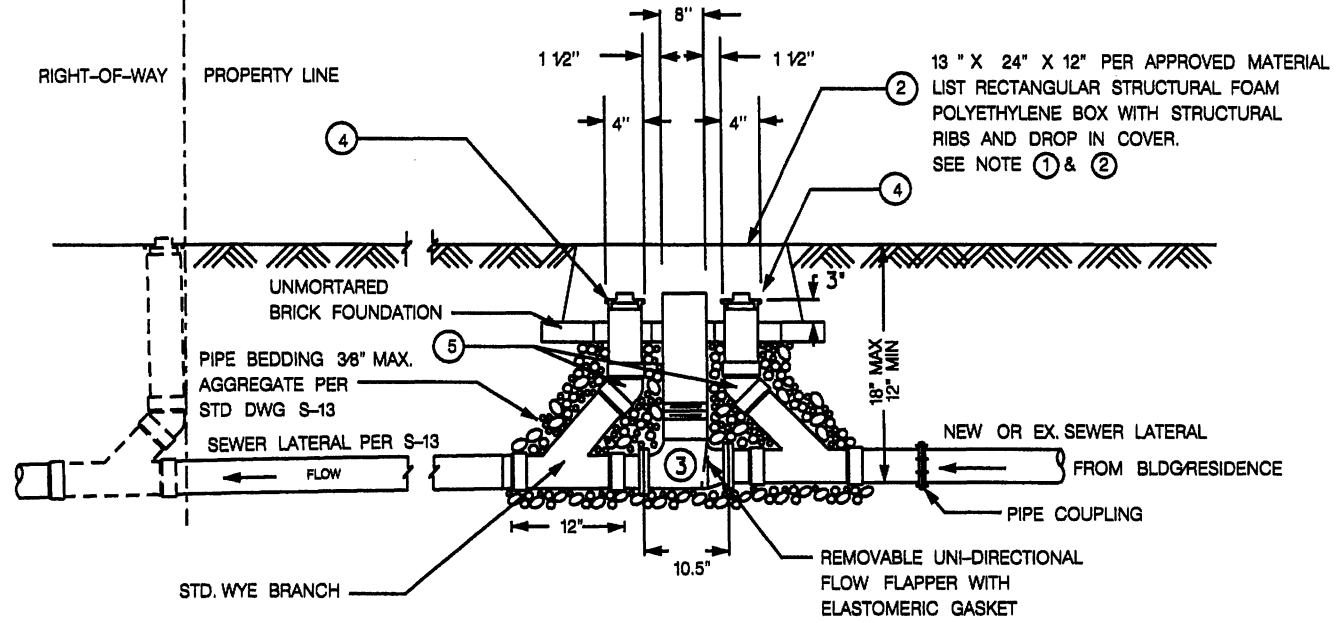
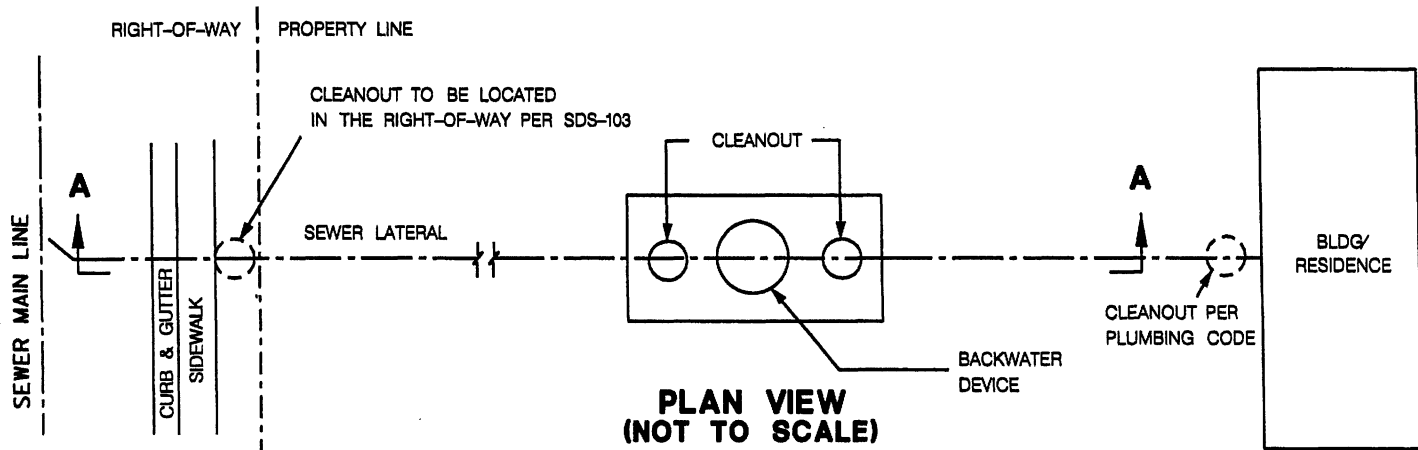
CITY OF SAN DIEGO  
STANDARDS COMMITTEE

Chairperson RCE 64572

Date

DRAWING  
NUMBER

*R. L.* 12-9-03  
**SDS-103**



**SECTION A-A  
(NOT TO SCALE)**

**Notes:**

- ① WHEN BACKWATER DEVICE IS INSTALLED IN THE DRIVEWAY, SEE PAGE 2
- ② INSTALL VALVE BOX SO THAT IT IS FLUSH WITH EXISTING PAVEMENT SURFACE OR 1" ABOVE GROUND COVER.
- ③ PVC BACKWATER DEVICE AND ATTACHED PARTS SHALL BE PER THE APPROVED MATERIAL LIST.
- ④ CLEANOUT PLUG (ABS) THREADED.
- ⑤ STANDARD 45° BEND.
- ⑥ OVERSIZED POP-UP CAP.
- ⑦ THREADED PLUG.

Revision	By	Approved	Date
DETAIL	C9S	Oskoui	12/03

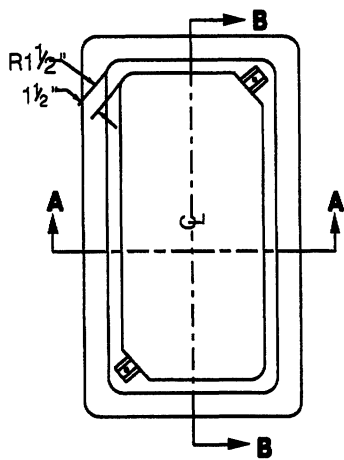
**CITY OF SAN DIEGO - STANDARD DRAWING**

**4" BACKWATER DEVICE**

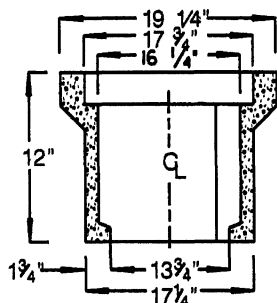
CITY OF SAN DIEGO  
STANDARD COMMITTEE

*[Signature]* 12-9-03  
Chairperson RCE 64672 Date

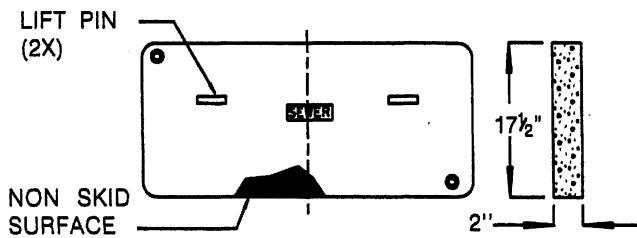
DRAWING NUMBER **SDS-104**



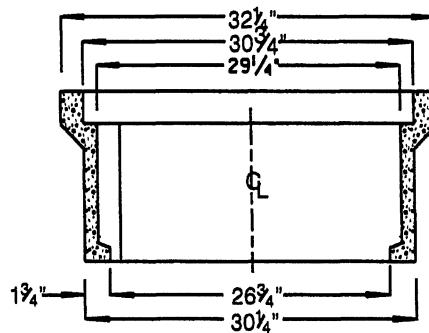
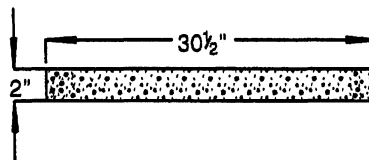
**TOP VIEW**



**SECTION A-A**



**POLYMER CONCRETE COVER**



**SECTION B-B**

(2X) HEX HEAD BOLTDOWN

LIFT PIN

POLYMER CONCRETE COVER

NON SKID SURFACE

FLOATING NUT

UNISTRUT CHANNEL

RPM BOX

DETAIL-A

**DETAIL-A**

POLYMER CONCRETE BOX

**NOT TO SCALE**

**NOTE:**

1. THE BOX & COVER IS 10K LOAD RATED.

**SHEET 2 OF 2**

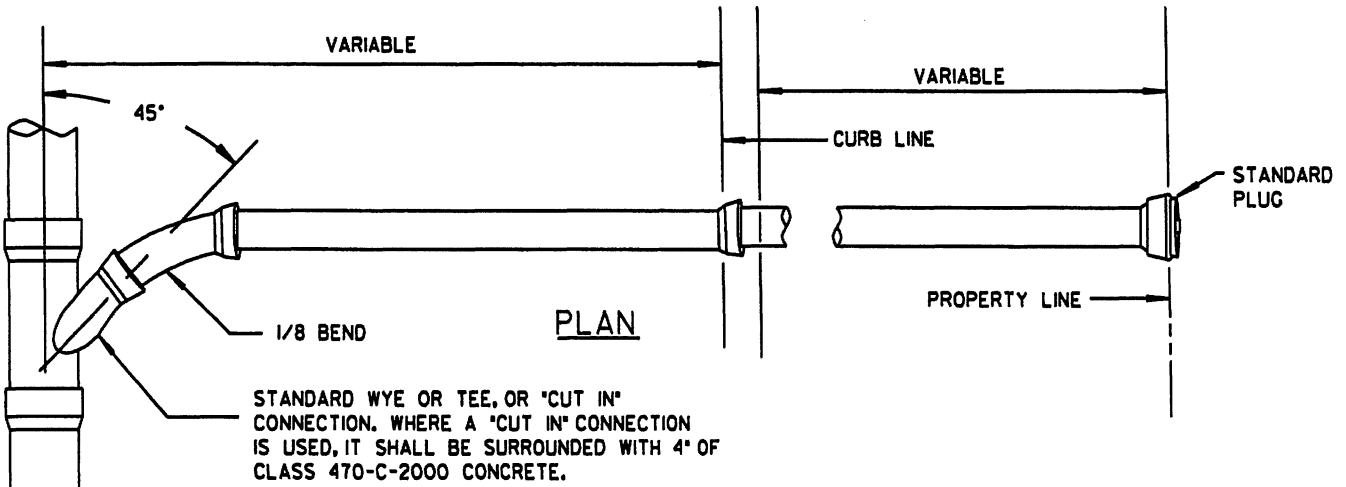
Revised	By	Approved	Date
DETAIL	SMS	Oskoui	12/03

**CITY OF SAN DIEGO - STANDARD DRAWING**

CITY OF SAN DIEGO  
STANDARDS COMMITTEE  
*Bl...* 12-9-03  
Chairperson RCE 64572 Date

**4" BACKWATER DEVICE**

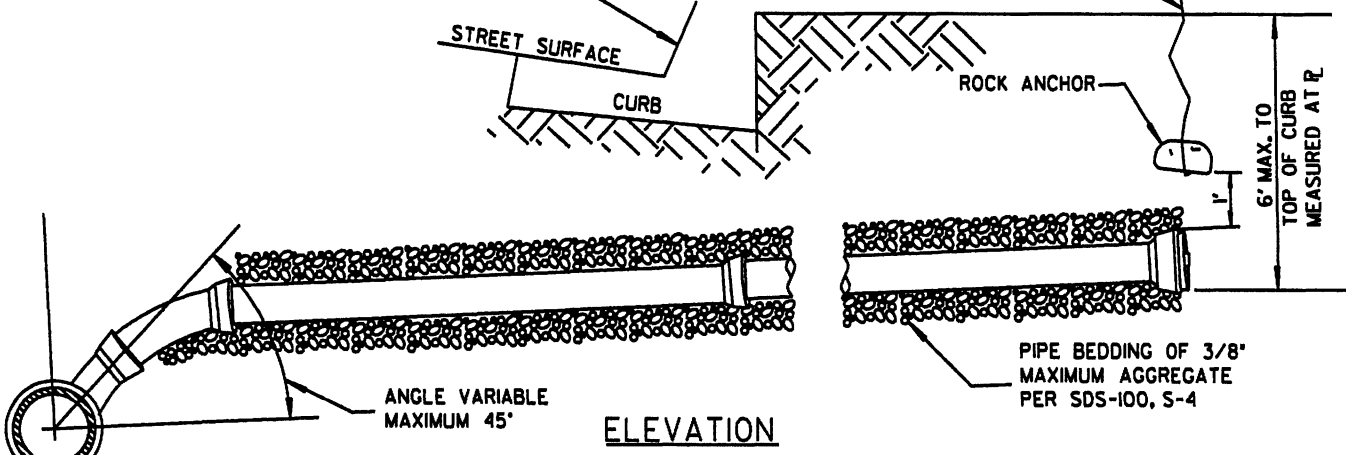
DRAWING NUMBER **SDS-104**



STANDARD WYE OR TEE, OR 'CUT IN' CONNECTION. WHERE A 'CUT IN' CONNECTION IS USED, IT SHALL BE SURROUNDED WITH 4" OF CLASS 470-C-2000 CONCRETE.

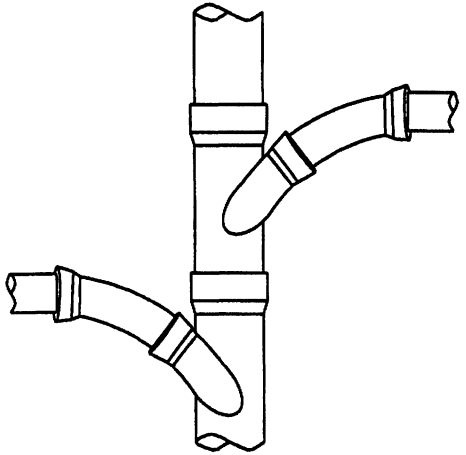
LETTER 'S' STAMPED OR CHISELED IN FACE OF CURB NOT LESS THAN 1 1/2" HIGH AND 3/16" DEEP

WIRE, #12 OR HEAVIER. EXTEND 2' TO 3' ABOVE GROUND AT TIME OF BACKFILL.



**NOTES**

1. IN NO CASE SHALL A LATERAL CONNECT TO THE SEWER MAIN DIRECTLY ON TOP OF THE PIPE.
2. SEWER LATERALS SHALL HAVE A MINIMUM SLOPE OF 2%.
3. ALL JOINTS ON SEWER LATERAL PIPE SHALL BE COMPRESSION TYPE OR APPROVED SOLVENT WELD.
4. LATERAL SHALL EXTEND TO PROPERTY LINE UNLESS OTHERWISE SHOWN ON PLANS
5. DO NOT TAP HOLE AND INSERT LATERAL PIPE DIRECTLY INTO MAIN. ALL CONNECTIONS SHALL BE MADE USING A SADDLE OR WYE CUT IN.
6. SEWER LATERAL SHALL HAVE 6 INCH METAL TAPE WITH GREEN LETTERING INDICATING 'SEWER' INSTALLED ABOVE THE ALIGNMENT OF THE PIPE FROM SEWER MAIN TO PROPERTY LINE, AT A MINIMUM 12 INCHES FROM THE FINISH GRADE AND A MINIMUM OF 12 INCHES FROM THE TOP OF PIPE.



LEGENDS ON PLANS



Revision	By	Approved	Date
DETAIL	JFP	Oskoui	12/03

CITY OF SAN DIEGO - STANDARD DRAWING

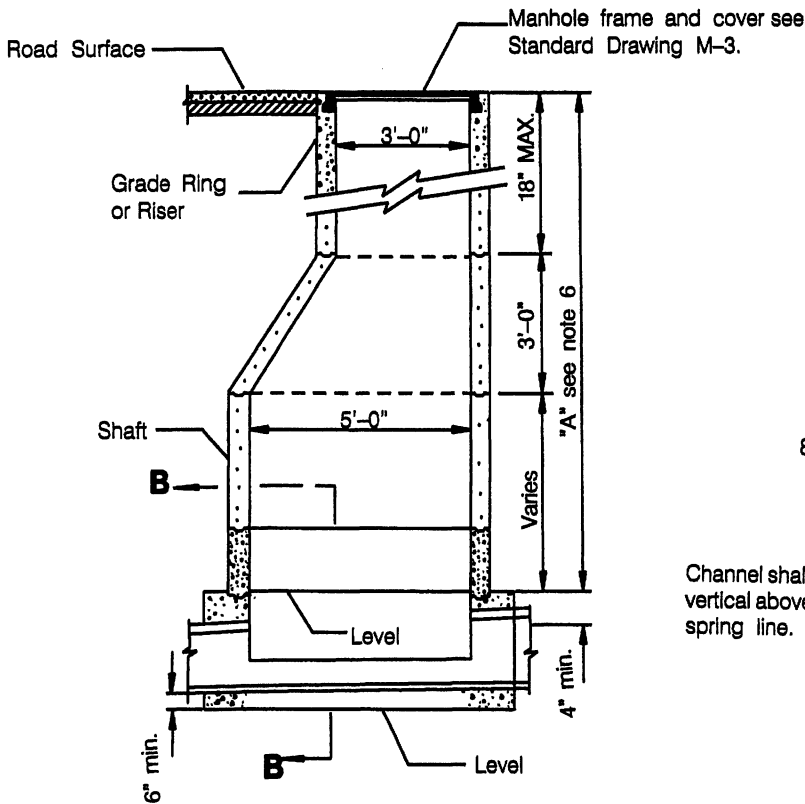
HOUSE CONNECTION  
(SEWER LATERAL)

CITY OF SAN DIEGO  
STANDARDS COMMITTEE

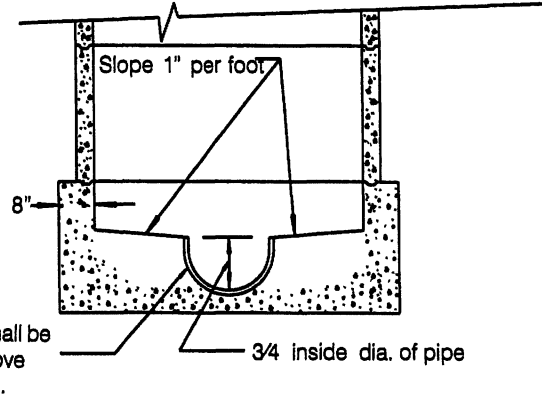
*Bl...* 12-9-03  
Chairperson RCE 64572 Date

DRAWING NUMBER SDS-105





**SECTION A-A**



**SECTION B-B**

**NOTES**

1. Manhole frame and all joints shall be set in Class "C" mortar.
2. All precast components shall be manufactured in accordance with ASTM C-478
3. Vertical wall of cone shall be on the upstream side of the manhole.
4. Concrete base shall be 560-C-3250 concrete..
5. Approved water stop required for plastic pipe connectors.
6. Precast sections shall be used within dimension "A" as required, in order of preference listed:
  - A) Cone (notched for pipe if dimension "A" is less than 3 ft.)
  - B) 6" to 18" of 3' diameter grade rings and/or risers.
  - C) 5 ft. diameter shaft variable height.
7. Flexible pipe joints shall be required within 12 inches of inside face of manhole, except for plastic pipe.
8. All patching within manhole base shall be epoxy mortar,
9. Prior approval of precast base is required by the Agency.

**LEGEND ON PLANS**



Revision	By	Approved	Date
DETAIL	SMS	Oskoui	12/03

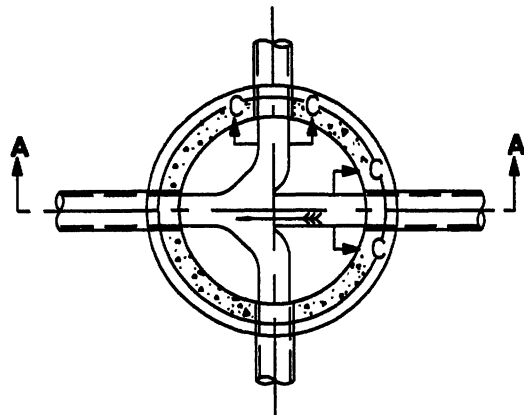
**CITY OF SAN DIEGO - STANDARD DRAWING**

**MANHOLE 5' X 3' DIAMETER**

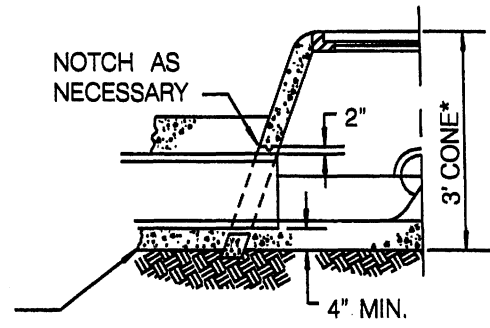
CITY OF SAN DIEGO  
STANDARDS COMMITTEE

*R. L. H.* 12-9-03  
Chairperson RCE 64572 Date

DRAWING NUMBER **SDS-106**

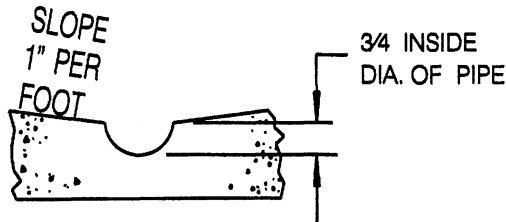


**SECTION B-B**



CONCRETE  
ENCASEMENT  
OR BACKFILL

\* EITHER CONCENTRIC OR  
ECCENTRIC CONE MAY BE USED

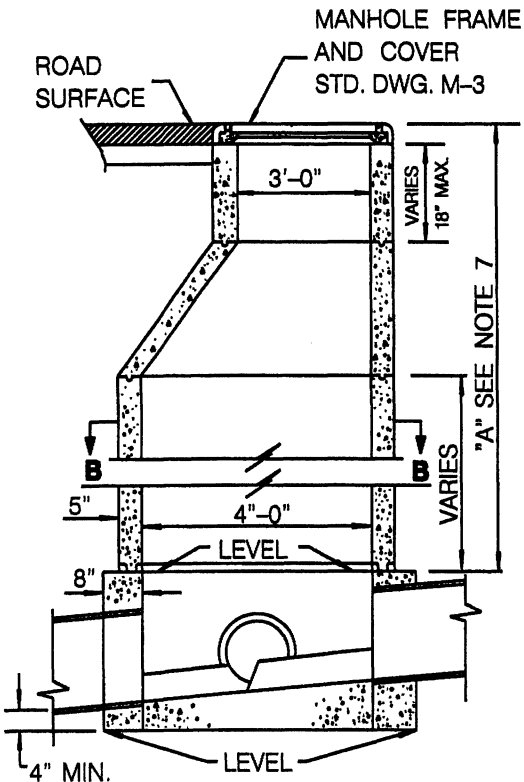


**SECTION C-C**

**HALF SECTION SHALLOW MANHOLE**

**NOTES**

1. ALL RISER JOINTS SHALL BE EPOXY MORTARED.
2. ALL PRECAST COMPONENTS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
3. VERTICAL WALL OF CONE SHALL BE ON THE UPSTREAM SIDE OF THE MANHOLE.
4. CONCRETE BASE SHALL BE 560-C-3250.
5. APPROVED WATER STOP REQUIRED FOR PLASTIC PIPE CONNECTIONS.
6. FLEXIBLE JOINTS SHALL BE REQUIRED WITHIN 12" OF INSIDE FACE OF MANHOLE (EXCEPT FOR PLASTIC PIPE).
7. PRECAST SECTIONS SHALL BE USED WITHIN DIMENSION "A" AS REQUIRED, IN ORDER OF PREFERENCE LISTED:
  - A) CONE (NOTCHED FOR PIPE IF DIMENSION "A" IS LESS THAN 3FT.
  - B) 3" TO 18" OF 3' DIAMETER GRADE RINGS AND /OR RISERS.
  - C) 4FT. DIAMETER SHAFT VARIABLE HEIGHT.
8. ALL PATCHING WITHIN MANHOLE BASE SHALL BE EPOXY MORTAR.
9. PRIOR APPROVAL OF PRECAST BASE IS REQUIRED BY THE AGENCY.
10. MANHOLES SERVING 18 INCH DIAMETER PIPE AND LARGER SHALL USE PRECAST RISERS LINED WITH WHITE PVC SHEETS IMBEDDED WITH LOCKING EXTENSIONS TO THE CONCRETE WALL. THE BASE AND ALL REMAINING EXPOSED CONCRETE SHALL BE COATED WITH AN APPROVED POLYURETHANE COATING.



**SECTION A-A**

**LEGEND ON PLANS**



**M.H. NO. 2**

Revision	By	Approved	Date
DETAIL	JFP	Oskoui	12/03

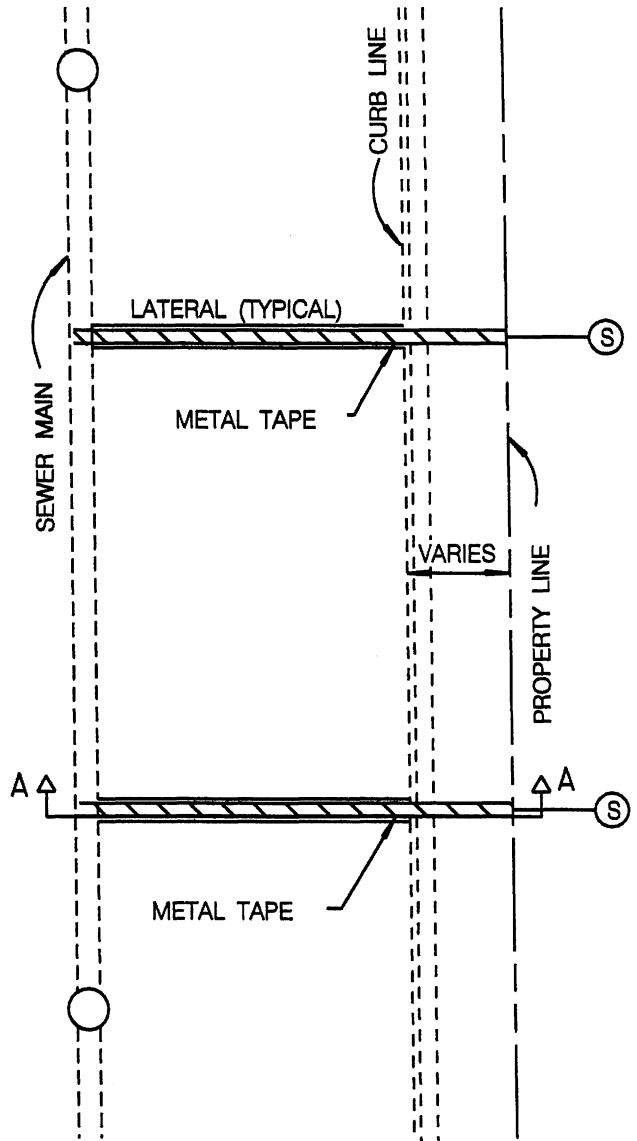
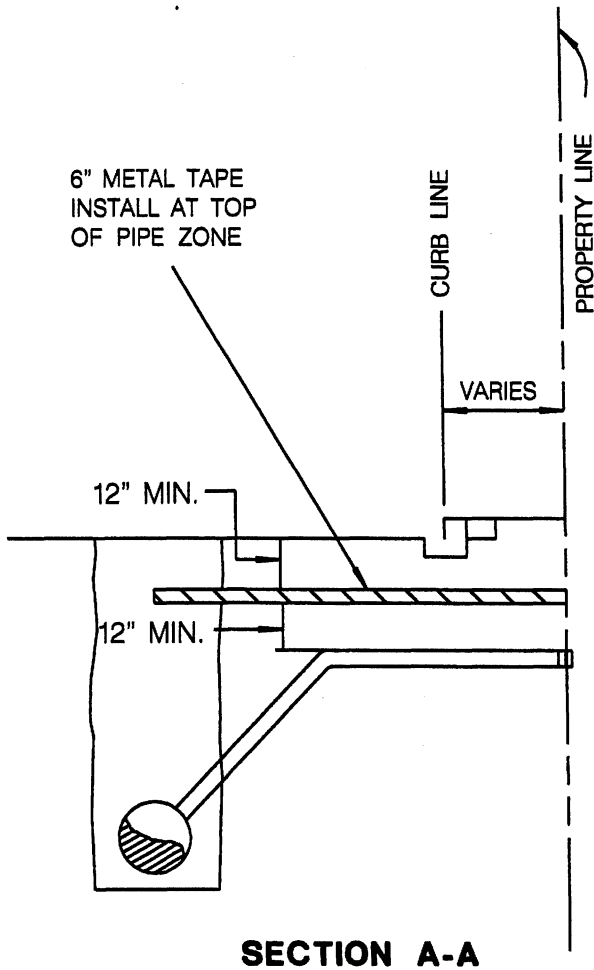
**CITY OF SAN DIEGO - STANDARD DRAWING**

**MANHOLE - 4' X 3' DIAMETER  
(FOR 15" MAXIMUM DIAMETER PIPE)**

CITY OF SAN DIEGO  
STANDARDS COMMITTEE

*R. L. ...* 12-9-03  
Chairperson RCE 64572 Date

DRAWING  
NUMBER **SDS-107**



**NOTE**

METAL TAPE SHALL BE INSTALLED  
ABOVE TOP OF PIPE (ZONE)  
APPROXIMATELY 12" BELOW  
PAVEMENT SECTION.

REVISION	BY	APPROVED	DATE
DETAIL	SMS	Oskoui	12/03

**CITY OF SAN DIEGO - STANDARD DRAWING**

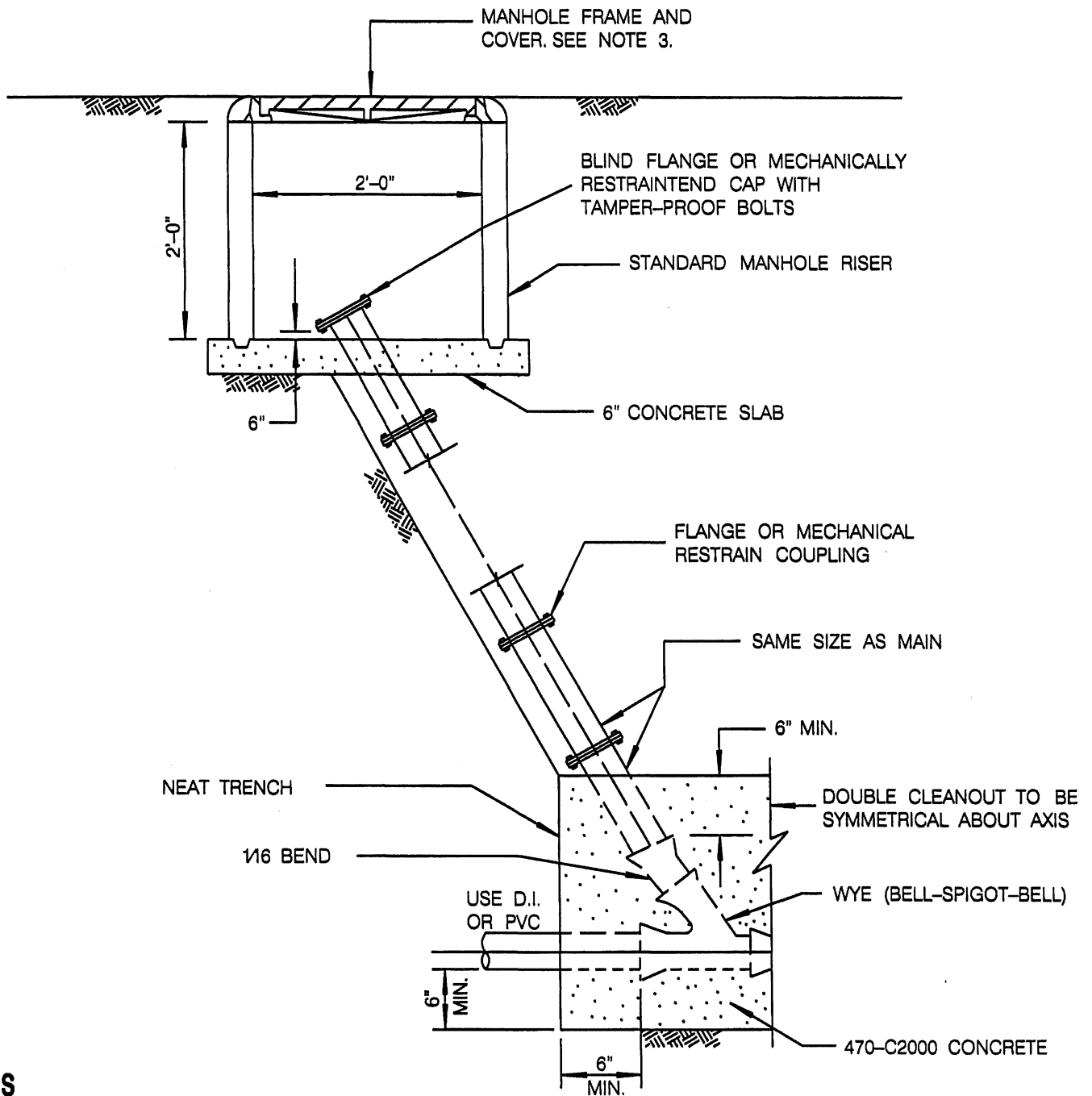
**METALLIC TAPE LOCATOR  
FOR NON-METALLIC SEWER PIPE**

CITY OF SAN DIEGO  
STANDARDS COMMITTEE

*R. Bluh* 12-9-03  
Chairperson RCE 64572 Date

DRAWING  
NUMBER

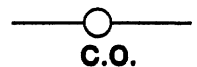
**SDS-108**



**NOTES**

1. SIMILAR POLYVINLYL CHLORIDE COMPONENTS MAY BE USED IN ACCORDANCE WITH A.S.T.M. STANDARD SPECIFICATION D-2241 AND D-3139.
2. CONCRETE SLAB SHALL BE 560-C-3250 CONCRETE.
3. USE HEAVY DUTY MANHOLE FRAME AND COVER, STANDARD DRAWING M-1, IN AREAS SUBJECT TO VEHICULAR TRAFFIC; USE LIGHT DUTY MANHOLE FRAME AND COVER, STANDARD DRAWING M-2, IN ALL OTHER LOCATIONS.
4. MINIMUM PIPE PRESSURE CLASS 200.

**LEGEND ON PLANS**



Revision	By	Approved	Date
DETAIL	JFP	Oskoui	12/03

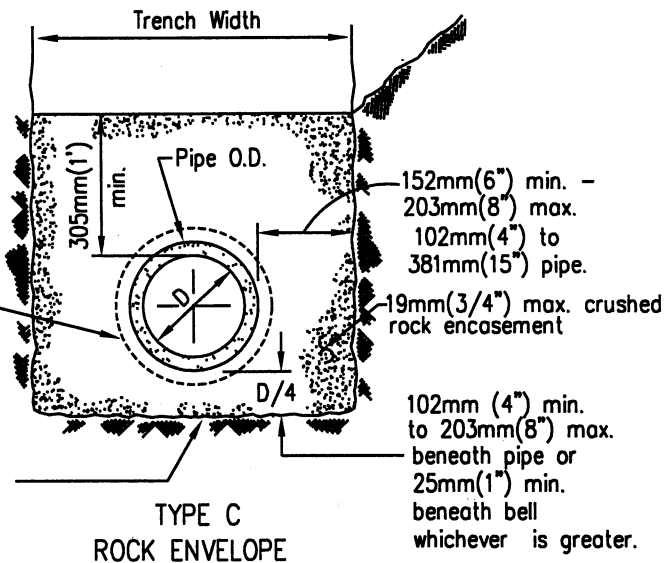
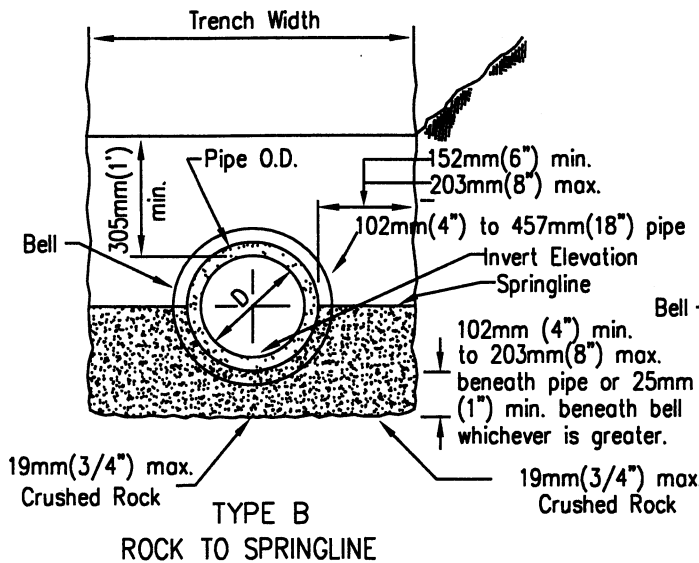
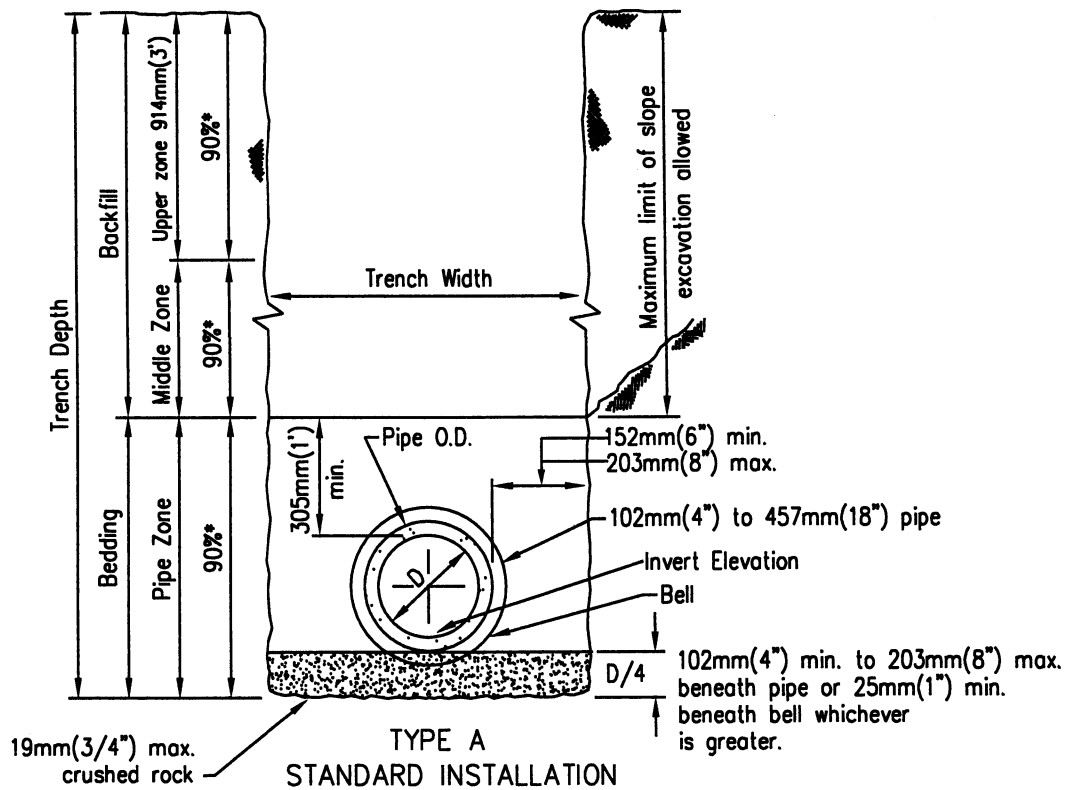
**CITY OF SAN DIEGO - STANDARD DRAWING**

**CLEANOUT - SEWER FORCE MAIN**

CITY OF SAN DIEGO  
STANDARDS COMMITTEE

*Bl...* 12-9-03  
Chairperson RCE 64572 Date

**DRAWING NUMBER SDS-109**



**NOTES**

1. For trenching in improved streets, see Standard Drawings G-24 or G-25 for trench resurfacing.
2. (\*) indicates minimum relative compaction.
3. Minimum depth of cover from the top of pipe to finish grade for all sanitary sewer installations shall be 914mm(3') For cover less than 914mm(3'), see Standard Drawing S-7 for concrete encasement.
4. See Type A installation for details not shown for Types B and C.

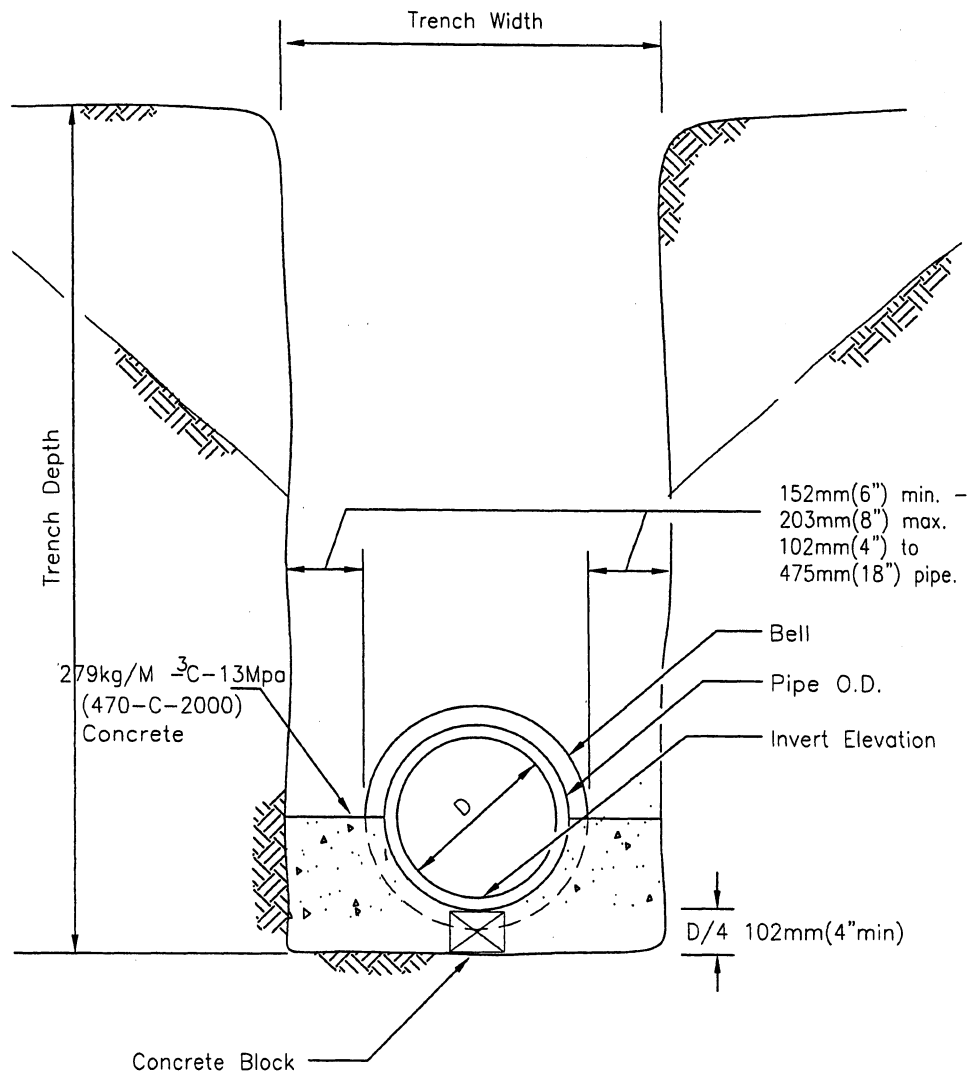
Revision	By	Approved	Date
Original	R.A.	A. Oskoui	12/06

**CITY OF SAN DIEGO - STANDARD DRAWING**

**PIPE BEDDING AND TRENCH BACKFILL FOR SEWERS**

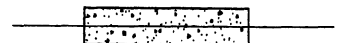
CITY OF SAN DIEGO STANDARDS COMMITTEE	
<i>M. Neal</i> 12/16/06	
COORDINATOR R.C.E 65271 Date	
DRAWING NUMBER	<b>SDS-110</b>

SEE SDS-100



SECTION

LEGEND ON PLANS

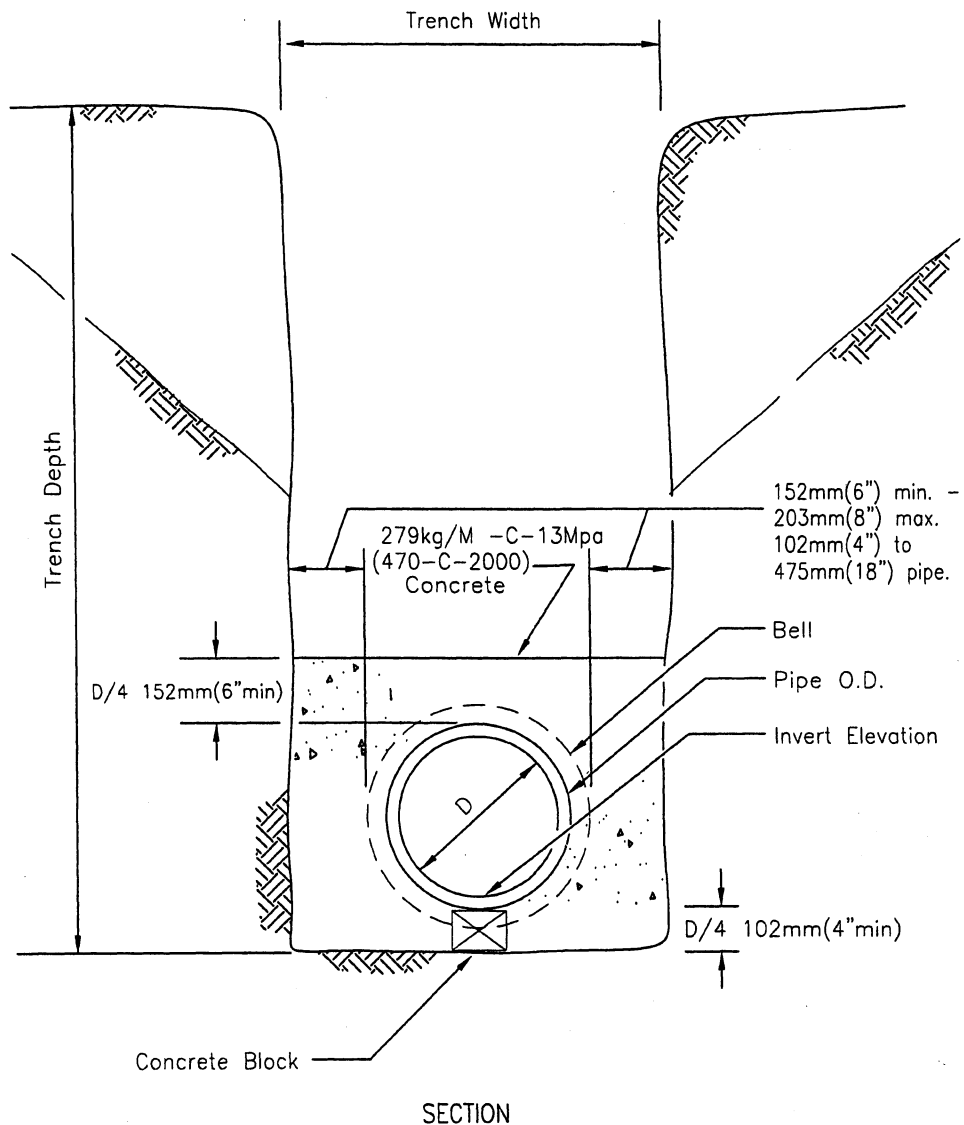


Revision	By	Approved	Date
Original	R.A.A. Oskoui		12/06

CITY OF SAN DIEGO - STANDARD DRAWING

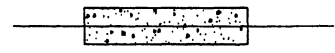
CONCRETE CRADLE

CITY OF SAN DIEGO STANDARDS COMMITTEE	
<i>Ch. W. ...</i> 12/16/06	
COORDINATOR R.C.E 65271 Date	
DRAWING NUMBER	<b>SDS-111</b>

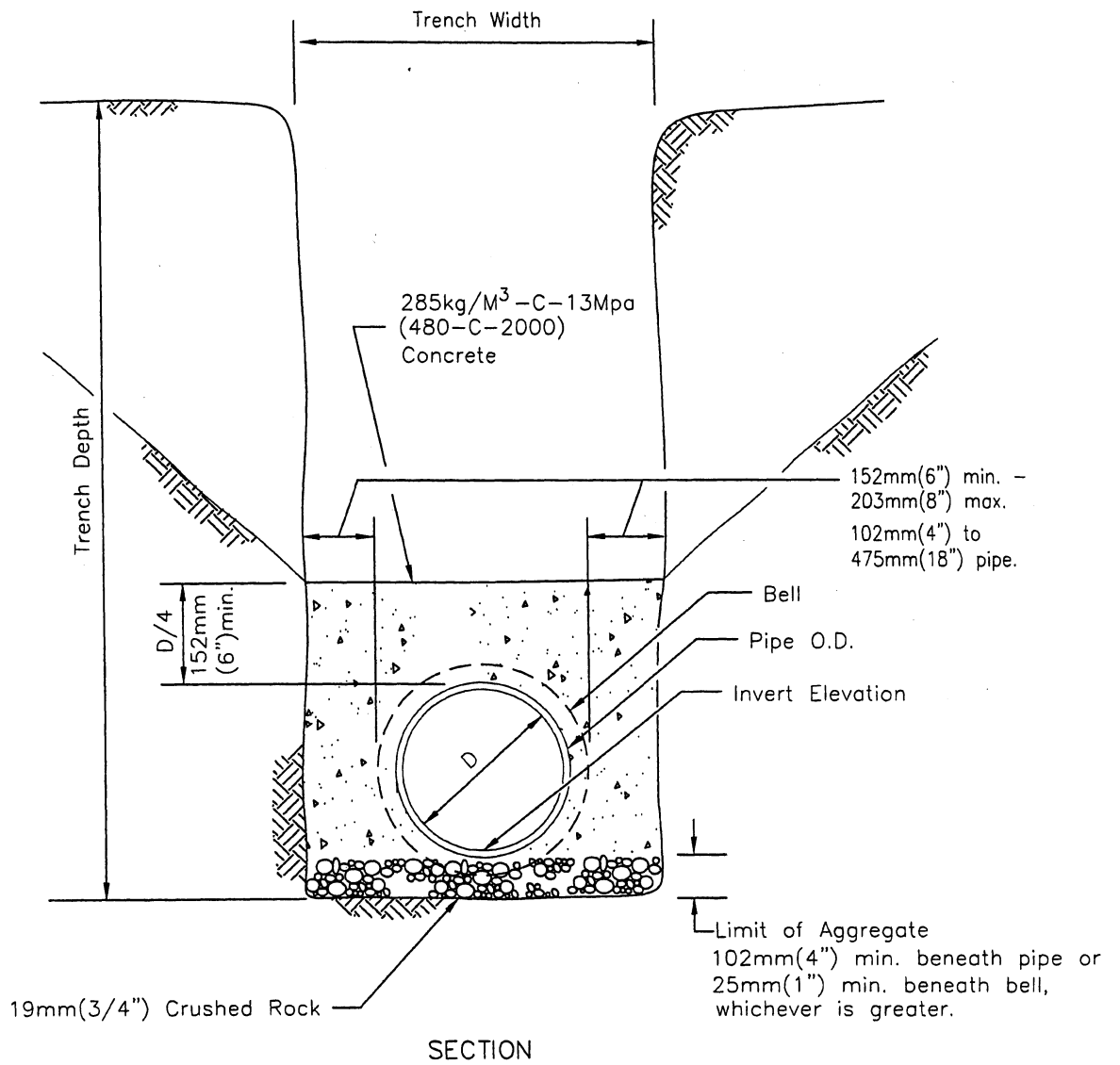


NOTE  
Encase pipe to the nearest flexible joint.

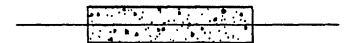
LEGEND ON PLANS



Revision	By	Approved	Date	CITY OF SAN DIEGO - STANDARD DRAWING	CITY OF SAN DIEGO STANDARDS COMMITTEE	
Original	R.A. A. Oskoui		12/06		CONCRETE ENCASEMENT	<i>H. Haal</i>
				COORDINATOR R.C.E 65271		Date
				DRAWING		SDS-112
				NUMBER		

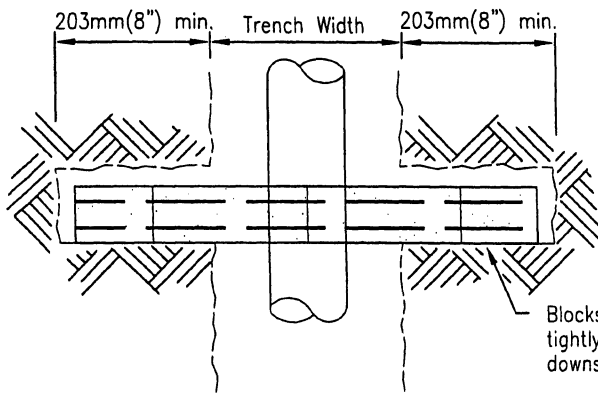


LEGEND ON PLANS



Revision	By	Approved	Date	CITY OF SAN DIEGO - STANDARD DRAWING	CITY OF SAN DIEGO STANDARDS COMMITTEE	
Original	R.A.	A. Oskoui	12/06		CONCRETE BACKFILL	<i>M. Havel</i> 12/16/6
				COORDINATOR R.C.E 65271 Date		
				DRAWING		
				NUMBER		
				<b>SDS-113</b>		



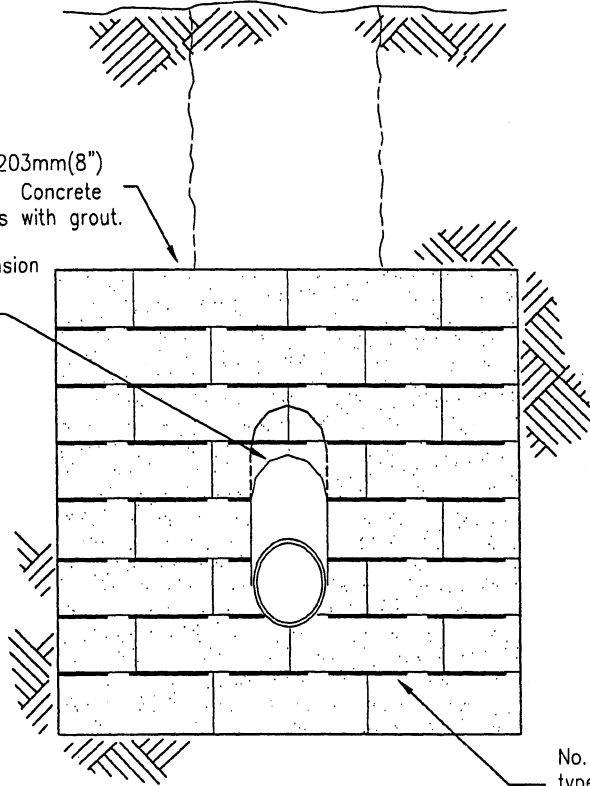


Blocks to be laid as tightly as possible to downstream side of notch.

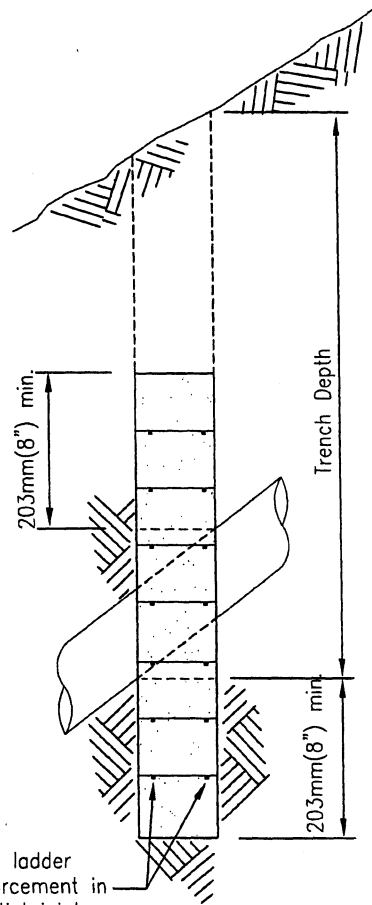
PLAN

203mm(8") x 203mm(8") x 406mm(16") Concrete Block. Fill cores with grout.

13mm(1/2") expansion joint material or jute around pipe.



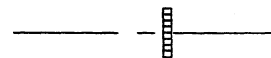
FRONT ELEVATION



No. 9 wire ladder type reinforcement in all horizontal joints.

SIDE ELEVATION

LEGEND ON PLANS



Revision	By	Approved	Date
Original	R.A.	A. Oskoui	12/06

CITY OF SAN DIEGO - STANDARD DRAWING

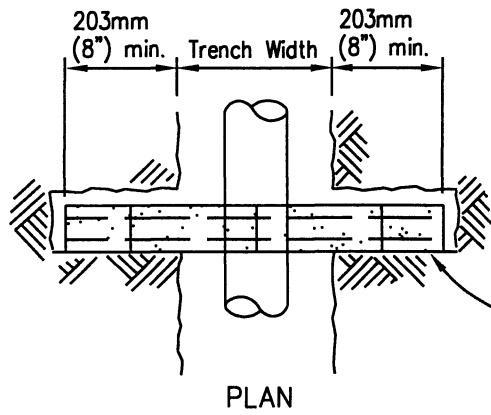
CONCRETE ANCHOR

CITY OF SAN DIEGO  
STANDARDS COMMITTEE

*A. Hove* 12/16/6  
COORDINATOR R.C.E 65271 Date

DRAWING  
NUMBER

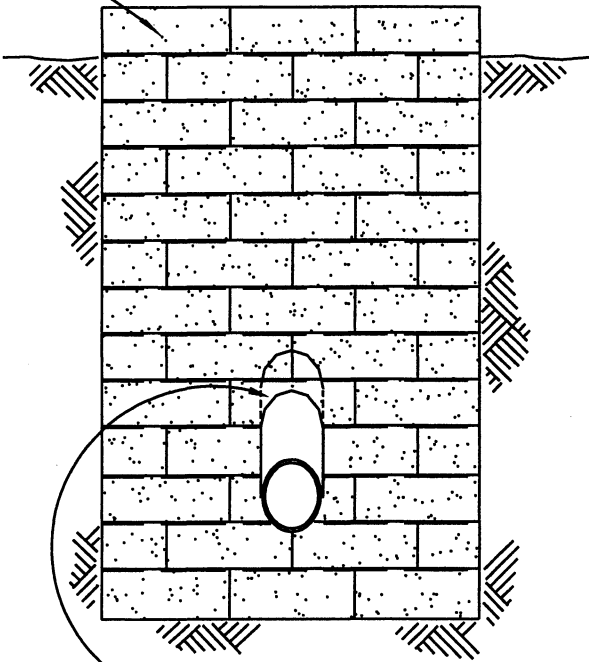
**SDS-114**



Blocks to be laid tightly as possible to downstream side of notch.

PLAN

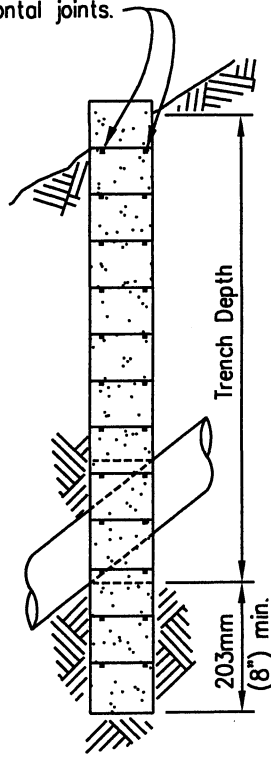
203mm x 203mm x 406mm concrete block.  
(8" x 8" x 16" concrete block.)  
Fill cores with grout.



13mm (1/2") expansion joint material or jute around pipe.

FRONT ELEVATION

No. 9 wire ladder type reinforcement in all horizontal joints.



SIDE ELEVATION

LEGEND ON PLANS



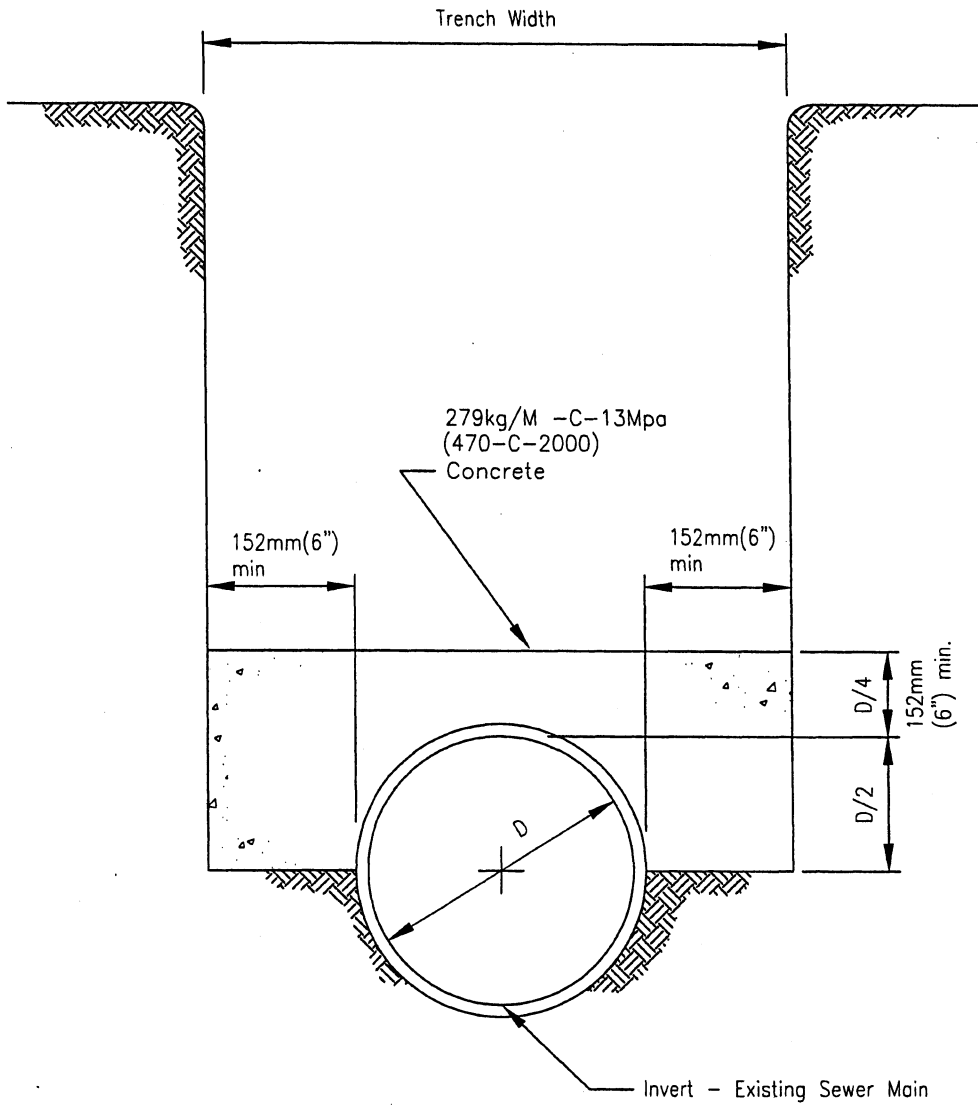
Revision	By	Approved	Date
Original	R.A. A. Oskoui		12/06

CITY OF SAN DIEGO - STANDARD DRAWING

CUTOFF WALL

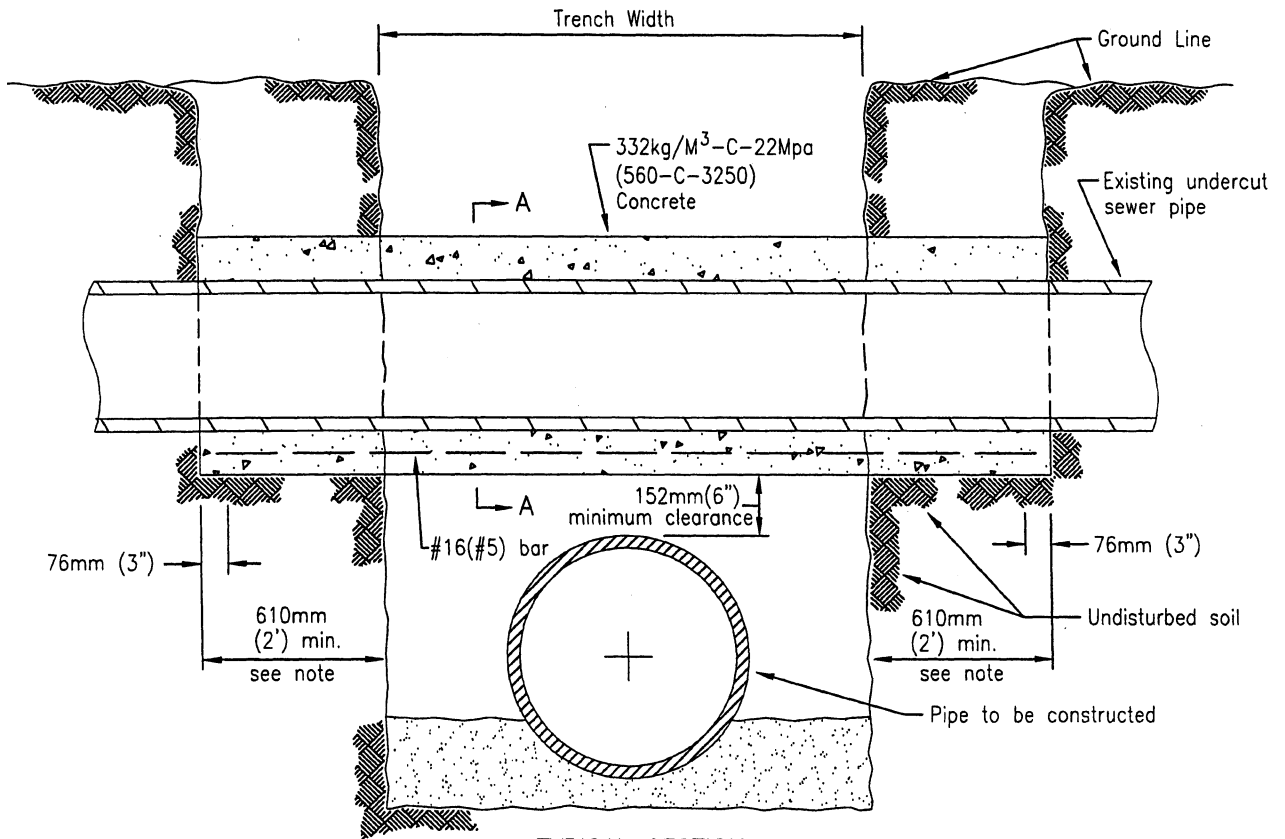
CITY OF SAN DIEGO STANDARDS COMMITTEE	
<i>H. Huel</i> 12/16/06	
COORDINATOR R.C.E 65271 Date	
DRAWING NUMBER	<b>SDS-115</b>

SEE SDS-100

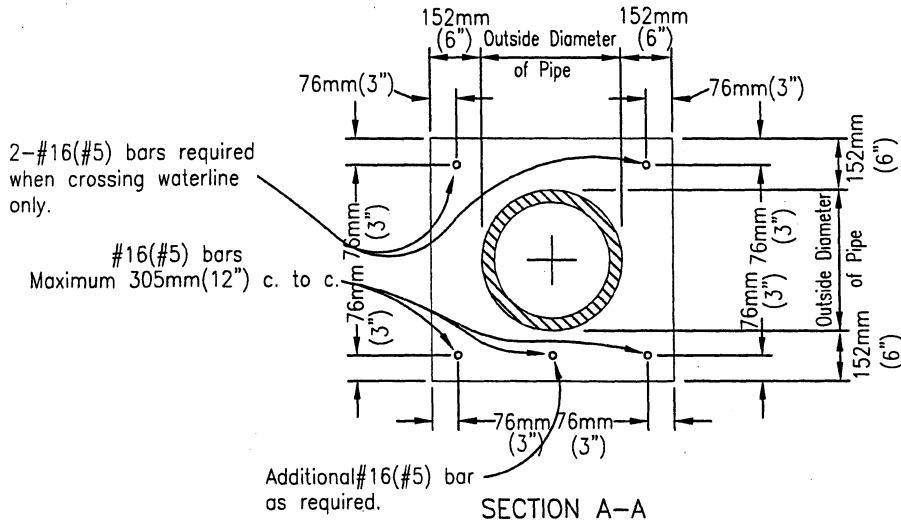


SECTION

Revision	By	Approved	Date	CITY OF SAN DIEGO - STANDARD DRAWING	CITY OF SAN DIEGO STANDARDS COMMITTEE	
Original	R.A.	A. Oskoui	12/06		<i>M. Ghali</i> 12/16/06 COORDINATOR R.C.E 65271 Da	
				CONCRETE PROTECTION FOR EXISTING SEWER PIPE	DRAWING NUMBER	SDS-116



TYPICAL SECTION



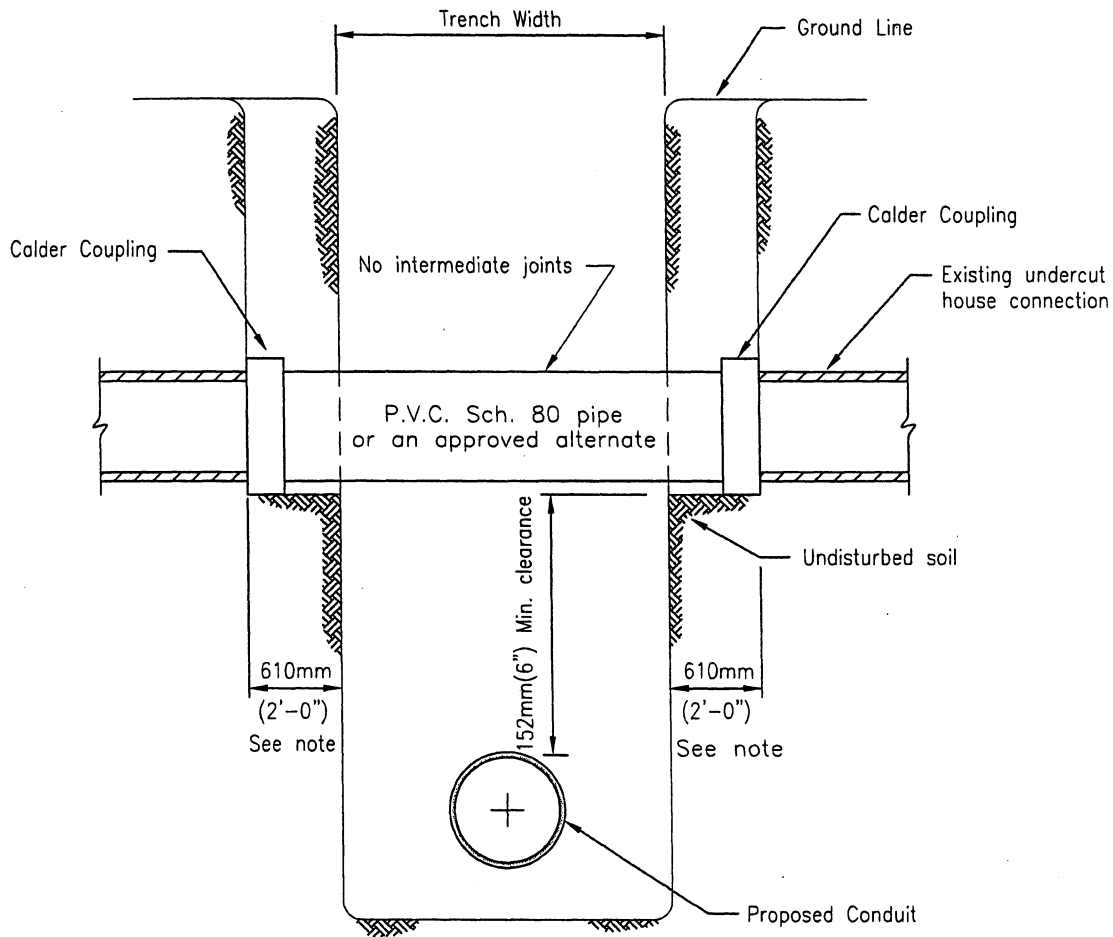
NOTE

For water line construction encasement shall extend to first joint beyond 610mm(2') at both sides of trench or to a distance of 1.2m(4'), whichever is less.

LEGEND ON PLANS



Revision	By	Approved	Date	CITY OF SAN DIEGO - STANDARD DRAWING	CITY OF SAN DIEGO STANDARDS COMMITTEE	
Original	R.A.	A. Oskoui	12/06			<i>M. Almal</i> 12/16/06 COORDINATOR R.C.E 65271 Da
				CONCRETE SUPPORT FOR UNDERCUT SEWER PIPE		
				DRAWING NUMBER		SDS-117

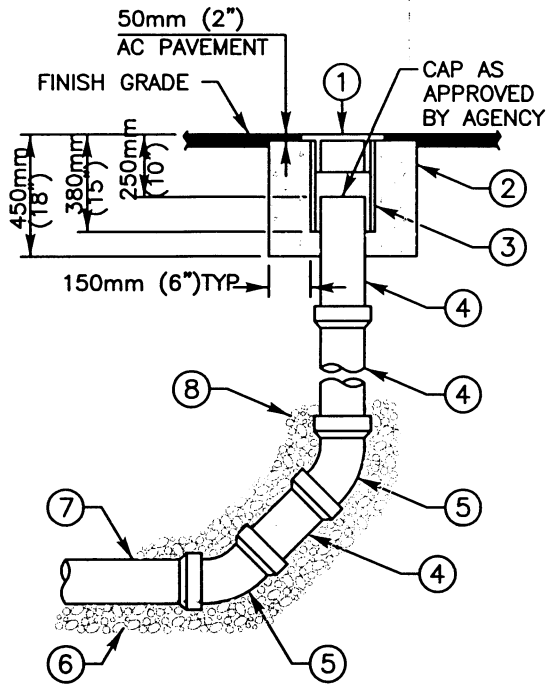


SECTION

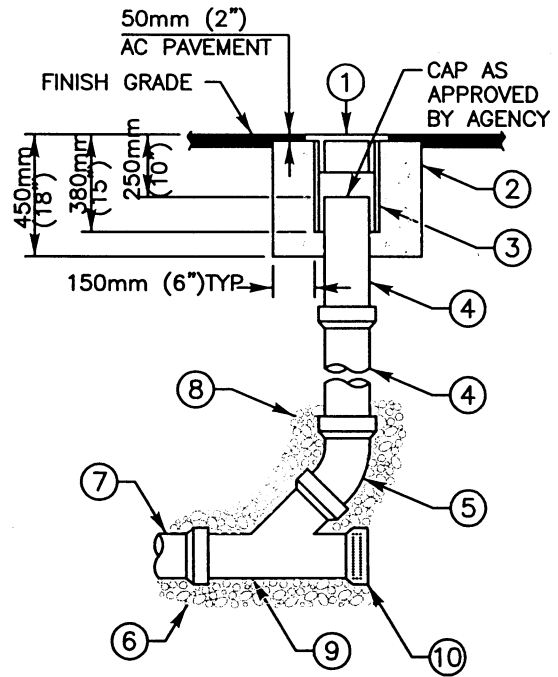
**NOTE**

For water line construction, repair pipe shall extend to first joint beyond 610mm(2') at both sides of trench or to a distance of 1.22m (4'), whichever is less.

Revision	By	Approved	Date	CITY OF SAN DIEGO - STANDARD DRAWING	CITY OF SAN DIEGO STANDARDS COMMITTEE	
Original	R.A.	A. Oskoui	12/06		<b>HOUSE CONNECTION SEWER REPAIR</b>	<i>M. H. Alali</i> 12/16/06 COORDINATOR R.C.E 65271 Da
				DRAWING NUMBER		
				<b>SDS-118</b>		



**TYPE A**  
MAINS FOR 150mm (6")  
AND 200mm (8")



**TYPE B**  
SEWER LATERAL  
CLEANOUT

**NOTES:**

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) CLEANOUTS TO BE INSTALLED AT THE END OF MAINS WHERE INDICATED ON THE PLANS
- 3) CLEANOUT PIPE TO BE SAME SIZE AND MATERIAL AS SEWER MAIN UP TO 200mm (8")
- 4) BACKFILL TO TOP OF 45° BEND WITH 19mm (3/4") CRUSHED ROCK
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

—○—  
LEGEND ON PLANS

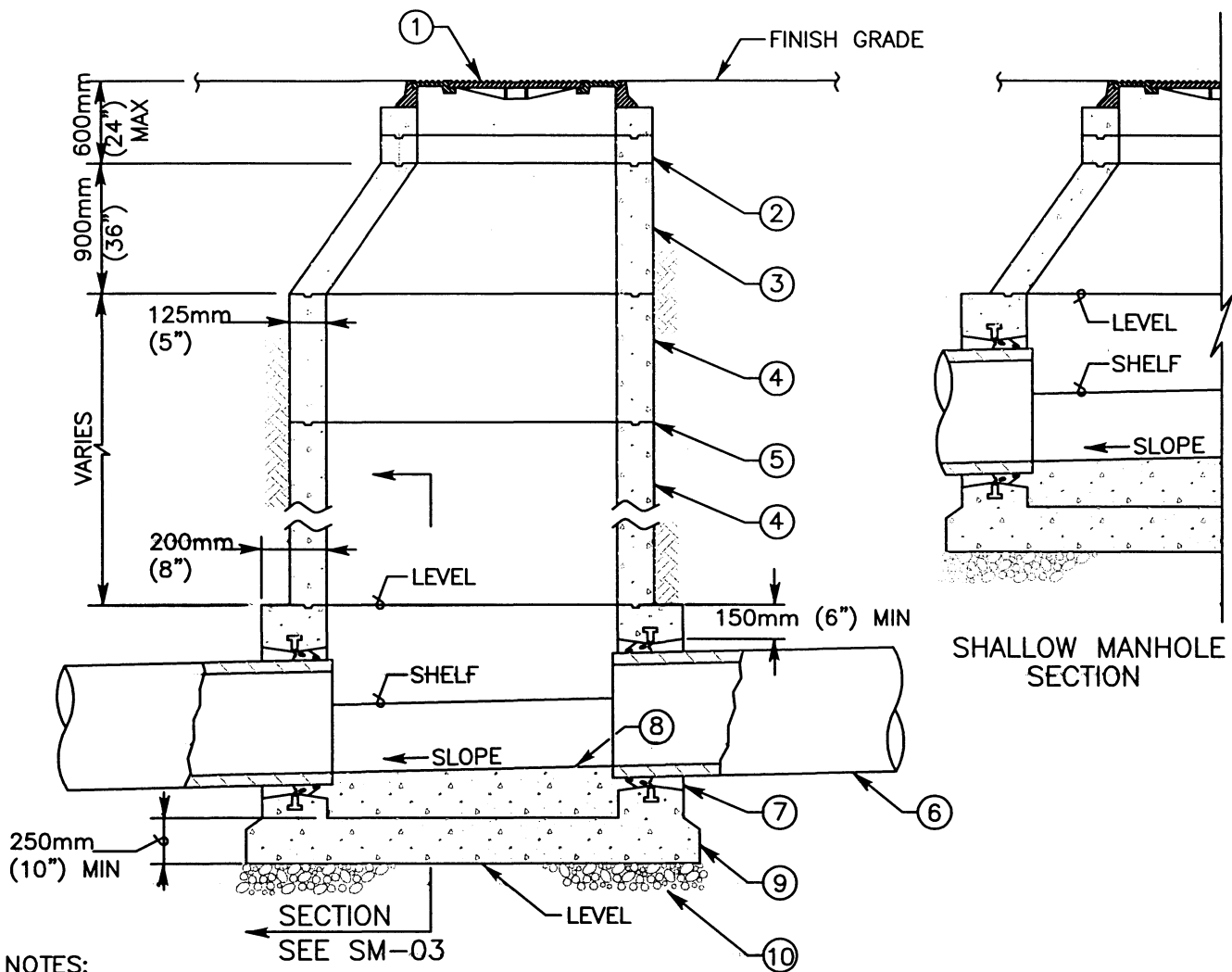
ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	300mm (12") CI CLEANOUT BOX COVER MARKED 'SEWER' AND AGENCY NAME AS REQUIRED	⑤	45° ELBOW
②	CONCRETE RING	⑥	19mm (3/4") CRUSHED ROCK PIPE BEDDING
③	300mm (12") PVC, C-900 x 380mm (15") LONG (CLEANOUT BOX)	⑦	SEWER MAIN
④	SIZE x REQUIRED LENGTH PVC PIPE	⑧	19mm (3/4") CRUSHED ROCK SEE NOTE 4
		⑨	STANDARD WYE BRANCH
		⑩	INSTALL PLUG AND CONCRETE LUG

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-03		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

**SEWER CLEANOUT**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  
*T. Stanton* 03/24/2005  
 Chairperson R.C.E. 19246 Date  
 DRAWING NUMBER **SC-01**



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE SEE SM-05 FOR ACCESS LOCATIONS
- 3) FOR MANHOLE BASES SEE SM-03
- 4) MANHOLES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED PER SM-07
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

1200mm (48")  
  
 LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	900mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3	⑤	WATER TIGHT JOINTS SEE SM-05
②	900mm (36") DIA GRADE RING(S) 150mm (6") TO 450mm (18") HIGH	⑥	SEWER MAIN
③	ECCENTRIC CONE SEE NOTE 2	⑦	MANHOLE PIPE CONNECTOR SEE SM-04
④	1200mm (48") DIA RING(S) VARIABLE HEIGHT	⑧	FIELD INSTALLED INVERT SEE SM-04
		⑨	CONCRETE BASE, PRECAST OR CAST IN PLACE
		⑩	150mm (6") OF 19mm (3/4") CRUSHED ROCK

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

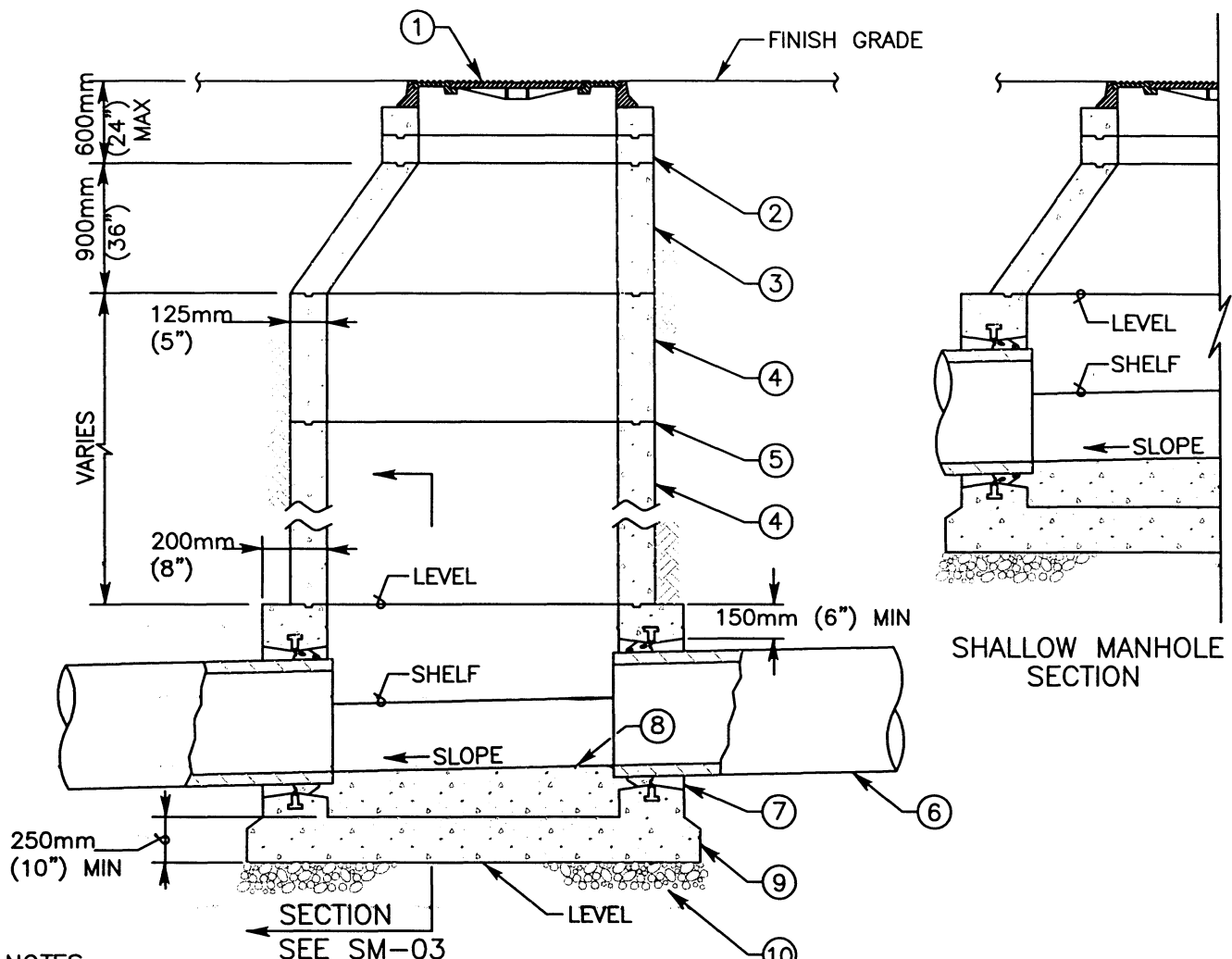
**SAN DIEGO REGIONAL STANDARD DRAWING**

**1200mm (48") DIAMETER PRECAST  
MANHOLE INSTALLATION**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

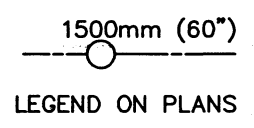
*T. Stanton* 03/24/2005  
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SM-01**



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE SEE SM-05 FOR ACCESS LOCATIONS
- 3) FOR MANHOLE BASES SEE SM-03
- 4) MANHOLES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED AND LINED PER SM-07
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST



ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	900mm (36") MANHOLE FRAME AND TWO CONCENTRIC COVERS SEE S.D.R.S.D. M-3	⑤	WATER TIGHT JOINTS SEE SM-05
②	900mm (36") DIA GRADE RING(S) 150mm (6") TO 450mm (18") HIGH	⑥	SEWER MAIN
③	ECCENTRIC CONE SEE NOTE 2	⑦	MANHOLE PIPE CONNECTOR SEE SM-04
④	1500mm (60") DIA RING(S) VARIABLE HEIGHT	⑧	FIELD INSTALLED INVERT SEE SM-04
		⑨	CONCRETE BASE, PRECAST OR CAST IN PLACE
		⑩	150mm (6") OF 19mm (3/4") CRUSHED ROCK

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

**1500mm (60") DIAMETER PRECAST MANHOLE INSTALLATION**

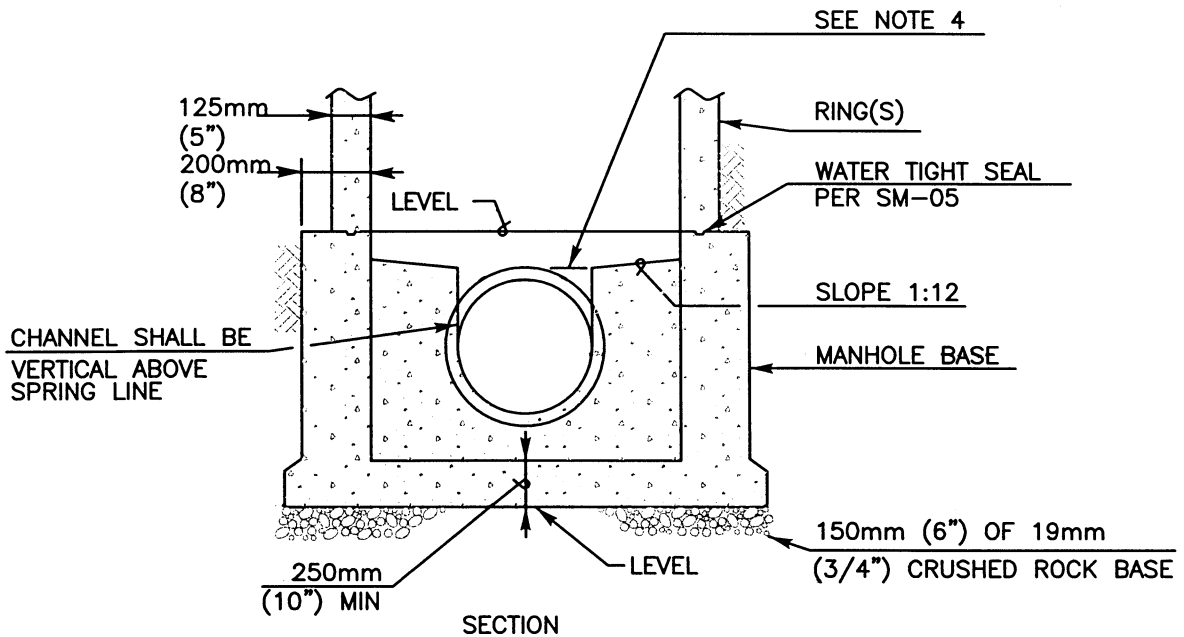
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SM-02**





**NOTES:**

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) FOR MANHOLE INSTALLATIONS SEE SM-01 AND SM-02
- 3) MANHOLE BASES FOR MAINS 450mm (18") AND LARGER SHALL BE COATED PER SM-07
- 4) LOWEST POINT ON SHELF SHALL BE EVEN WITH TOP OF PIPE
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

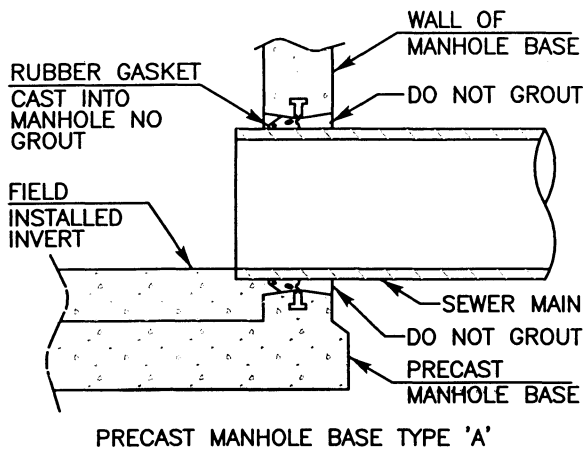
**SEWER MANHOLE BASE**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

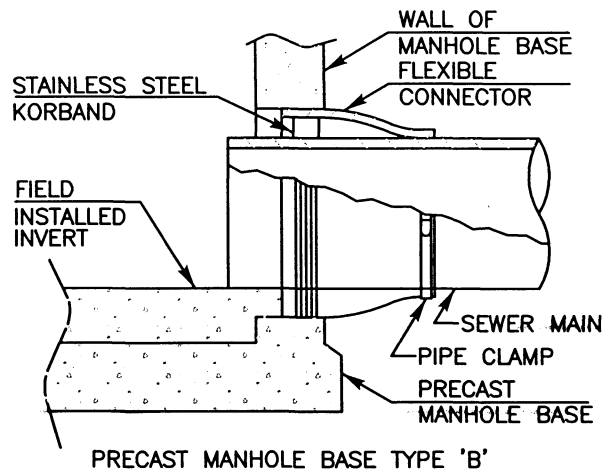
*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

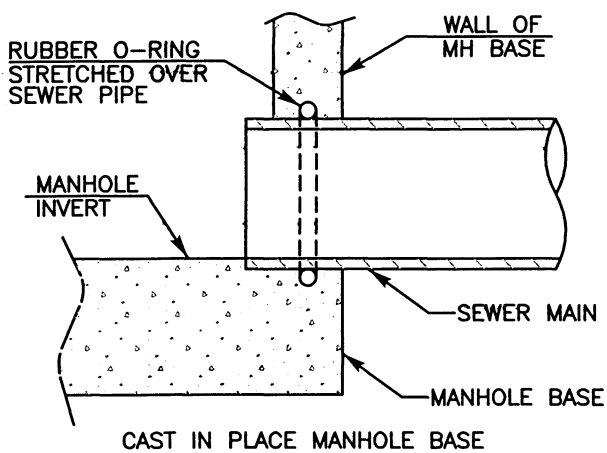
DRAWING NUMBER **SM-03**



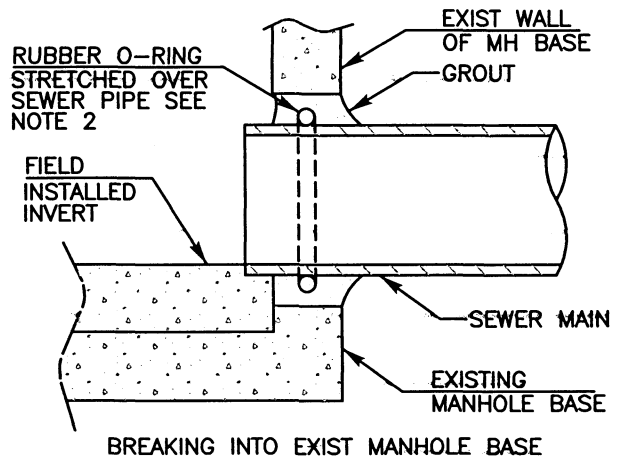
PRECAST MANHOLE BASE TYPE 'A'



PRECAST MANHOLE BASE TYPE 'B'



CAST IN PLACE MANHOLE BASE



BREAKING INTO EXIST MANHOLE BASE

**NOTES:**

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) A RUBBER O-RING OR A FLEXIBLE CONNECTOR (AS SHOWN IN PRECAST MANHOLE BASE TYPE 'B') CAN BE USED WHEN BREAKING INTO EXISTING MANHOLE
- 3) FOR MANHOLES REQUIRING COATING AND LINING SEE SM-07
- 4) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

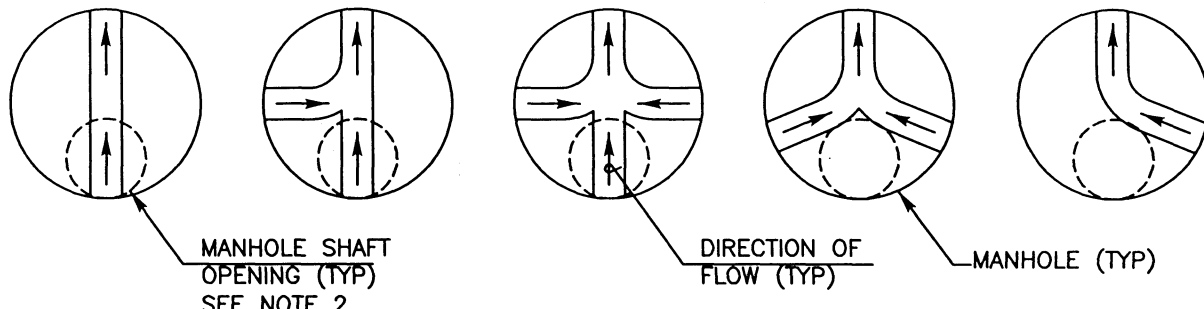
**MANHOLE PIPE CONNECTORS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

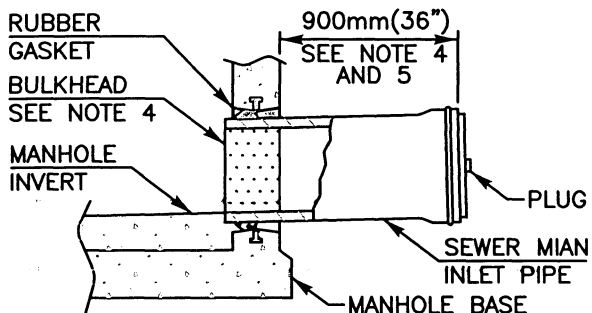
*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

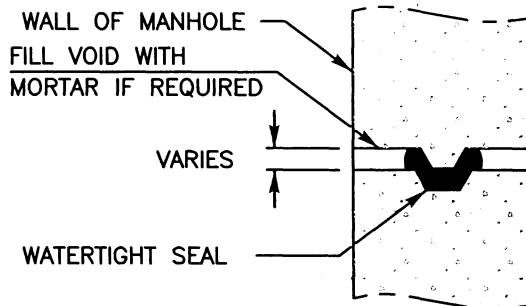
DRAWING NUMBER **SM-04**



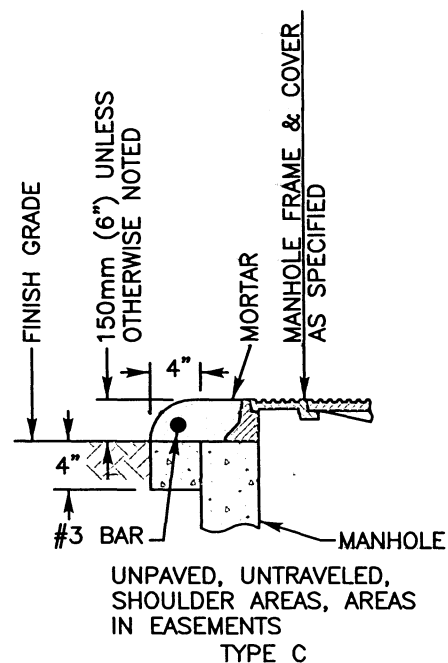
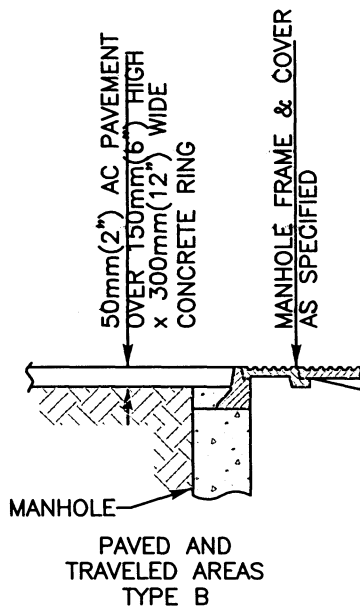
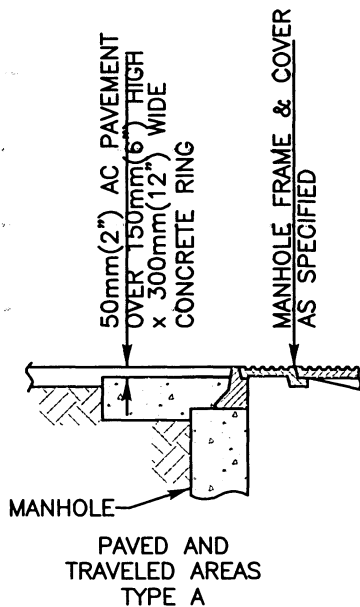
MANHOLE ACCESS LOCATION PLAN VIEW



MANHOLE STUB OUT FOR FUTURE CONNECTION



WATERTIGHT MANHOLE JOINT



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) VERTICAL WALL OF CONE TO BE ON THE UP STREAM SIDE OF MANHOLE
- 3) FOR MANHOLES REQUIRING COATING AND LINING SEE SM-07
- 4) BULDHEADS SHALL BE INSTALLED AT THE MANHOLE END OF STUBS
- 5) SEWER MAIN TO BE LAID WITH BELLS UP-GRADE
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomosulo	03/05

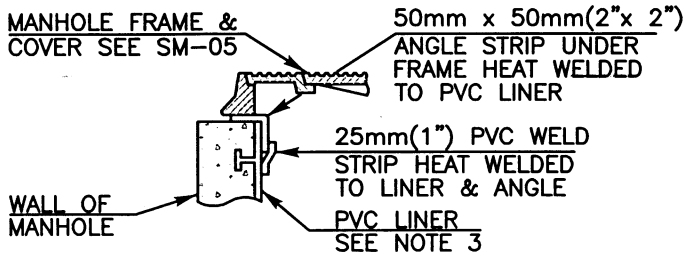
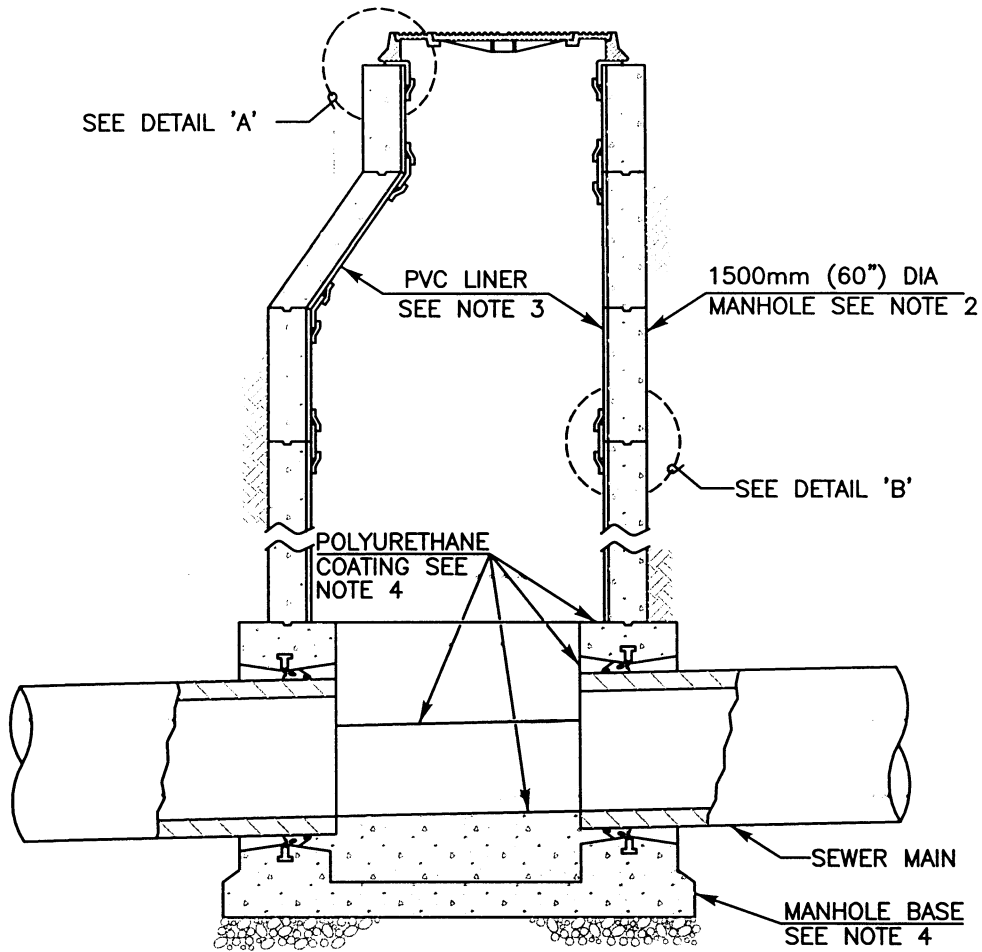
SAN DIEGO REGIONAL STANDARD DRAWING

MANHOLE MISCELLANEOUS DETAILS

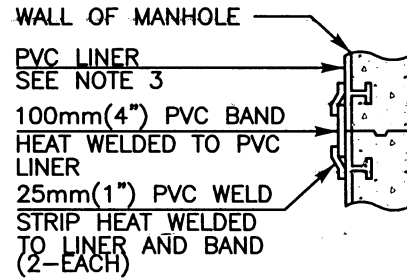
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE  
*T. Stanton* 03/24/2005  
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER SM-05

NOT USED



DETAIL "A" MANHOLE  
FRAME & COVER



DETAIL "B" MANHOLE  
JOINT SECTIONS

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) MANHOLES FOR SEWER MAINS 450mm(18") AND LARGER SHALL BE COATED AND LINED
- 3) MANHOLE SHAFT AND CONE SECTIONS, AND GRADE RINGS SHALL HAVE A PVC LINER PLACED WITH T-SHAPED SUPPORTS INTEGRALLY CAST INTO THE CONCRETE
- 4) ELASTOMERIC POLYURETHANE COATING SHALL BE APPLIED TO THE INTERIOR OF MANHOLE BASES
- 5) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomosulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

MANHOLE COATING AND  
LINING SYSTEM

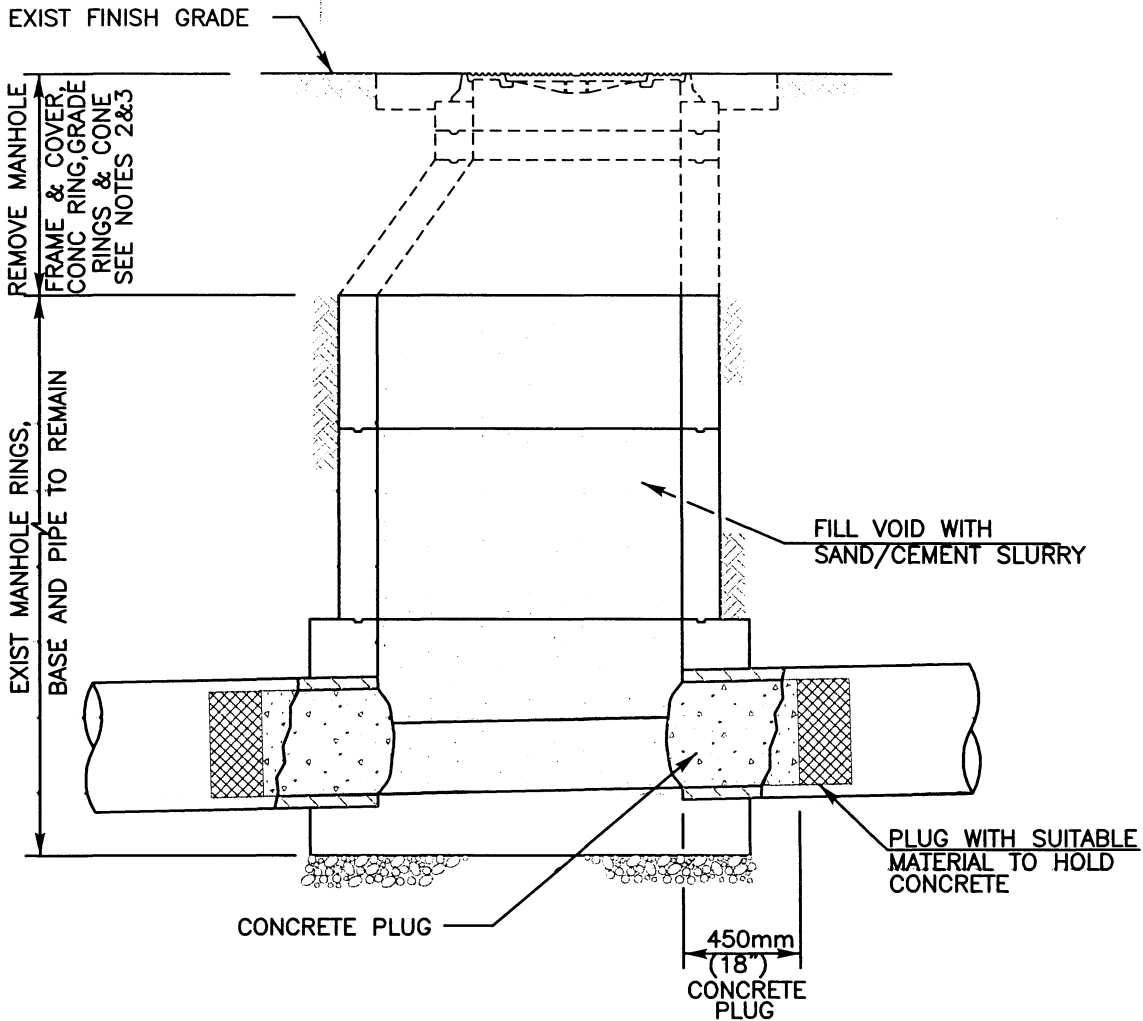
RECOMMENDED BY THE SAN DIEGO  
REGIONAL STANDARDS COMMITTEE

*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

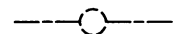
DRAWING  
NUMBER

SM-07



**NOTES:**

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) ALL SALVAGED MATERIAL BECOMES PROPERTY OF AGENCY OF JURISDICTION
- 3) BACKFILL PER AGENCY'S REQUIREMENT
- 4) FOR CUTTING & PLUGGING ABANDONED SEWER MAINS SEE WP-03



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-02		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

**EXISTING MANHOLE  
ABANDONMENT**

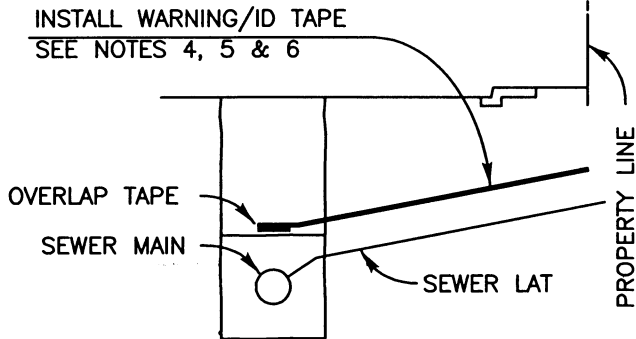
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 03/24/2005

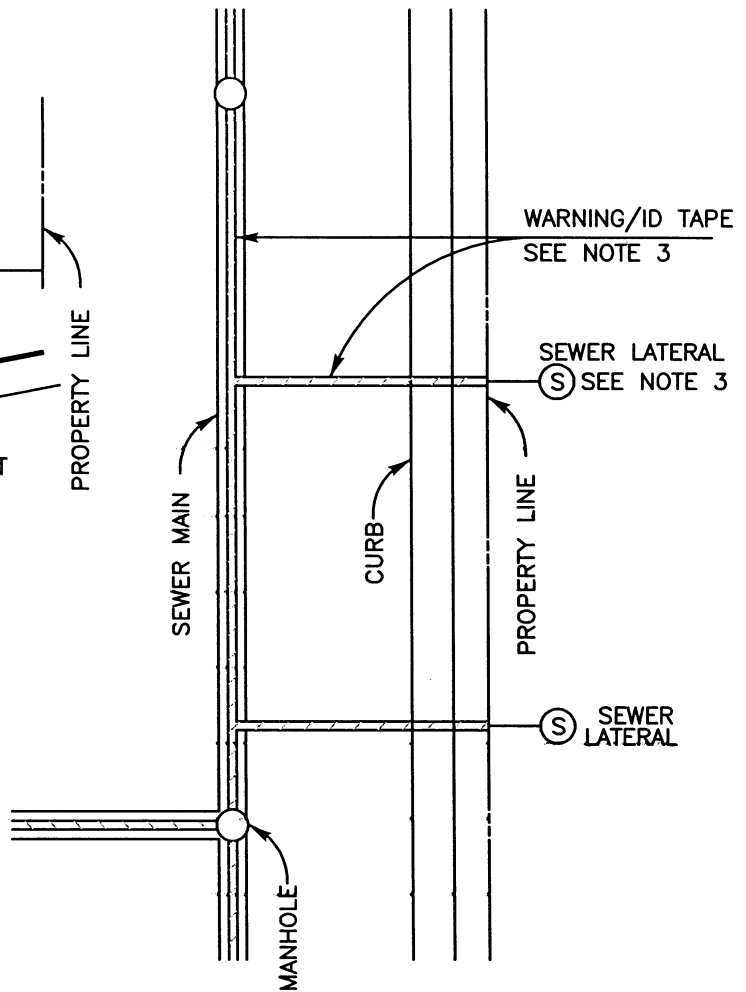
Chairperson R.C.E. 19246 Date

DRAWING  
NUMBER

**SM-08**



SECTION AT SEWER LATERALS



PLAN

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) WARNING/IDENTIFICATION TAPE SHALL BE INSTALLED AS SPECIFIED BY AGENCY
- 3) STAMP OR CHISEL A 50mm (2") HIGH 'S' IN CURB FACE TO IDENTIFY SEWER LATERAL LOCATION
- 4) FOR SEWER LATERALS EXTEND TAPE TO PROPERTY LINE
- 5) DEPTH OF WARNING/IDENTIFICATION TAPE AS SPECIFIED BY AGENCY
- 6) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-19		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

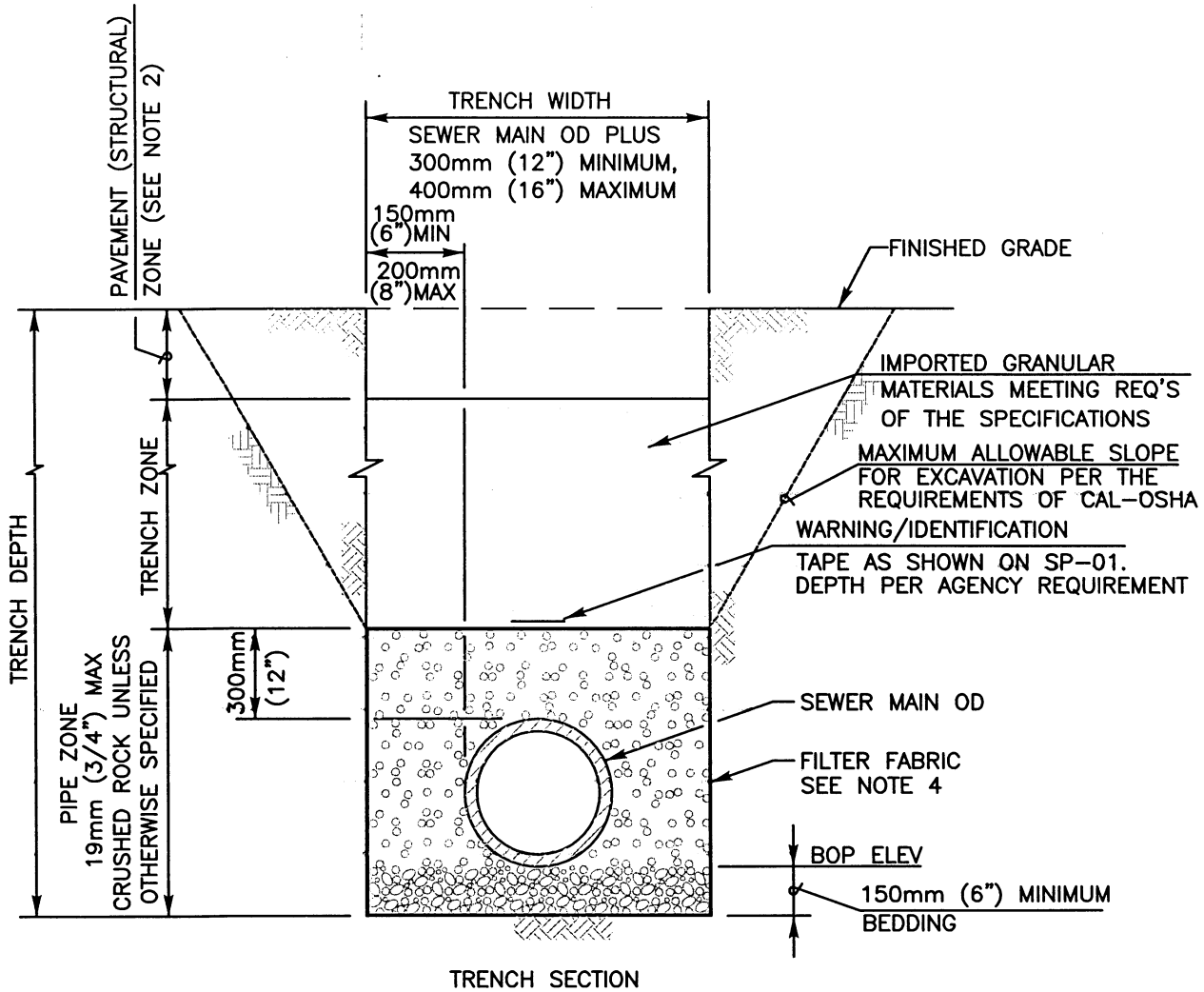
WARNING/IDENTIFICATION  
TAPE INSTALLATION

RECOMMENDED BY THE SAN DIEGO  
REGIONAL STANDARDS COMMITTEE

*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING  
NUMBER SP-01



**NOTES:**

- 1) REFER TO AGENCY SPECIFICATIONS FOR TRENCHING, BACKFILLING AND COMPACTING WHERE APPLICABLE
- 2) PAVING OR PAVEMENT REPAIR TO BE DONE IN ACCORDANCE WITH AGENCY OF JURISDICTION
- 3) EXCAVATE BELL HOLES AT EACH JOINT TO PERMIT PROPER ASSEMBLY AND INSPECTION OF THE ENTIRE JOINT
- 4) FILTER FABRIC AS REQUIRED BY AGENCY OF JURISDICTION (WITH A MINIMUM 12" OVERLAP).

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-04		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

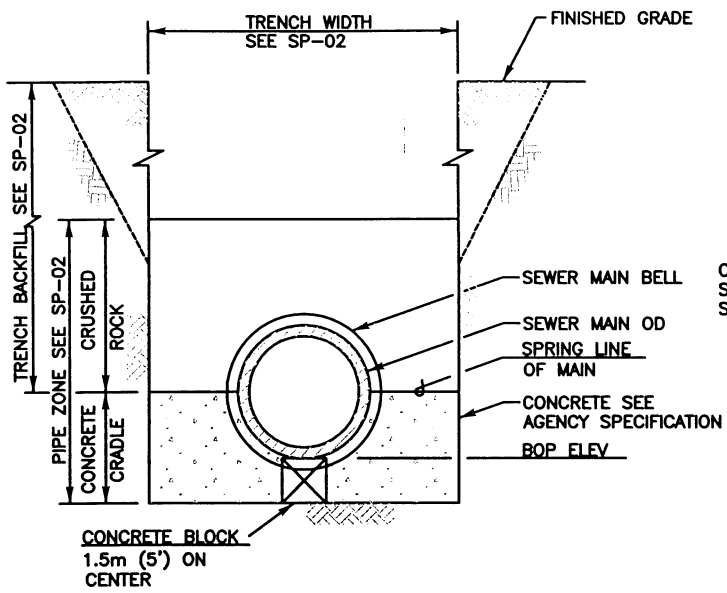
**PIPE BEDDING AND TRENCH  
BACKFILL FOR SEWER FACILITIES**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

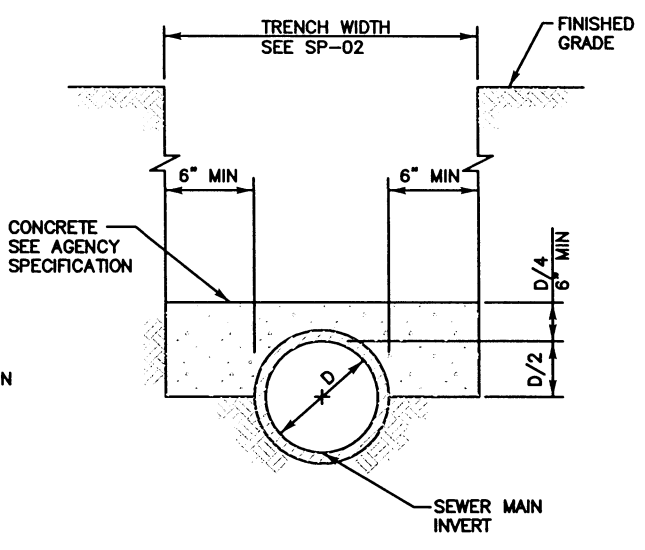
*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

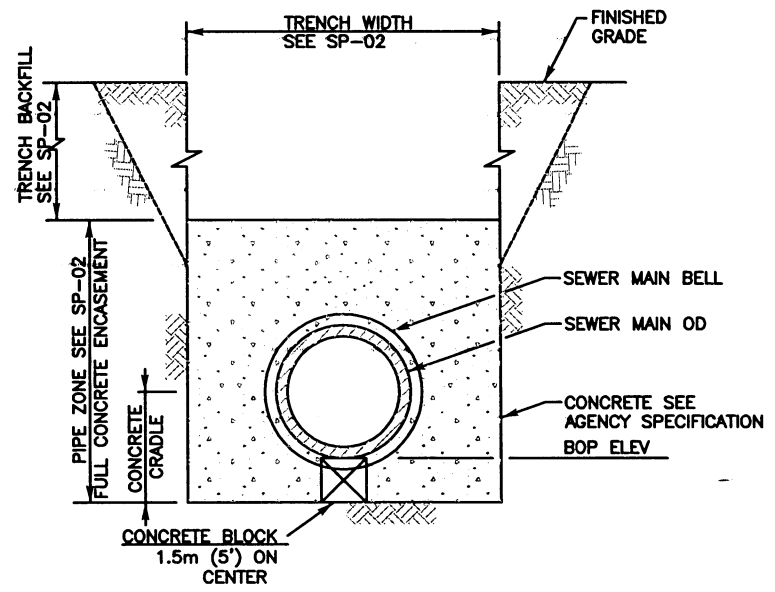
DRAWING NUMBER **SP-02**



TRENCH SECTION  
CONCRETE PIPE CRADLE



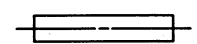
TRENCH SECTION  
CONCRETE PROTECTION



TRENCH SECTION  
CONCRETE PIPE ENCASEMENT

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR TRENCHING, BACKFILLING AND COMPACTING WHERE APPLICABLE
- 2) CONCRETE CRADLE SHALL BE USED WHEN THE TRENCH WIDTH AT THE UPPER LIMIT OF THE PIPE ZONE EXCEEDS THE MAX WIDTH SPECIFIED ON SP-02 AND OR DIRECTED BY AGENCY'S ENGINEER
- 3) FOR PIPE BEDDING AND TRENCH BACKFILL SEE SP-02



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-06		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

**CONCRETE PROTECTION FOR  
SEWER PIPE**

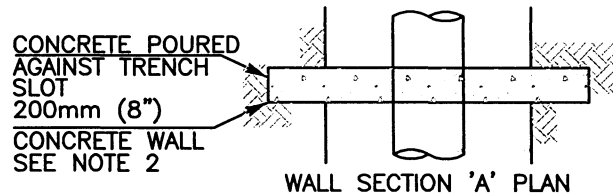
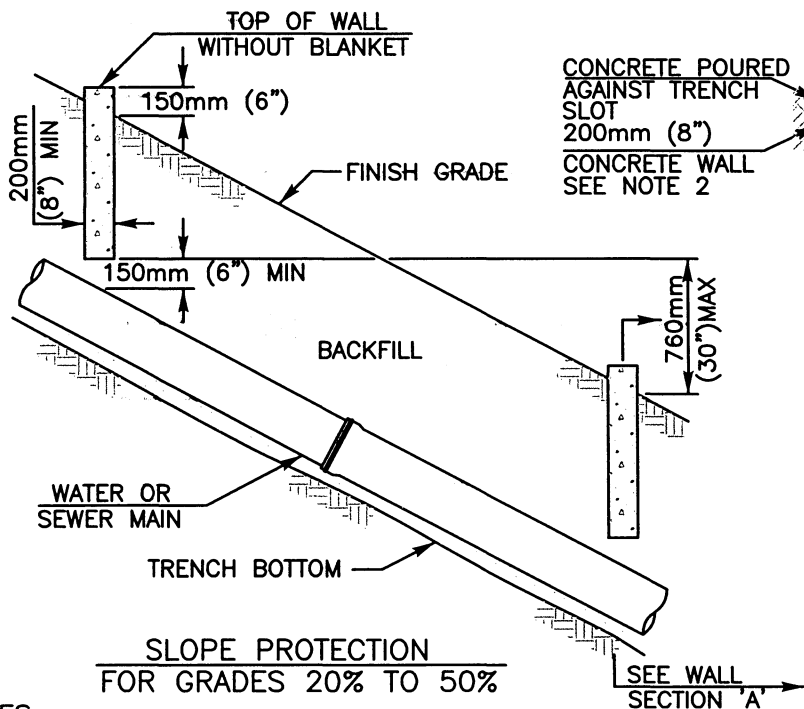
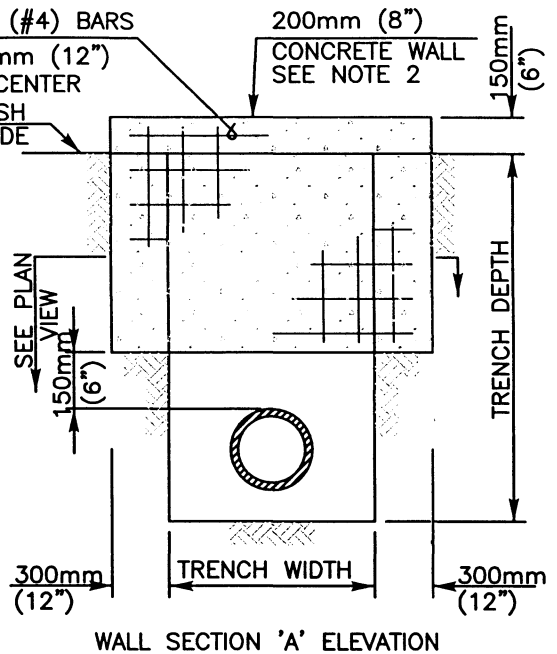
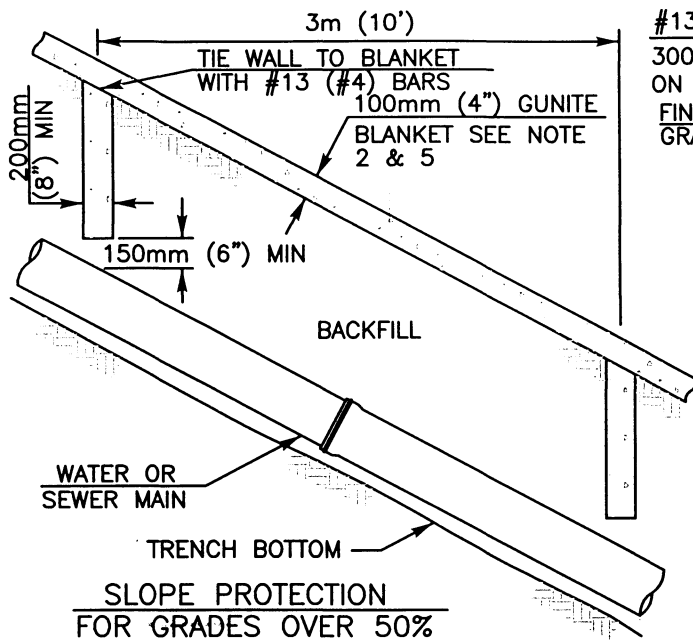
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SP-03**





NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) THE DETAILS SHOWN REPRESENT THE MINIMUM REQUIRED. THE ENGINEER OF WORK IS REQUIRED TO PROVIDE A SUBMITTAL TO THE AGENCY OF JURISDICTION FOR REVIEW AND APPROVAL BY THE AGENCY'S ENGINEER PRIOR TO INSTALLATION
- 3) WALLS SHALL BE REINFORCED CONCRETE OR 200mm x 200mm x 400mm (8" x 8" x 16") CONCRETE BLOCK, REINFORCED AND ALL CORES FILLED WITH GROUT SEE SPECIFICATIONS
- 4) FOR GRADES OVER 50%, SLOPE PROTECTION SHALL ALSO INCLUDE AC PAVING, CONCRETE SLAB OR GUNITITE BLANKET PLACED OVER THE PIPELINE ALIGNMENT
- 5) 100mm (4") GUNITITE BLANKET WITH 150mm (6") SQUARE x 10 GAGE WIRE FABRIC AT THE ENGINEERS DISCRETION

LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

SLOPE PROTECTION INSTALLATIONS

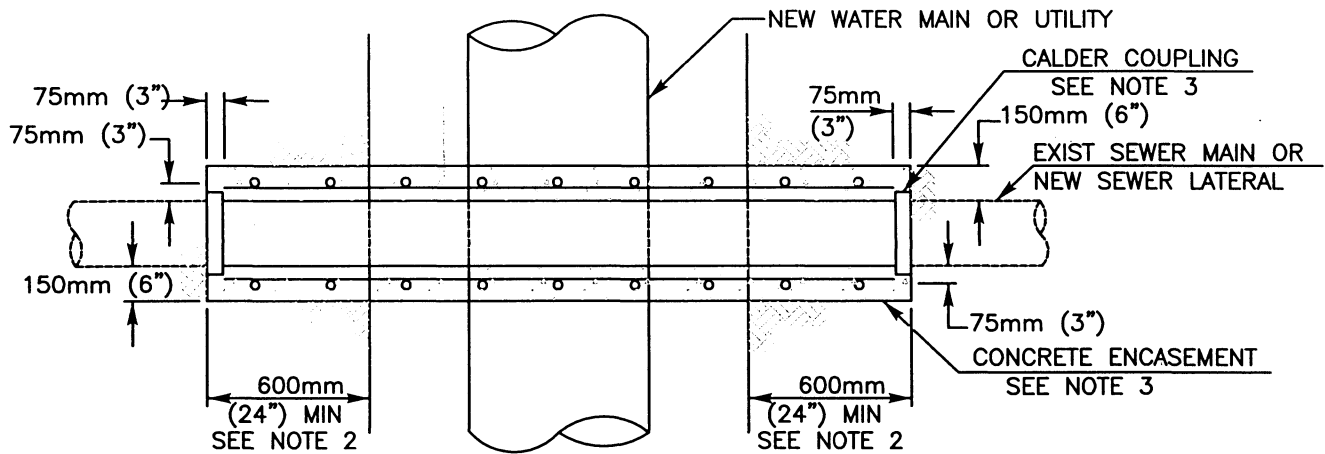
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*R. Stanton* 03/24/2005

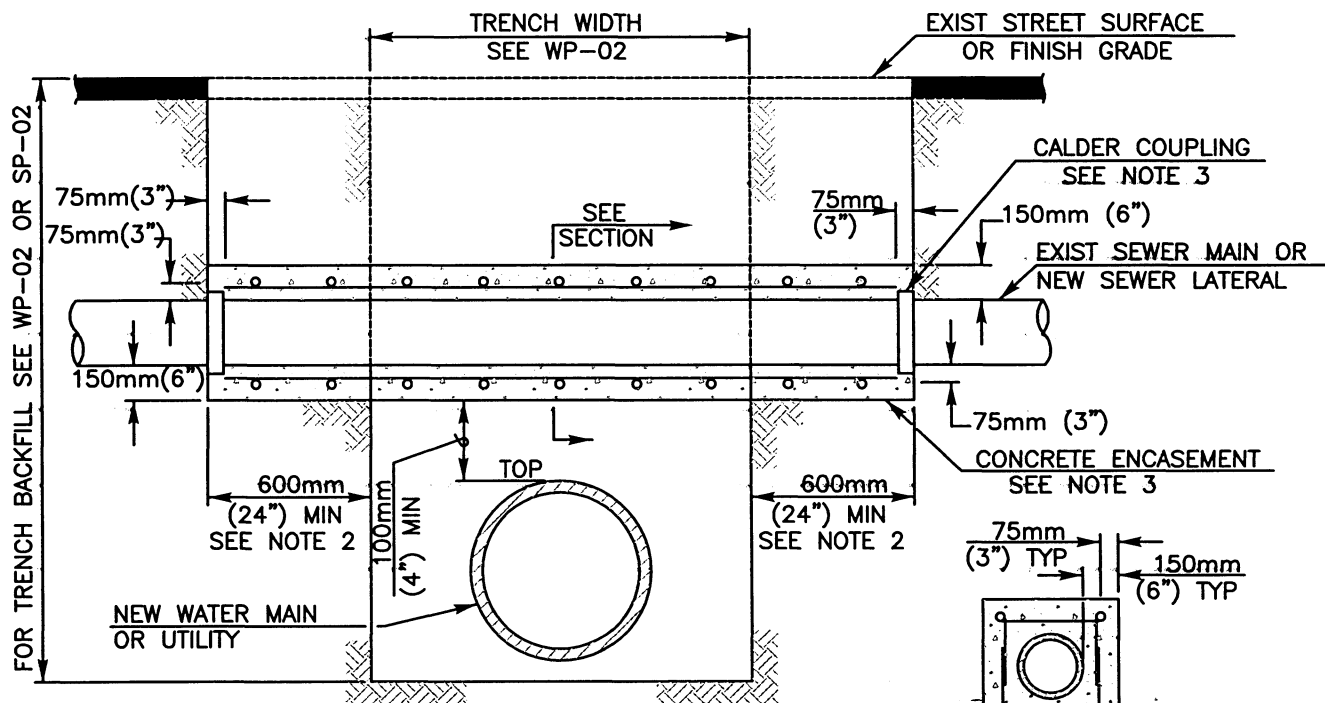
Chairperson R.C.E. 19246 Date

DRAWING NUMBER SP-05

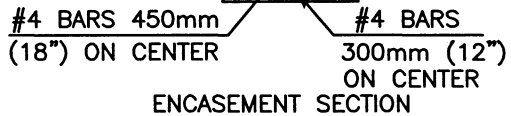




PLAN

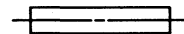


ELEVATION



NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS FOR PROTECTION OF EXISTING FACILITIES
- 2) ENCASEMENT SHALL EXTEND TO FIRST JOINT BEYOND BOTH SIDES OF TRENCH [600mm (24") MIN 1200mm (48") MAX OF SUITABLE NATIVE SUPPORT BEYOND EDGE OF TRENCH].
- 3) CONCRETE ENCASEMENT REQUIRED FOR SEWER MAINS ONLY. CALDER COUPLINGS REQUIRED FOR SEWER LATERALS ONLY. SEWER LATERALS TO BE REPLACED WITH SCH. 80 PVC WITH NO INTERMEDIATE JOINTS.
- 4) FOR PIPE BEDDING AND TRENCH BACKFILL SEE WP-02 OR SP-02.



LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

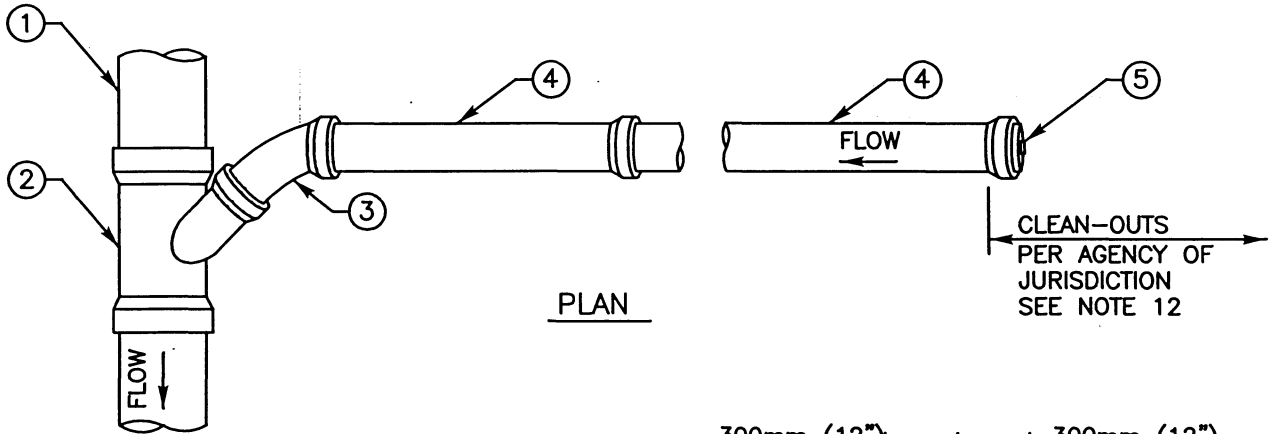
PIPE SUPPORT FOR UNDERCUT  
SEWER MAINS OR SEWER LATERALS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

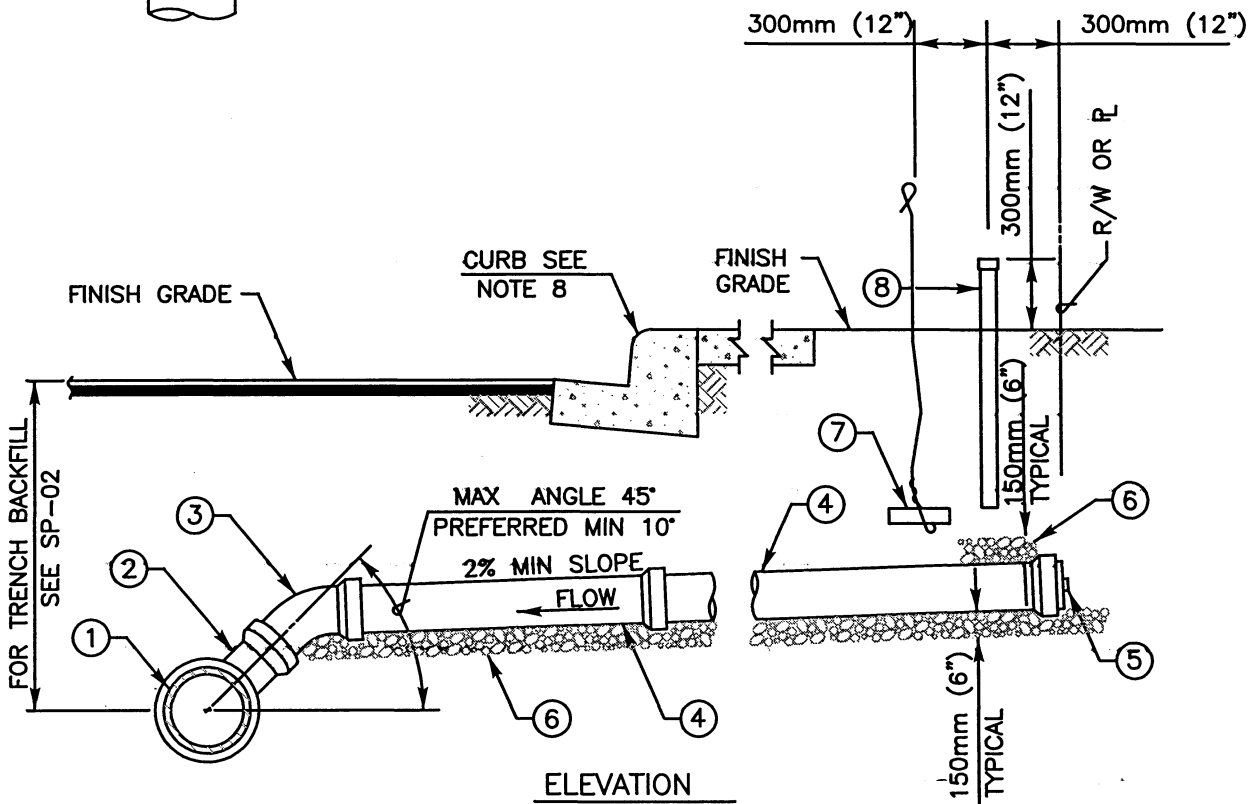
*J. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SP-09**



PLAN



ELEVATION

(INDICATE SIZE)  
 S

FOR SEWER LATERAL NOTES SEE DETAIL SS-03

LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SEWER MAIN	⑤	PLUG OR CAP
②	45° WYE	⑥	19mm (3/4") MAXIMUM CRUSHED ROCK
③	45° ELBOW	⑦	#9 WIRE ATTACHED TO A BRICK
④	PIPE LATERAL SEE NOTE 3 & 5	⑧	100mm (4") PVC PIPE WITH GLUED CAP

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-13		J. Tomasulo	03/05

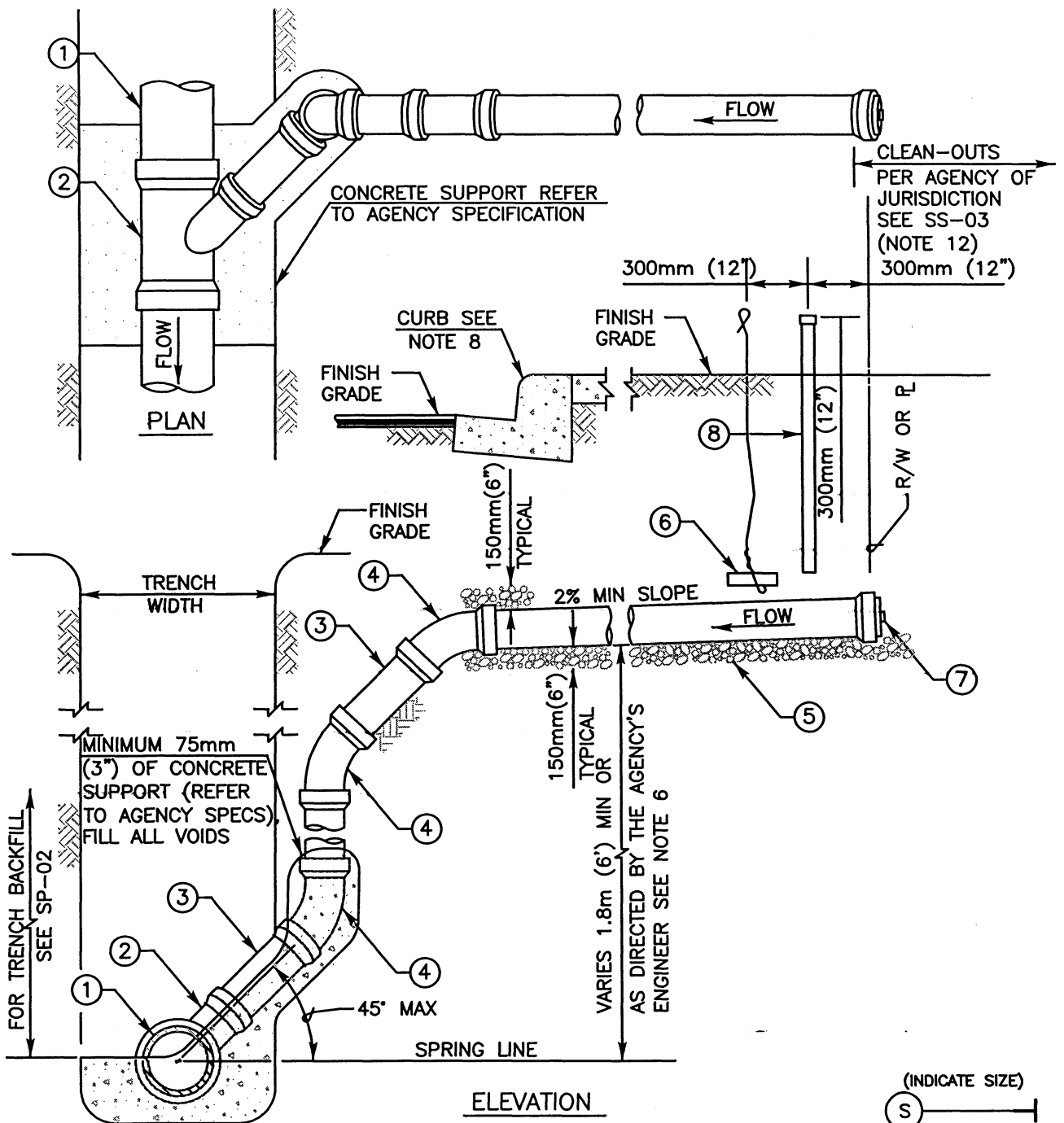
**SAN DIEGO REGIONAL STANDARD DRAWING**

**100mm (4") AND 150mm (6")  
SEWER LATERAL INSTALLATION**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*J. Stanton* 03/24/2005  
 Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SS-01**



FOR SEWER LATERAL NOTES SEE DETAIL SS-03

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	SEWER MAIN	⑤	19mm (3/4") MAXIMUM CRUSHED ROCK
②	45° WYE	⑥	#9 WIRE ATTACHED TO A BRICK
③	PIPE	⑦	PLUG OR CAP
④	45° ELBOW	⑧	100mm (4") PVC PIPE WITH GLUED CAP

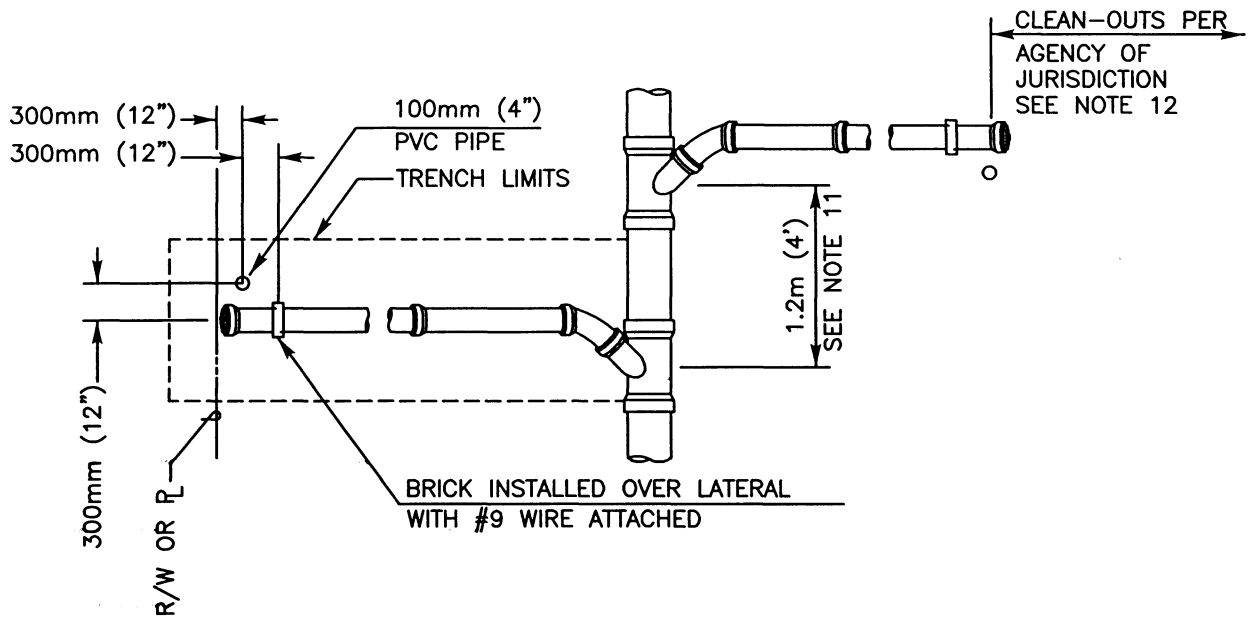
Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-13		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

100mm (4") AND 150mm (6")  
DEEP-CUT SEWER LATERAL INSTALLATION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
<i>T. Stanton</i>	03/24/2005
Chairperson R.C.E. 19246	Date
DRAWING NUMBER	SS-02

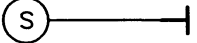
NOT USED



SEWER LATERAL DETAIL  
SEE NOTE 10 BELOW

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) IN NO CASE SHALL LATERAL CONNECT DIRECTLY ON TOP OF SEWER MAIN
- 3) LATERAL SHALL BE INSTALLED TO PROPERTY LINE UNLESS SPECIFIED ON PLANS
- 4) MINIMUM 1.2m (4') COVER ABOVE LATERAL AT PROPERTY LINE
- 5) LATERAL TO HAVE A MINIMUM SLOPE OF 2%
- 6) VERTICAL PIPE SHALL BE BRACED WHILE BACKFILLING TRENCH
- 7) INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON SP-01
- 8) STAMP OR CHISEL A 50mm (2") HIGH "S" IN CURB FACE OVER LATERAL TO IDENTIFY SEWER LATERAL LOCATION
- 9) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST
- 10) FOR SEWER LATERAL INSTALLATIONS SEE SS-01 AND SS-02
- 11) FOR SEWERS SPECIFIED AS PVC PIPE, A MINIMUM 0.9m (3') SECTION OF PIPE IS REQUIRED BETWEEN FITTINGS
- 12) SEWER CLEAN-OUT SEE SC-01 TYPE B AS REQUIRED BY AGENCY OF JURISDICTION

(INDICATE SIZE)  
  
 LEGEND ON PLANS

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-13		J. Tomasulo	03/05

SAN DIEGO REGIONAL STANDARD DRAWING

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

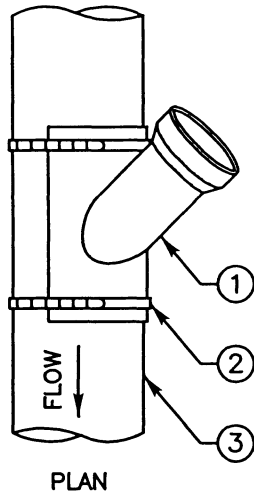
*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

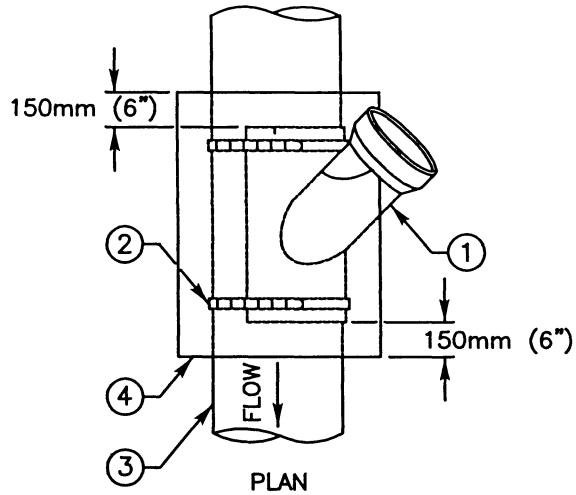
SEWER LATERAL NOTES AND DETAIL

DRAWING NUMBER **SS-03**

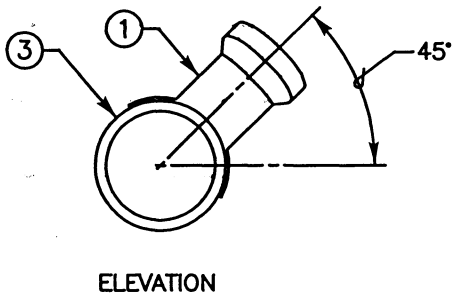
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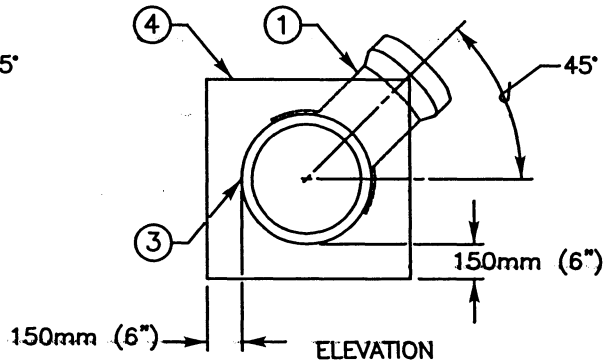
PLAN



PLAN



ELEVATION



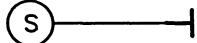
ELEVATION

CUT IN WYE CONNECTION  
TYPE A

CUT IN WYE CONNECTION  
TYPE B

NOTES:

- 1) REFER TO AGENCY SPECIFICATIONS WHERE APPLICABLE
- 2) CONNECTIONS TO EXISTING SEWER MAINS TO BE MADE BY AGENCY PERSONNEL IN ACCORDANCE WITH SPECIFICATIONS UNLESS OTHERWISE NOTED ON PLANS
- 3) IN NO CASE SHALL CONNECTION BE MADE DIRECTLY ON TOP OF SEWER MAIN
- 4) NO MORE THAN ONE CUT IN WYE WILL BE ALLOWED FOR EACH LENGTH OF EXISTING VCP SEWER MAIN
- 5) FOR SEWER LATERAL INSTALLATION SEE SS-01 AND SS-02
- 6) FOR TRENCH BACKFILL SEE SP-02
- 7) MATERIALS SHALL BE SELECTED FROM THE AGENCY'S APPROVED MATERIALS LIST

(INDICATE SIZE)  
  
 LEGEND ON PLANS

ITEM NO	SIZE AND DESCRIPTION	ITEM NO	SIZE AND DESCRIPTION
①	45° SADDLE WYE WITH GASKET	③	EXISTING SEWER MAIN
②	STAINLESS STEEL HOSE CLAMPS (2-EACH)	④	CONCRETE ENCASEMENT

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Replaced S-13		J. Tomasulo	03/05

**SAN DIEGO REGIONAL STANDARD DRAWING**

**100mm (4") AND 150mm (6") SEWER  
CUT-IN WYE CONNECTIONS**

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

*T. Stanton* 03/24/2005

Chairperson R.C.E. 19246 Date

DRAWING NUMBER **SS-04**

NOT USED