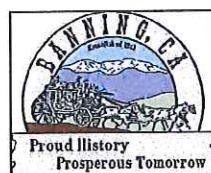
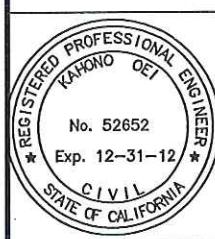


S-1 STANDARD LEGEND  
 S-2 SEWER LINE LOCATION  
 S-3 PRE-CAST CONCRETE MANHOLE (ECCENTRIC) DETAIL  
 S-4 CONCRETE BASE AND JOINT DETAILS  
 S-5 ADJUSTING EXISTING MANHOLE TO GRADE  
 S-6 MANHOLE SHAFT LOCATION DETAILS  
 S-7 TRAFFIC MANHOLE FRAME AND COVER  
 S-8 SPECIAL MANHOLE (20'-0" TO 30'-0" DEEP)  
 S-9 SPECIAL MANHOLE (30'-0" + DEEP)  
 S-10 DROP MANHOLE DETAIL (SPECIAL ACCEPTANCE ONLY)  
 S-11 GUARD POST DETAIL (EASEMENT/OUTSIDE OF PAVING MANHOLE)  
 S-12 TERMINAL OR MAIN CLEANOUT DETAIL (SPECIAL CONDITION/ACCEPTANCE ONLY)  
 S-13 TERMINUS (CUL DE SAC) MANHOLE  
 S-14 NOT USED  
 S-15 V.C.P. PIPE BEDDING DETAILS  
 S-16 PIPE BEDDING AND SPECIAL DETAILS  
 S-17 TRENCH REPAIR DETAIL  
 S-18 SEWER MAIN PROTECTION DETAIL  
 S-19 CONCRETE SLOPE ANCHORS  
 S-20 STEEL CASING PIPE  
 S-21 4" AND 6" SEWER SADDLE CONNECTION TO EXISTING MAINS  
 S-22 V.C.P. HOUSE LATERAL  
 S-23 DEEP SEWER LATERAL DETAIL  
 S-24 BACKWATER VALVE DETAIL  
 S-25 BACKWATER VALVE INSTALLATION DETAIL

2012 EDITION



Proud History  
Prosperous Tomorrow



RECOMMENDED BY:

ARTURO VELA, P.E., SENIOR ENGINEER

12-12-12

APPROVED BY:

KAHONO OEI, P.E., CITY ENGINEER

12-12-12

**CITY OF BANNING**

**SEWER STANDARD INDEX**

STANDARD  
NO.

SS-1  
1 OF 2

STANDARDS

S-1 STANDARD LEGEND  
S-2 SEWER LINE LOCATION

MANHOLES

S-3 MANHOLE DETAIL  
S-4 CONCRETE BASE AND JOINT DETAILS  
S-5 ADJUSTING EXISTING MANHOLE TO GRADE  
S-6 MANHOLE SHAFT LOCATION DETAILS  
S-7 TRAFFIC MANHOLE FRAME AND COVER  
S-8 SPECIAL MANHOLE (20'-0" TO 30'-0" DEEP)  
S-9 SPECIAL MANHOLE (30'-0" + DEEP)  
S-10 DROP MANHOLE DETAIL (SPECIAL ACCEPTANCE ONLY)  
S-11 GUARD POST DETAIL (EASEMENT/OUTSIDE OF PAVING MANHOLE)  
S-12 TERMINAL OR MAIN CLEANOUT DETAIL (SPECIAL CONDITION/ACCEPTANCE ONLY)  
S-13 TERMINUS (CUL DE SAC) MANHOLE

PIPE AND CASING DETAILS

S-15 V.C.P. PIPE BEDDING DETAILS  
S-16 PIPE BEDDING AND SPECIAL DETAILS  
S-17 TRENCH REPAIR DETAIL  
S-18 SEWER MAIN PROTECTION DETAIL  
S-19 CONCRETE SLOPE ANCHORS  
S-20 STEEL CASING PIPE

LATERALS

S-21 4" AND 6" SEWER SADDLE CONNECTION TO EXISTING MAINS  
S-22 V.C.P. HOUSE LATERAL  
S-23 DEEP SEWER LATERAL DETAIL  
S-24 BACKWATER VALVE DETAIL  
S-25 BACKWATER VALVE INSTALLATION DETAIL  
S-26 SEWER SAMPLING BOX



2012 EDITION



RECOMMENDED BY:	
ARTURO VELA, P.E., SENIOR ENGINEER	
DATE 12-12-12	
APPROVED BY:	
KAHONO OEI, P.E., CITY ENGINEER	
DATE 12-12-12	

**CITY OF BANNING****SEWER STANDARD INDEX**

STANDARD NO.

SS-1  
2 OF 2

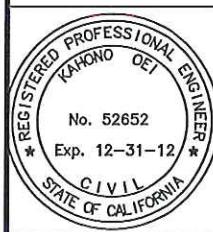
## STANDARD LEGEND

— — — — —	RIGHT OF WAY (R.O.W.)
— — — — —	CENTERLINE
W x	EXISTING WATER LINE
W	PROPOSED WATER LINE
NPW x	EXISTING RECYCLED WATER LINE
NPW	PROPOSED RECYCLED WATER LINE
SS x	EXISTING SEWER LINE
SS	PROPOSED SEWER LINE
NG x	EXISTING GAS LINE
NG	PROPOSED GAS LINE
■	SERVICE LATERAL
— — — — —	ENCASEMENT
E x	EXISTING ELECTRICAL CONDUIT
E	PROPOSED ELECTRICAL CONDUIT
T x	EXISTING TELEPHONE CONDUIT
T	PROPOSED TELEPHONE CONDUIT
FO x	EXISTING FIBER OPTIC CABLE
FO	PROPOSED FIBER OPTIC CABLE
■■■■■	PORTLAND CEMENT CONCRETE IN SECTION
■■■■■	PORTLAND CEMENT CONCRETE IN PLAN

—○—○—	POWER POLE AND GUY LINE	C.O.	CLEAN-OUT
○	TRAFFIC SIGNAL EXISTING	D.I.P.	DUCTILE IRON PIPE
○	WATER WELL	D.M.H.	DROP MANHOLE
— — —	BUTTERFLY VALVE	J.M.H.	JUNCTION MANHOLE
○	GATE VALVE	M.H.	MANHOLE
○		V.C.P.	VITRIFIED CLAY PIPE
—○—○—	FIRE HYDRANT	—○—	CLEAN-OUT
—○—○—	BLOW-OFF	— —	HOUSE CONNECTION SEWER
—○—○—		— —	WYE BRANCH
—→—	AIR & VACUUM VALVE ASSEMBLY (SIZE PER PLAN)		
—→—	POTABLE WATER QUALITY SAMPLE STATION		
—→—	NON-POTABLE WATER QUALITY SAMPLE STATION		



2012 EDITION



RECOMMENDED BY: *A.H. Vela* 12-12-12

ARTURO VELA, P.E., SR. ENGINEER DATE

APPROVED BY: *Ch* 12-12-12

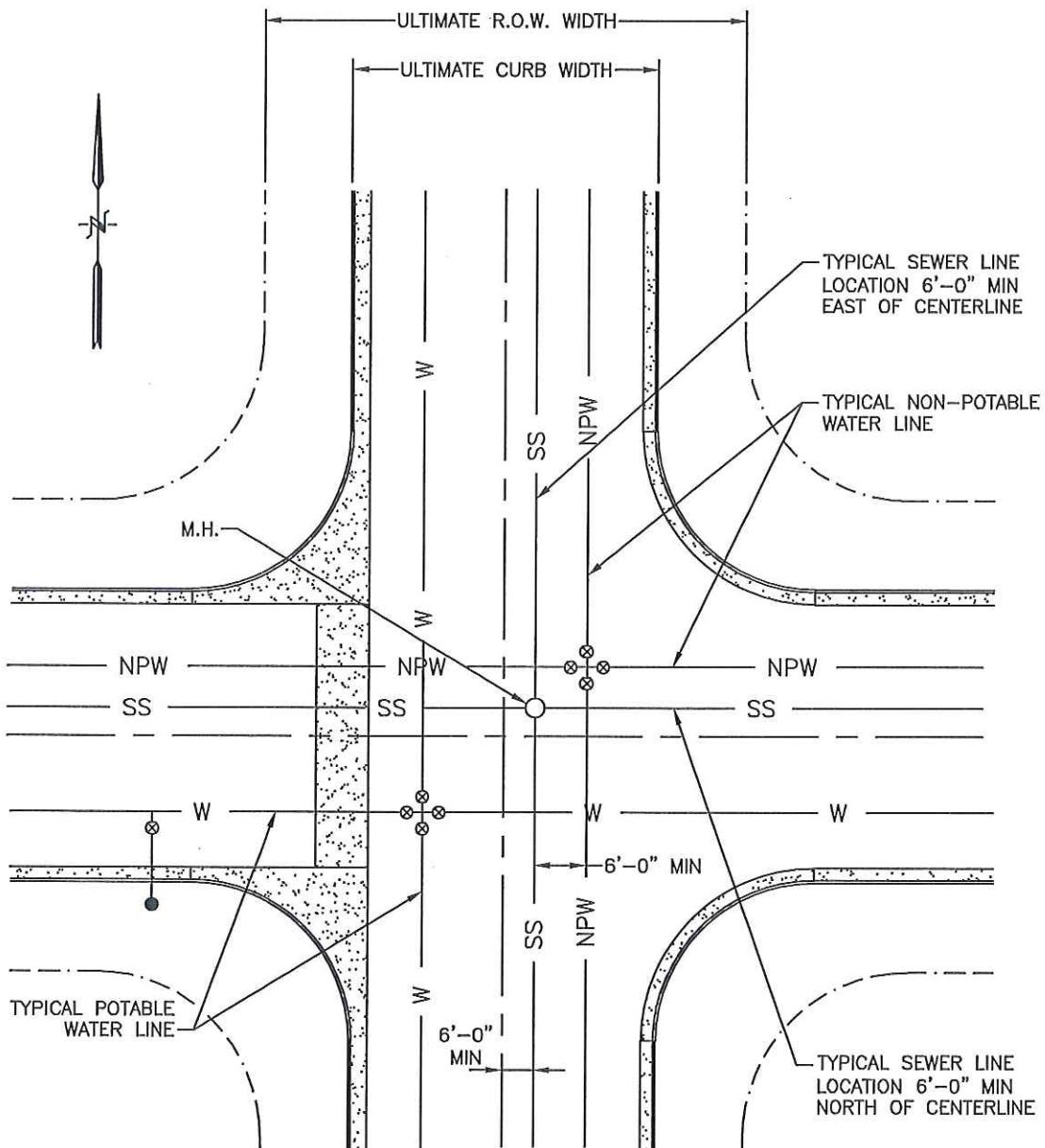
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

STANDARD NO.

STANDARD LEGEND

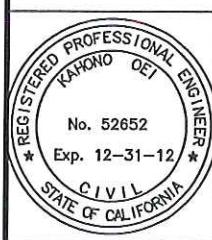
S-1



NOTE:  
SEWER LINE SIZE TO BE DETERMINED BY C.O.B. MASTER PLAN AND STANDARDS



2012 EDITION



RECOMMENDED BY: *Arturo Vela* 12-12-12

ARTURO VELA, P.E., SR. ENGINEER

DATE

APPROVED BY: *Ch* 12-12-12

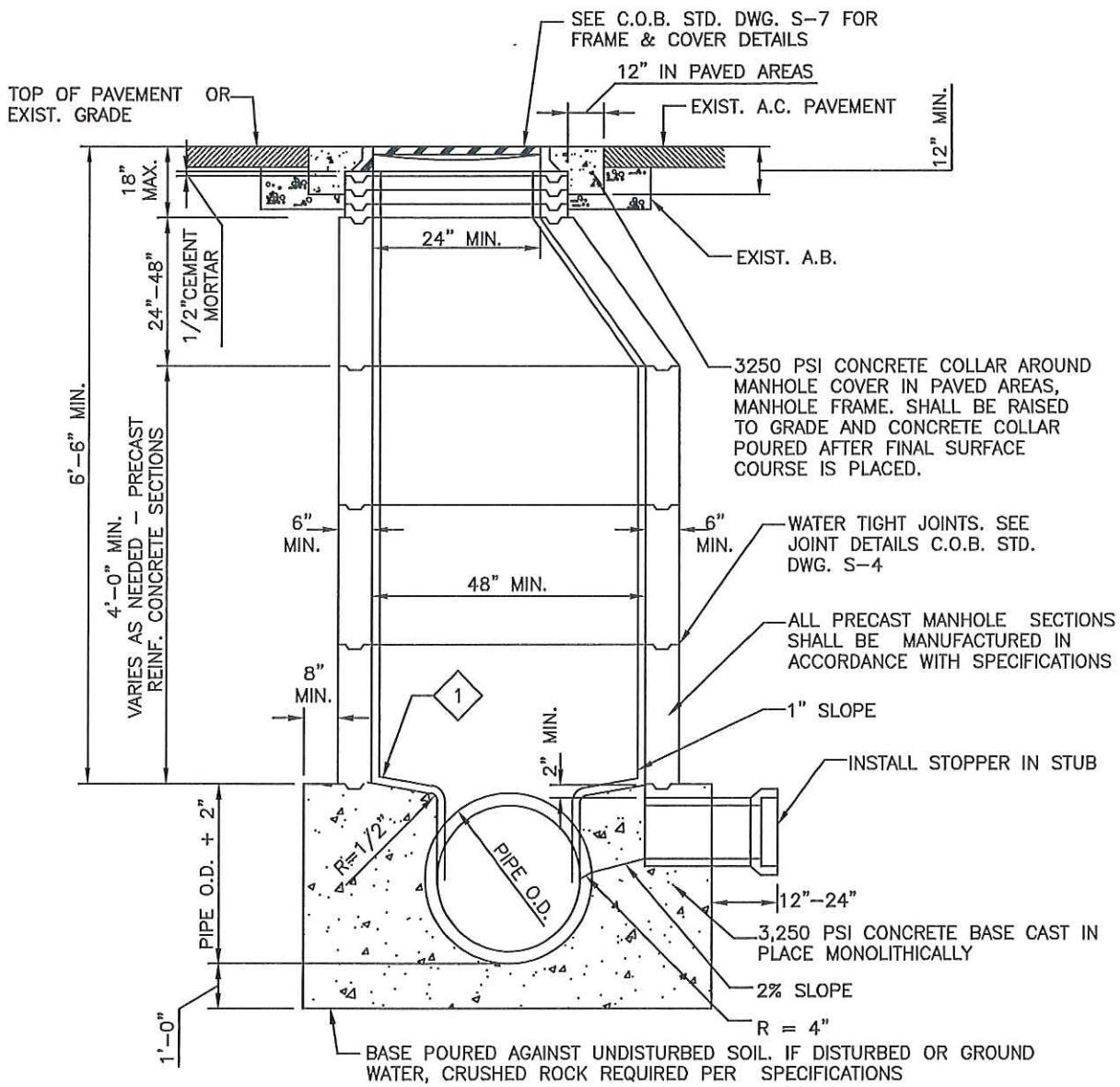
KAHONO OEI, P.E., CITY ENGINEER

**CITY OF BANNING**

STANDARD NO.

SEWER LINE LOCATION

S-2

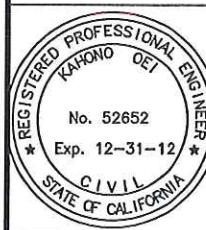


NOTES:

1. PLACE TWO HALF MOON SHAPED PLYWOOD COVERS (5/8" THICK MINIMUM) IN BOTTOM OF MANHOLE AFTER SHAFTS HAVE BEEN SET TO KEEP DEBRIS FROM ENTERING SEWER.
2. FOR DROP MANHOLE DETAIL SEE C.O.B. STD. DWG. S-10. (SPECIAL ACCEPTANCE BY CITY ENGINEER ONLY).
3. FOR MANHOLES LOCATED OUTSIDE PAVED AREAS THE FRAME AND COVER SHOULD BE SET A MINIMUM OF 0.1 FT. ABOVE FINISH GRADE IN SHOULDER AREAS, UNPAVED ROADS OR LANDSCAPED AREAS, AND 18" IN UNFINISHED AREAS.
4. ALL INLETS AND OUTLETS SHALL BE SUPPORTED WITH CONCRETE SUPPORTS PRIOR TO POURING MANHOLE BASE.
5. PRECAST ECCENTRIC CONCRETE CONE, ORIENT PER C.O.B. STD. S-6



2012 EDITION



RECOMMENDED BY: ARTURO VELA, P.E., SR. ENGINEER	12-12-12
APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER	12-12-12

**CITY OF BANNING**  
**PRE-CAST CONCRETE**  
**MANHOLE (ECCENTRIC)**

STANDARD NO.  
**S-3**  
1 OF 1

FOR LOCATION OF  
MH. SHAFT  
OPENING SEE  
C.O.B. STD. DWG.  
S-6

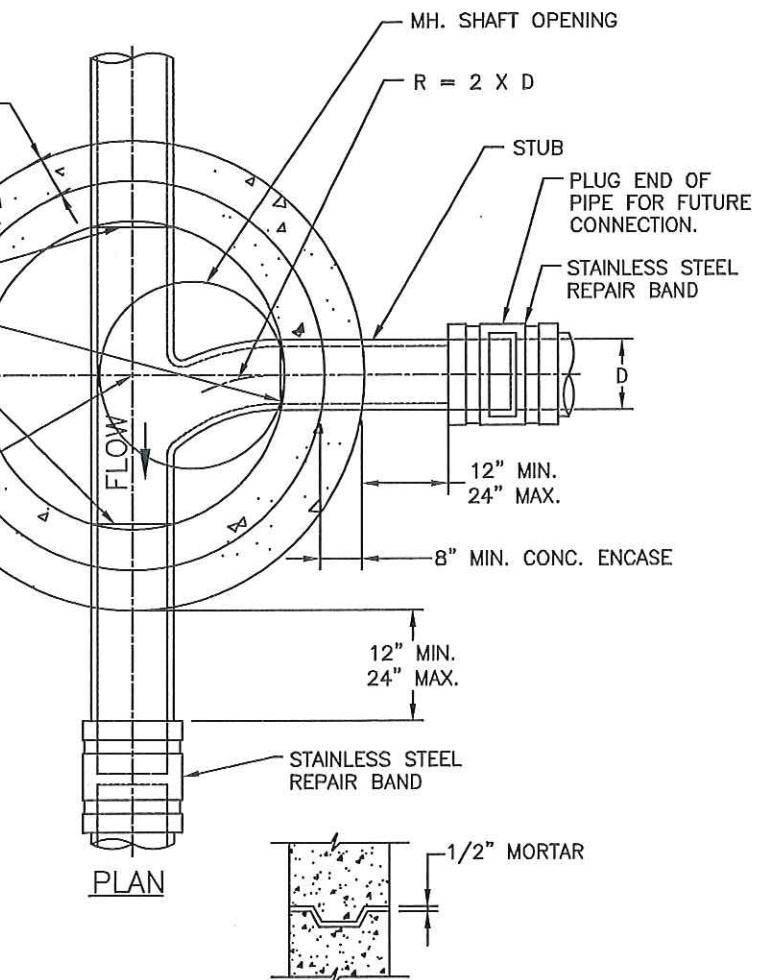
PIPE SHALL BE LAID  
WITH END SQUARE INTO  
MH. BASE, UNLESS  
OTHERWISE NOTED.  
CONSTRUCT FILLET  
SHELF OVER PIPE TO  
DRAIN

MH. STATIONING

0.10' MIN. FALL ACROSS MH.  
UNLESS SEWER SLOPE GREATER.  
0.20' MIN. FALL FOR 90" MH.

JOINT  
SEALING  
COMPOUND

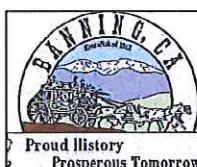
PLASTIC JOINT



MORTAR JOINT

NOTES:

1. MORTAR JOINTS – SUFFICIENT MORTAR SHALL BE APPLIED ACROSS ENTIRE FACE OF JOINT SO THAT WHEN PRECAST UNITS ARE PLACED ON TOP OF ONE ANOTHER, THE MORTAR WILL SQUEEZE OUT BOTH THE INSIDE AND OUTSIDE WALL FACES. JOINTS SHALL BE "POINTED UP" AFTER SETTING PRECAST UNITS EXCLUDING GRADE RINGS.
2. ALL MORTARED JOINTS MUST HAVE A TOOLED FINISH ON INSIDE OF MANHOLES. EXCESS MORTAR SHALL BE CLEANED OFF OF PRE-CAST CONCRETE SECTIONS.
3. PLASTIC JOINTS – PREFORMED COLD-APPLIED READY-TO-USE PLASTIC JOINT SEALING COMPOUND SHALL BE QUICK-SEAL AS SUPPLIED BY QUIKSET UTILITY VAULTS, SANTA ANA, CALIFORNIA – OR APPROVED EQUAL. MUST BE USED WHEN GROUND WATER IS ENCOUNTERED.



2012 EDITION



RECOMMENDED BY:

ARTURO VELA, P.E., SR. ENGINEER DATE

APPROVED BY:

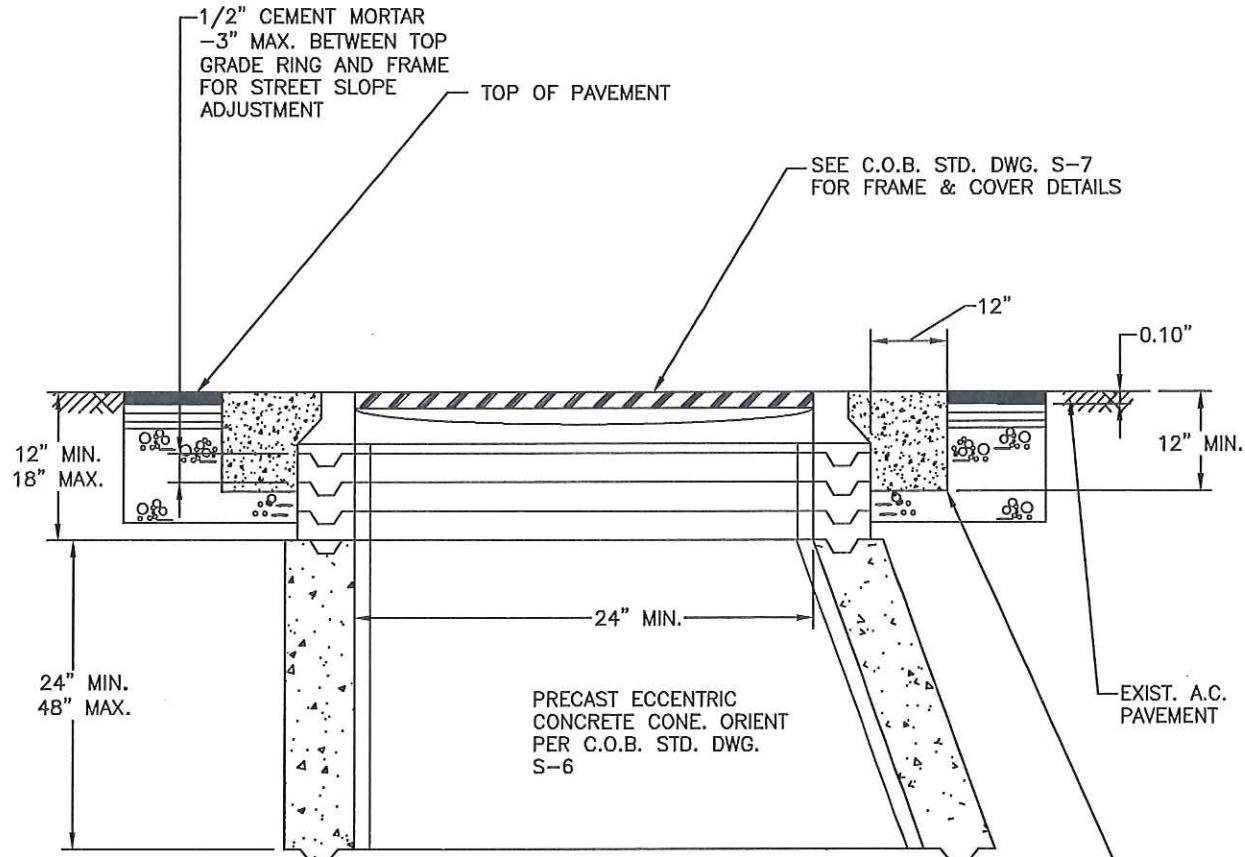
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

STANDARD  
NO.

**CONCRETE BASE  
AND JOINT DETAILS**

**S-4**  
1 OF 1



NOTES:

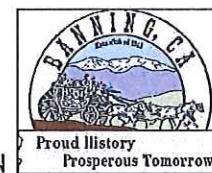
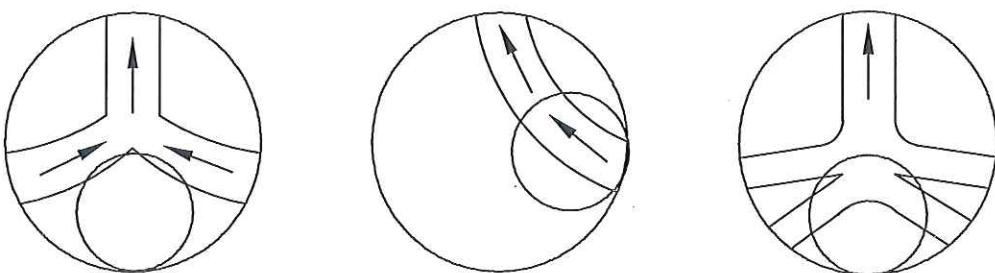
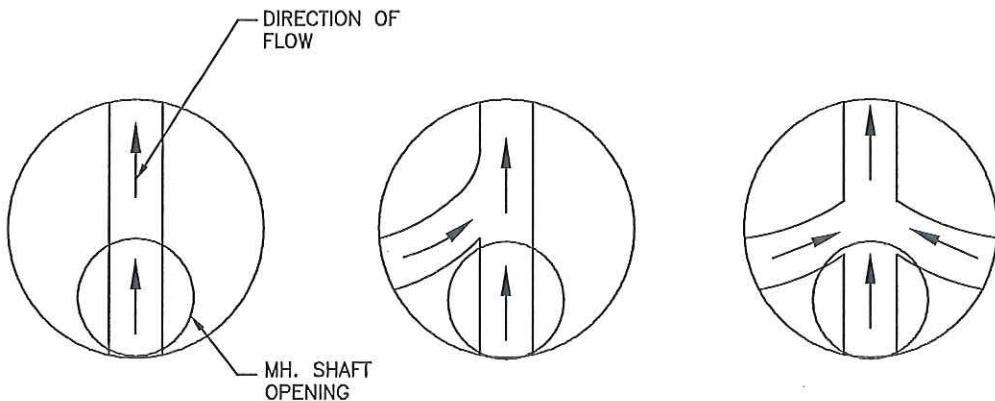
MORTAR JOINTS — SUFFICIENT MORTAR SHALL BE APPLIED ACROSS ENTIRE FACE OF JOINT SO THAT WHEN PRECAST UNITS ARE PLACED ON TOP OF ONE ANOTHER, THE MORTAR WILL SQUEEZE OUT BOTH THE INSIDE AND OUTSIDE WALL FACES. JOINTS SHALL BE "POINTED UP" AFTER SETTING PRECAST UNITS EXCLUDING GRADE RINGS.

ALL MORTARED JOINTS MUST HAVE A TOOLED FINISH ON INSIDE OF MANHOLES. EXCESS MORTAR SHALL BE CLEANED OFF OF PRE-CAST CONCRETE SECTIONS.

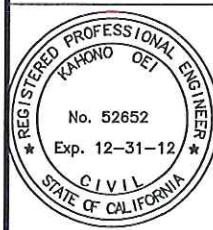


2012 EDITION

 <p>REGISTERED PROFESSIONAL ENGINEER KAHONO OEI No. 52652 Exp. 12-31-12 CIVIL STATE OF CALIFORNIA</p>	<p>RECOMMENDED BY: ARTURO VELA, P.E., SENIOR ENGINEER DATE: 12-12-12</p>	<p><b>CITY OF BANNING</b></p>	<p>STANDARD NO.</p>
	<p>APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER DATE: 12-12-12</p>	<p><b>ADJUSTING EXISTING MANHOLE TO GRADE</b></p>	<p><b>S-5</b> 1 OF 1</p>



2012 EDITION



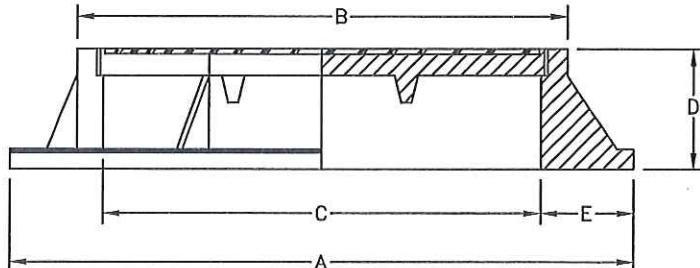
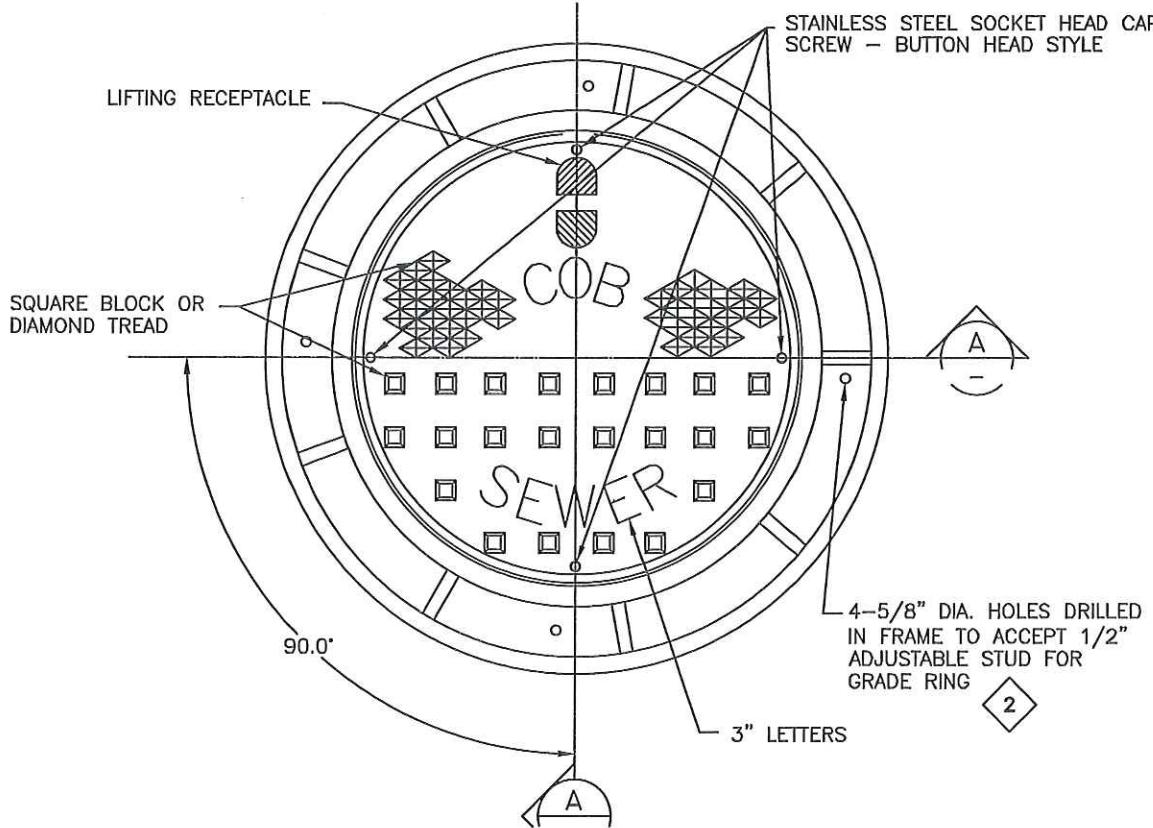
RECOMMENDED BY: *Arturo Vela* 12-12-12  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
APPROVED BY: *Ch* 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

**MANHOLE SHAFT  
LOCATION DETAILS**

**STANDARD  
NO.**

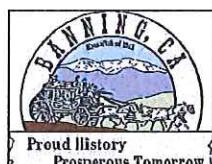
**S-6  
1 OF 1**



SECTION



SEE S-7 SHEET 2 OF 2 FOR NOTES, MANHOLE DIMENSION SCHEDULE, AND MANHOLE SIZE SCHEDULE.



2012 EDITION



RECOMMENDED BY: *A.H. Vela* 12-12-12  
 ARTURO VELA, P.E., SR. ENGINEER DATE  
 APPROVED BY: *Ch* 12-12-12  
 KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

TRAFFIC MANHOLE  
FRAME AND COVER

STANDARD  
NO.

S-7  
1 OF 2

NOTES:

1. 48" AND 60" MANHOLES SHALL HAVE 24" COVERS. 72" MANHOLES SHALL HAVE 30" COVERS.
2. WHERE FRAME AND COVER ARE SET 18" ABOVE GRADE, 4  $\frac{1}{2}$ " DIA. INSERTS FOR ADJUSTABLE STUDS SHALL BE CAST IN TOP GRADE RING, ALIGNED AS DETAILED ON SHEET 1 OF 2. FRAME SHALL BE BOLTED TO GRADE RING.
3. WHERE MANHOLE IS LOCATED WITHIN AN EASEMENT, BOLT DOWN FRAME AND COVER SHALL BE REQUIRED.

MANHOLE DIMENSIONS		
SIZE	24"	30"
A	32"	38"
B	27 1/4"	33"
C	24"	30"
D	3.5"	6"
E	4"	4"

MANHOLE SIZES			
SEWER MAIN	MAX BRANCH SIZE	MANHOLE SIZE	FRAME AND COVER
8" - 15"	10"	48"	24"
18" - 21"	12"	60"	24"
24" - 36"	15"	72"	30"



2012 EDITION



RECOMMENDED BY: *Arturo Vela* 12-12-12  
ARTURO VELA, P.E., SR. ENGINEER DATE  
APPROVED BY: *Chu* 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

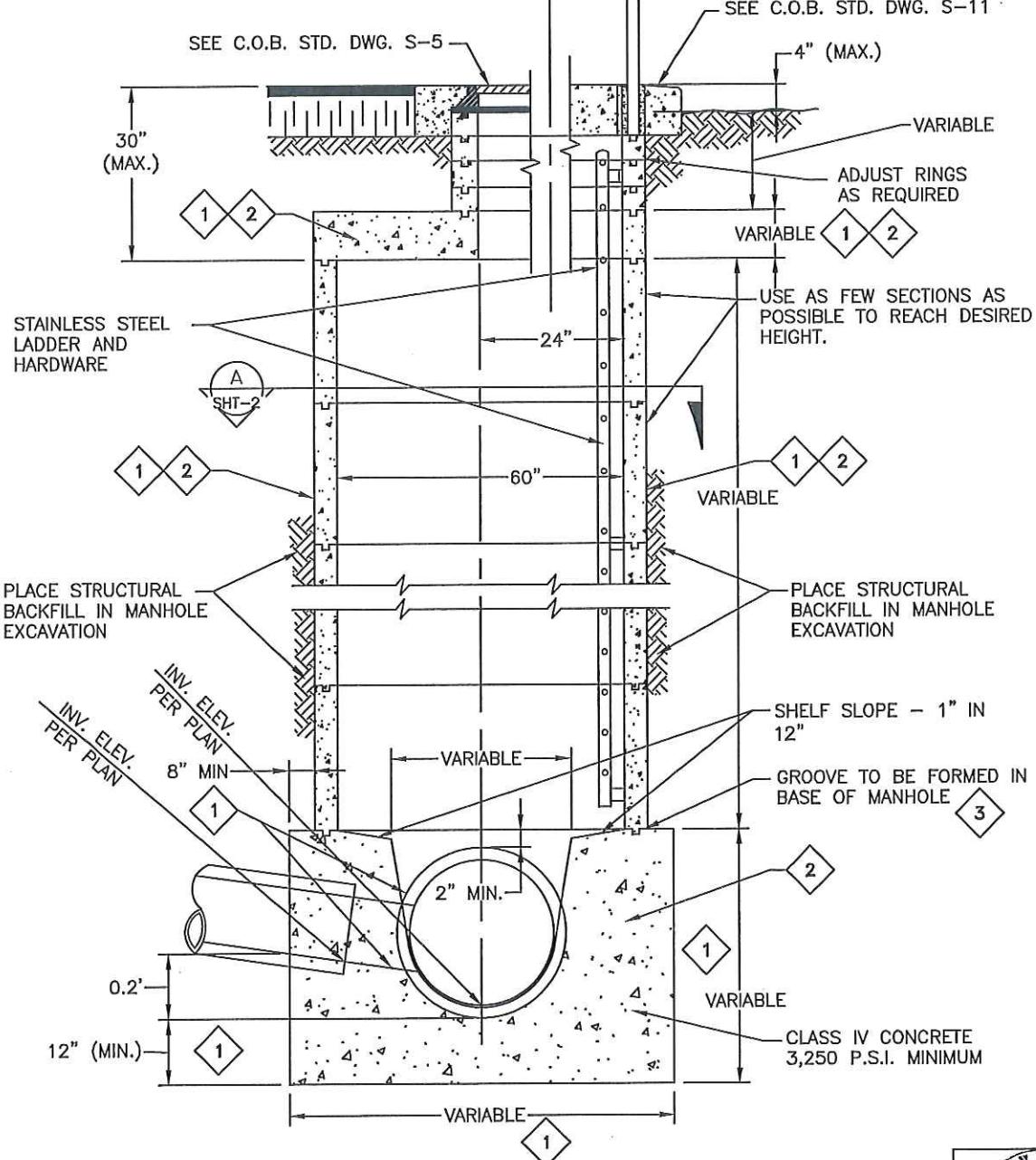
STANDARD NO.

TRAFFIC MANHOLE  
FRAME AND COVER

S-7  
2 OF 2

DETAIL FOR MANHOLES IN  
PAVED SURFACES

DETAIL FOR MANHOLES IN  
EASEMENTS



SEE C.O.B. STD. DWG. S-8 SHEET 2 OF 2 FOR SECTION AND NOTES.



2012 EDITION



RECOMMENDED BY:  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
12-12-12

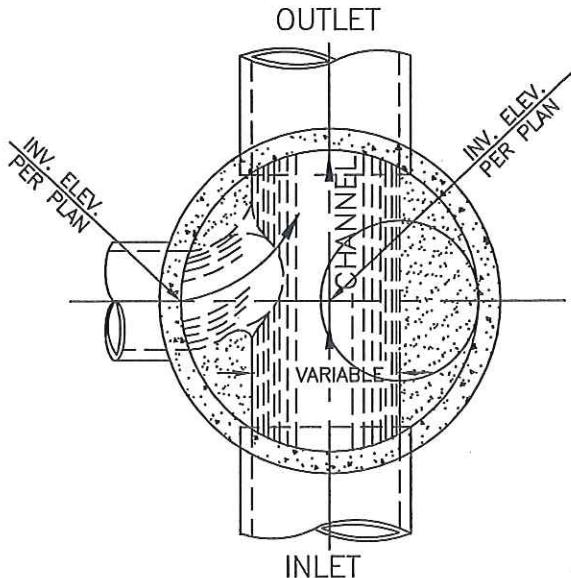
APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
12-12-12

**CITY OF BANNING**

SPECIAL MANHOLE  
(20' TO 30' DEEP)

STANDARD  
NO.

S-8  
1 OF 2



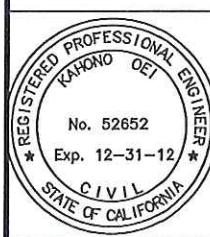
SECTION A  
SHT-1

NOTES:

1. DIMENSIONS PER MANHOLE MANUFACTURER'S SPEC.
2. STEEL REINFORCEMENT PER MANHOLE MANUFACTURER'S SPECIFICATIONS.
3. INVERT CHANNELS, SHELF AND GROOVE SHALL BE FORMED MONOLITHICALLY WITH THE MANHOLE BASE, NO REWORKING OF CONCRETE WHICH HAS PARTIALLY HARDENED.
4. ALL SECTIONS TO BE WASHED, TO REMOVE ANY LOOSE MATERIAL AND WHILE STILL WET, THEY ARE TO BE SET IN 1:3 MORTAR TRIMMED SMOOTH INSIDE AND OUTSIDE AT TIME OF SETTING, INCLUDING FRAME. INSIDE MORTARED JOINTS MUST HAVE A TOOLED FINISH. EXCESS MORTAR SHALL BE CLEANED OFF PRE-CAST CONCRETE SECTIONS.
5. CONCRETE FOR MANHOLE SECTION 3,250 P.S.I. MIN.
6. PROVIDE FLEXIBLE JOINT IN ALL SEWER PIPES OUTSIDE MANHOLE BUT WITHIN 12"-24" OF CONCRETE BASE. NO BELLS, USE MISSION CLAY STAINLESS STEEL BAND REPAIR COUPLINGS OR EQUAL.
7. ADJUSTMENT OF FRAME AND COVER AFTER FINAL PAVING OPERATIONS. FRAME AND COVER SHALL BE SET 1/4" BELOW PAVING TO ALLOW FOR PAVING SETTLEMENT.
8. PRECAST MANHOLE SUPPLIER TO SUBMIT STRUCTURAL CALCULATION TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.  
SOIL ACTIVE PRESSURE = 49 P.C.F.  
SOIL BEARING PRESSURE = 1,500 P.S.F. (OR VALUES PER APPROVED SOIL REPORT)



2012 EDITION



RECOMMENDED BY:

ARTURO VELA, P.E., SENIOR ENGINEER

12-12-12

APPROVED BY:

KAHONO OEI, P.E., CITY ENGINEER

DATE

**CITY OF BANNING**

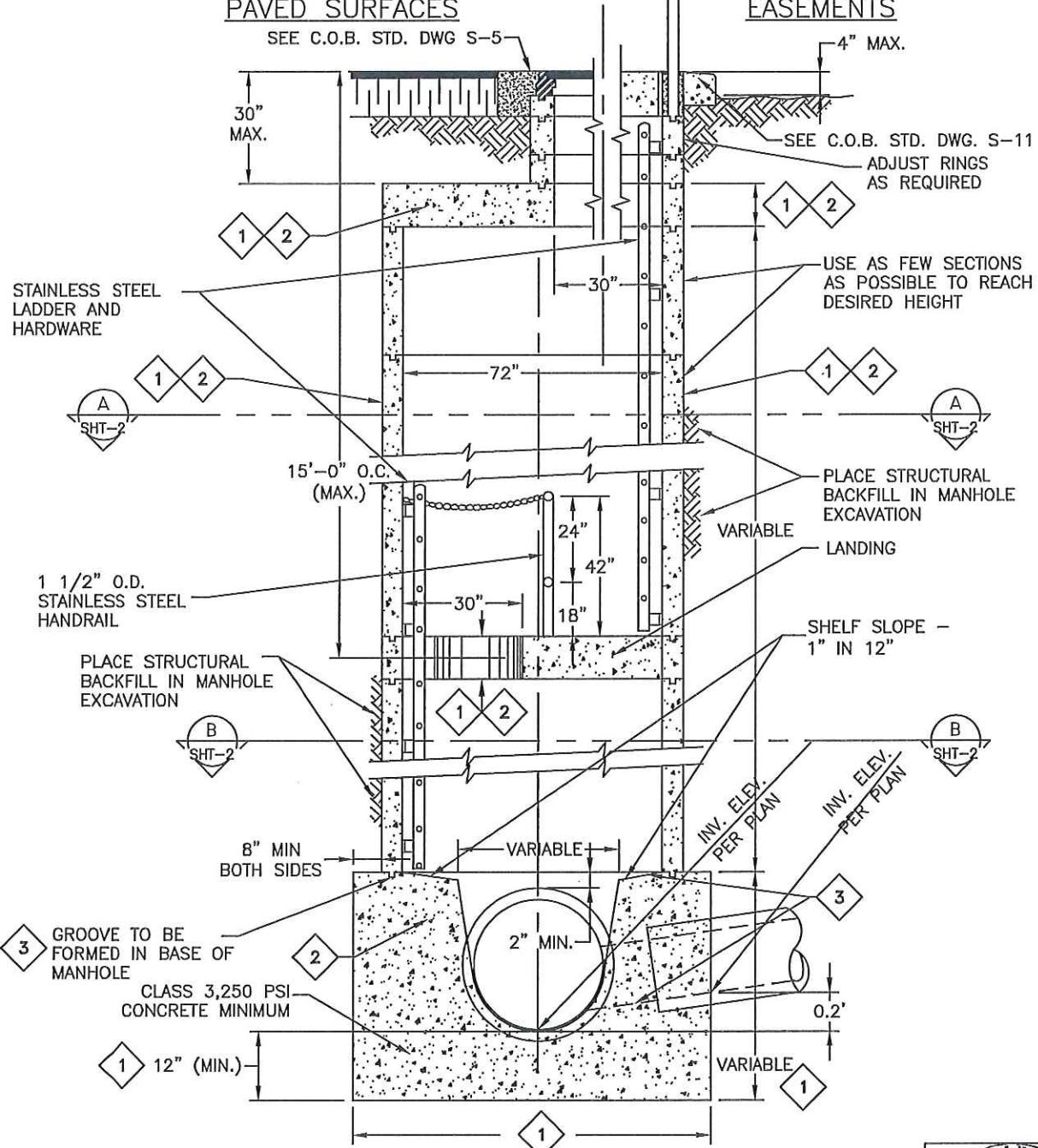
STANDARD NO.

SPECIAL MANHOLE  
(20' TO 30' DEEP)

S-8  
2 OF 2

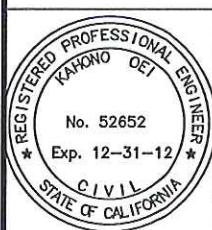
DETAIL FOR MANHOLES IN  
PAVED SURFACES

SEE C.O.B. STD. DWG S-5



SEE C.O.B. STD. DWG. S-9 SHEET 2 OF 2

2012 EDITION

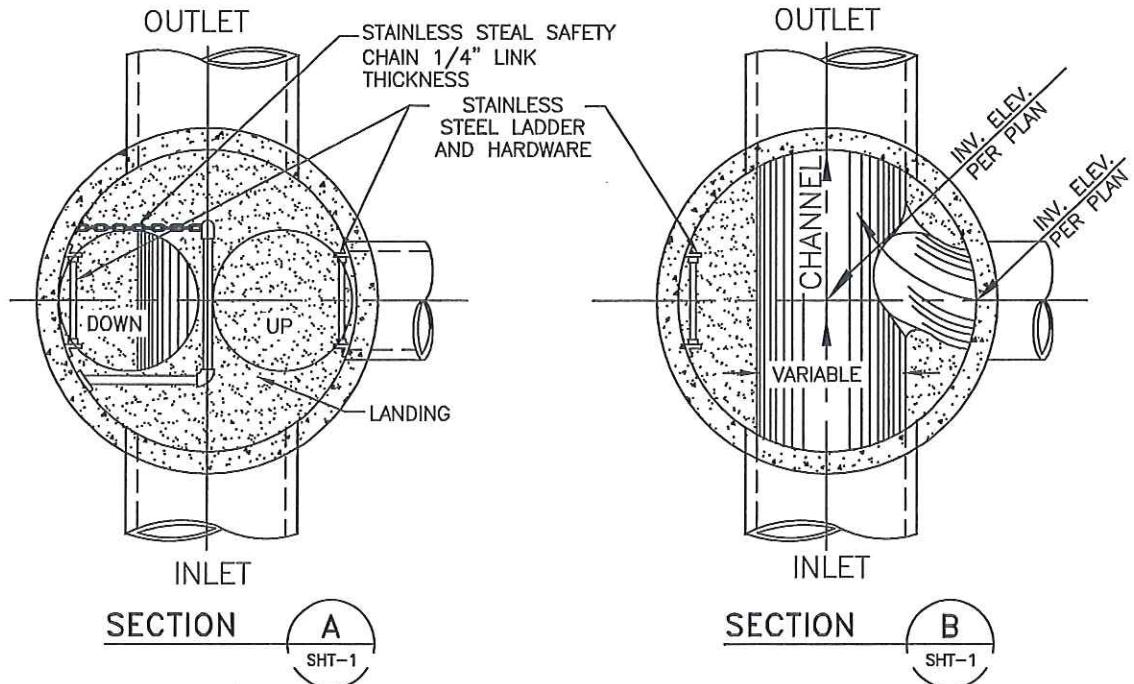


RECOMMENDED BY:	<i>Arturo Vela</i>	12-12-12
ARTURO VELA, P.E., SENIOR ENGINEER		DATE
APPROVED BY:	<i>Ch</i>	12-12-12
KAHONO OEI, P.E., CITY ENGINEER		DATE

**CITY OF BANNING**

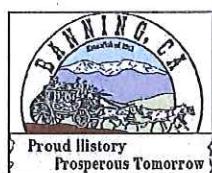
SPECIAL MANHOLE  
(30' OR DEEPER)

STANDARD  
NO.  
S-9  
1 OF 2

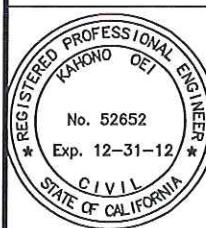


NOTES:

1. DIMENSIONS PER MANHOLE MANUFACTURER'S SPEC.
2. STEEL REINFORCEMENT PER MANHOLE MANUFACTURER'S SPECIFICATIONS.
3. INVERT CHANNELS, SHELF AND GROOVE SHALL BE FORMED MONOLITHICALLY WITH THE MANHOLE BASE, NO REWORKING OF CONCRETE WHICH HAS PARTIALLY HARDENED.
4. ALL SECTIONS TO BE WASHED, TO REMOVE ANY LOOSE MATERIAL AND WHILE STILL WET, THEY ARE TO BE SET IN 1:3 MORTAR TRIMMED SMOOTH INSIDE AND OUTSIDE AT TIME OF SETTING, INCLUDING FRAME. INSIDE MORTARED JOINTS MUST HAVE A TOOLED FINISH. EXCESS MORTAR SHALL BE CLEANED OFF PRE-CAST CONCRETE SECTIONS.
5. CONCRETE FOR MANHOLE SECTION 3,250 PSI MIN.
6. PROVIDE FLEXIBLE JOINT IN ALL SEWER PIPES OUTSIDE MANHOLE BUT WITHIN 12"-24" OF CONCRETE BASE. NO BELLS, USE MISSION CLAY STAINLESS STEEL BAND REPAIR COUPLINGS OR EQUAL.
7. ADJUSTMENT OF FRAME AND COVER AFTER FINAL PAVING OPERATIONS. FRAME AND COVER SHALL BE SET 1/4" BELOW PAVING TO ALLOW FOR PAVEMENT SETTLEMENT.
8. PRECAST MANHOLE SUPPLIER TO SUBMIT STRUCTURAL CALCULATION TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION.  
USE: SOIL ACTIVE PRESSURE = 49 P.C.F.  
SOIL BEARING PRESSURE = 1,500 P.S.F. (OR VALUES PER APPROVED SOIL REPORT)



2012 EDITION



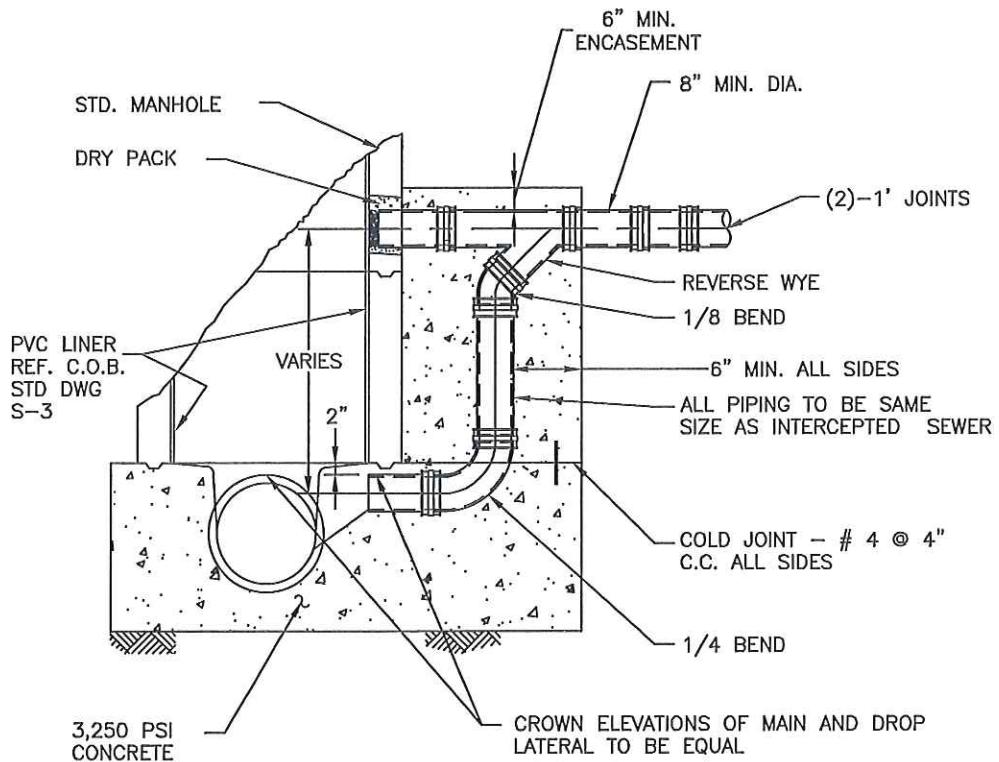
RECOMMENDED BY: *Arturo Vela* 12-12-12  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
APPROVED BY: *Ch* 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

STANDARD NO.

SPECIAL MANHOLE  
(30' OR DEEPER)

S-9  
2 OF 2



### SECTION

#### NOTES:

1. DROP MANHOLE ONLY TO BE USED FOR SPECIAL SITUATIONS, AND SHALL NOT BE CONSTRUCTED WITHOUT PRIOR APPROVAL.
2. ALL NEW OPENINGS CONSTRUCTED INTO MANHOLE SHALL BE DONE BY CORE DRILLING.
3. INTERIOR WALL OF MANHOLE TO BE LINED WITH PVC LINER PER SPECIFICATIONS.



2012 EDITION



RECOMMENDED BY: *Arturo Vela* 12-12-12

ARTURO VELA, P.E., SR. ENGINEER DATE

APPROVED BY: *John* 12-12-12

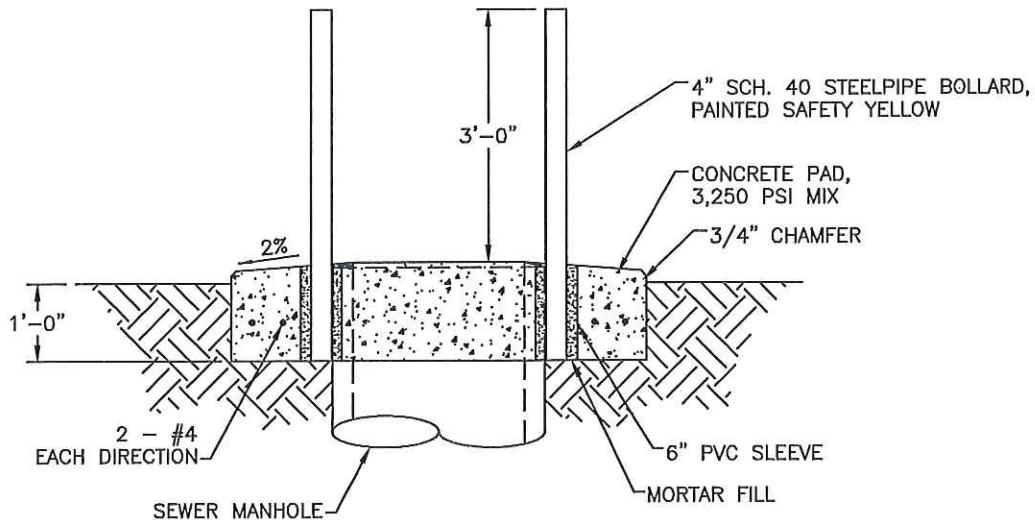
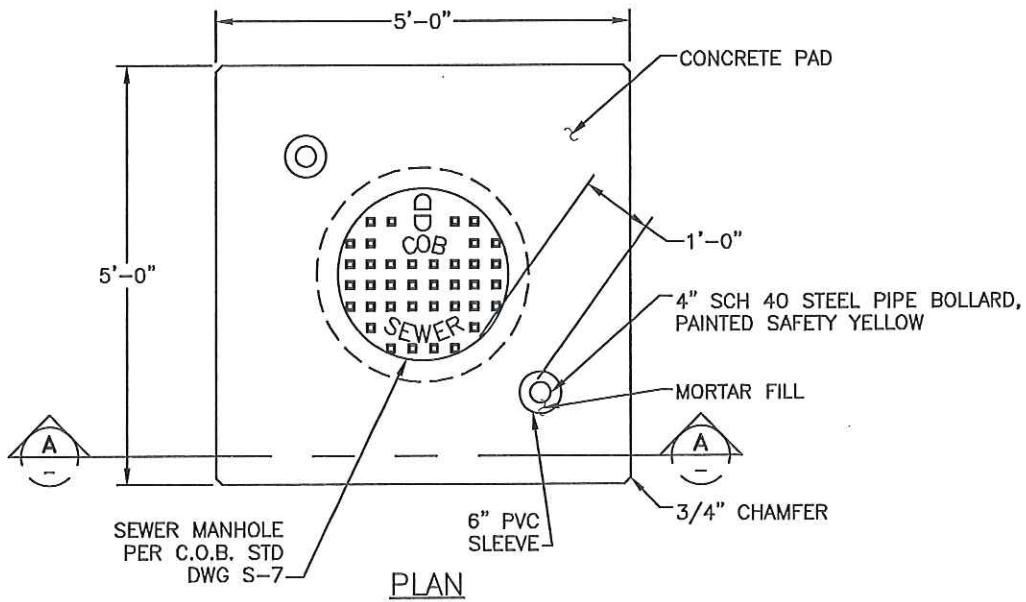
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

STANDARD NO.

**DROP MANHOLE DETAIL  
(SPECIAL ACCEPTANCE DETAIL)**

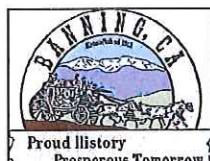
**S-10**  
1 OF 1



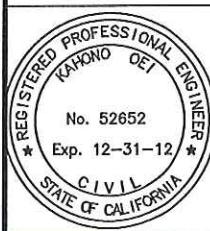
SECTION A

NOTE:

1. THIS DETAIL IS MEANT TO BE USED WHEN MANHOLES ARE IN AN EASEMENT AND/OR NOT WITHIN A PAVED AREA.



2012 EDITION



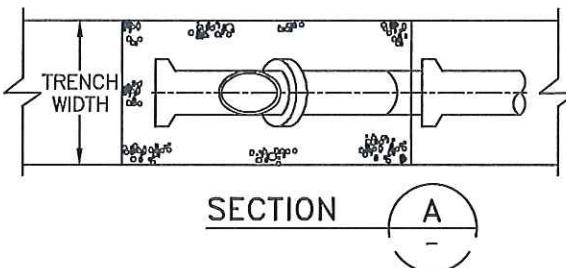
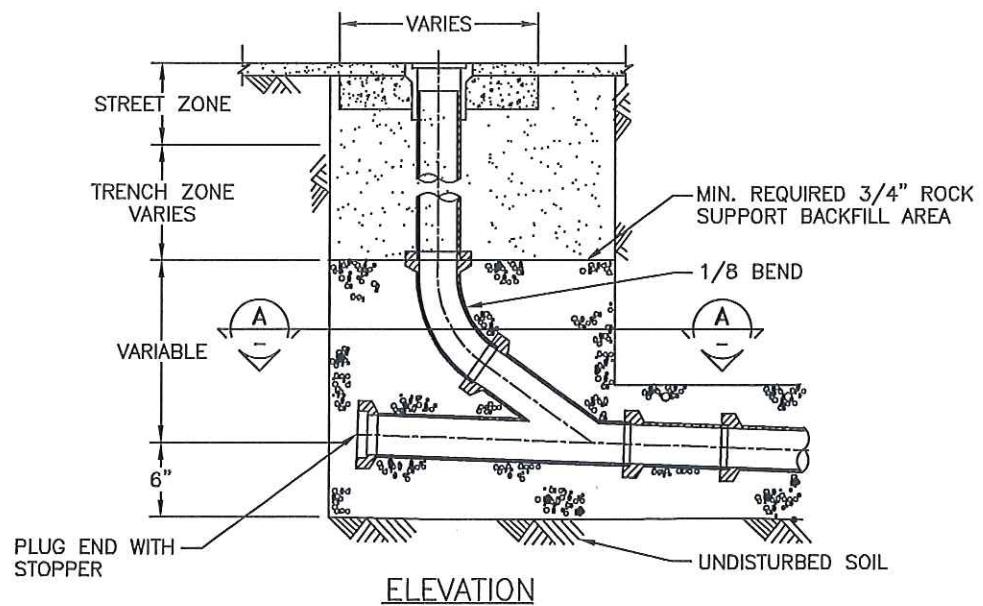
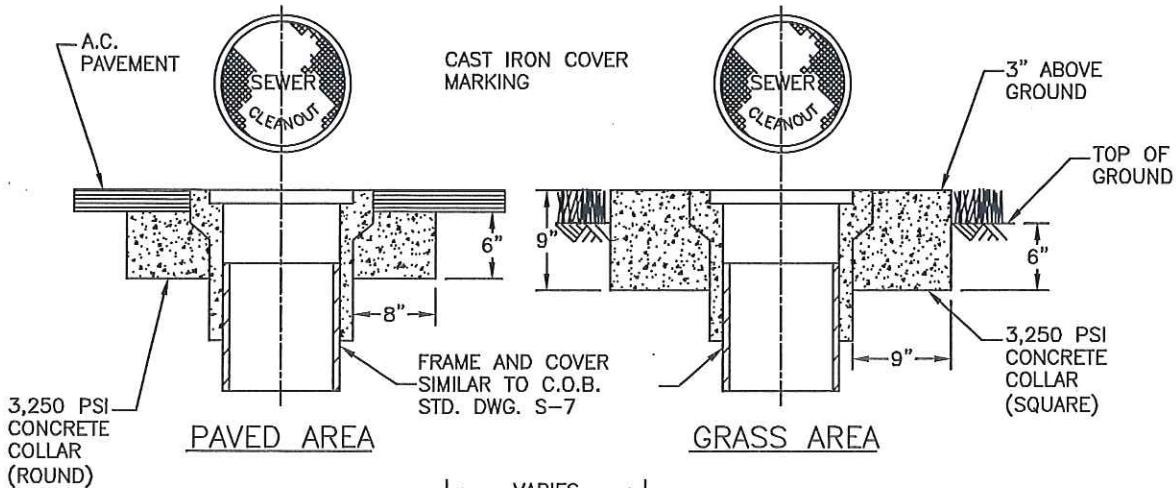
*Arturo Vela*  
RECOMMENDED BY: 12-12-12  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
  
*CH* APPROVED BY: 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

STANDARD  
NO.

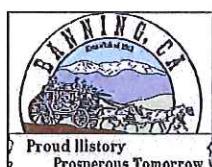
GUARD POST DETAIL

S-11  
1 OF 1



NOTE:

1. CLEANOUT PIPE TO BE SAME SIZE AND KIND OF MATERIAL AS MAIN.



2012 EDITION



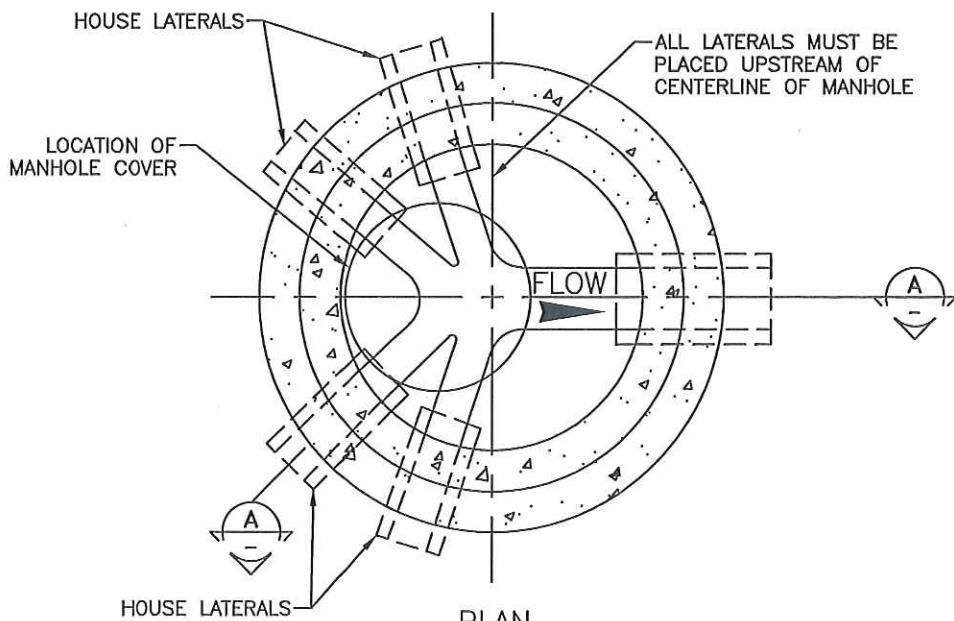
RECOMMENDED BY:  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
12-12-12  
APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
12-12-12

**CITY OF BANNING**

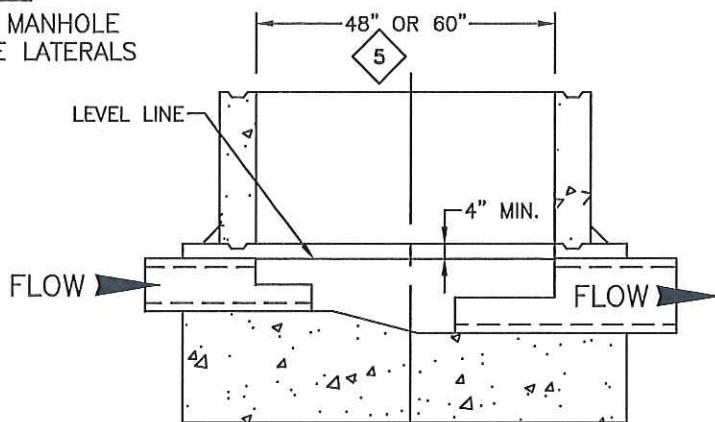
STANDARD NO.

TERMINAL OR MAIN  
CLEANOUT DETAIL

S-12  
1 OF 1



PLAN  
TERMINUS MANHOLE  
WITH HOUSE LATERALS

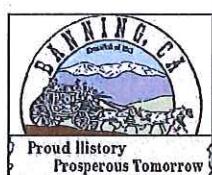


SECTION

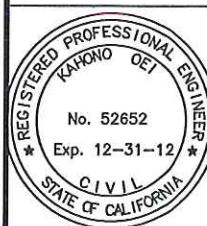


NOTES:

1. REFER TO STANDARD DRAWINGS OF MANHOLES FOR DETAILS PERTAINING TO MANHOLES ONLY.
2. THE TOP 1/2 DIAMETER OF THE PIPE IS TO BE BROKEN OUT TO A NEAT LINE. BROKEN EDGES SHALL BE PLASTERED SMOOTH WITH CEMENT MORTAR.
3. THE MAXIMUM NUMBER OF LATERALS INTO A TERMINUS MANHOLE SHALL BE FOUR.
4. THE MAXIMUM NUMBER OF LATERALS INTO A KNUCKLE MANHOLE SHALL BE THREE.
5. ALL MANHOLES WITH THREE OR MORE CONNECTING LATERALS SHALL BE 5'-0" DIAMETER.



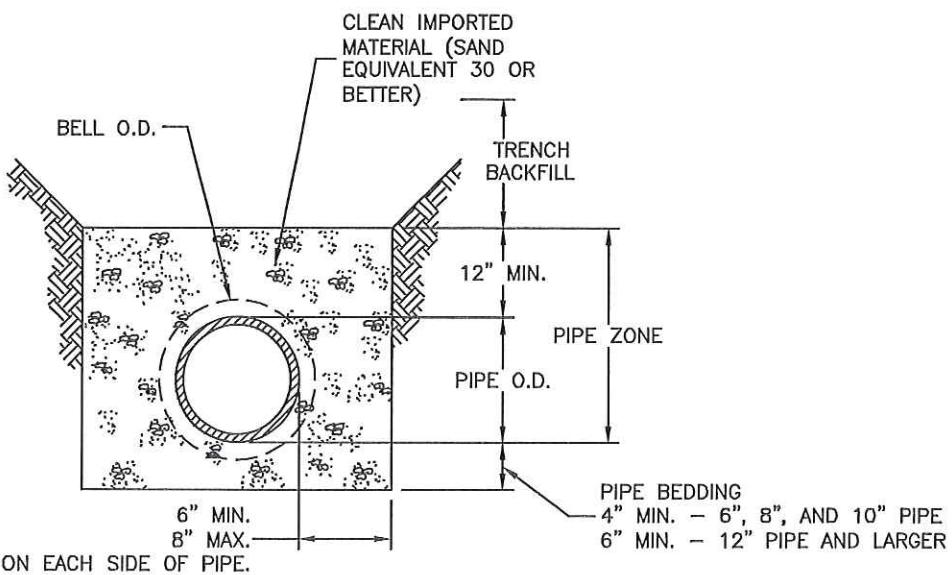
2012 EDITION



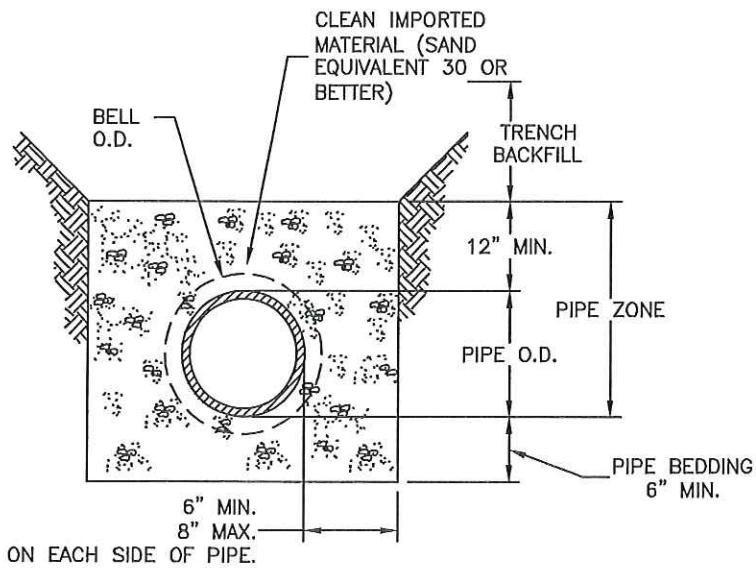
RECOMMENDED BY: *A.H. Vela* 12-12-12  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
APPROVED BY: *Ch* 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**  
**TERMINUS (CUL DE SAC)**  
**MANHOLE**

STANDARD NO.  
**S-13**  
1 OF 1



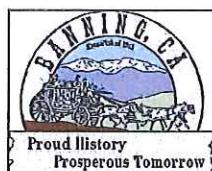
LOAD FACTOR=1.1



LOAD FACTOR=2.2

NOTES:

1. IF UNSTABLE SOIL IS ENCOUNTERED, DISTRICT REPRESENTATIVE SHALL DETERMINE DEPTH OF REMOVAL AND SIZE OF FOUNDATION ROCK REFILL MATERIAL.



2012 EDITION



RECOMMENDED BY:  
ARTURO VELA, P.E., SR. ENGINEER DATE  
12-12-12

APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
12-12-12

**CITY OF BANNING**  
V.C.P. PIPE BEDDING  
DETAILS

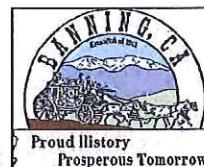
STANDARD NO.  
**S-15**  
1 OF 2

MINIMUM LOAD FACTOR — UNLIMITED TRENCH WIDTH

SEWER DIAMETER	DEPTH OF COVER						
	6'-0"	8'-0"	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"
8"	1.1	1.1	1.1	2.2	2.2	2.2	2.2
10"	1.1	1.1	2.2	2.2	2.2	2.2	—
12"	1.1	2.2	2.2	2.2	2.2	—	—
15"	1.1	2.2	2.2	2.2	—	—	—

NOTES:

1. FOR SEWER DIAMETERS DIFFERENT THAN SHOWN AND FOR DEPTHS OF COVER DIFFERENT THAN SHOWN, CITY SHALL APPROVE PIPE BEDDING AND PIPE ZONE BACKFILL PRIOR TO CONSTRUCTION.
2. WHEN DEPTH REACHES 10'-0", ALL PIPE ZONE BEDDING SHALL BE A MINIMUM DEPTH OF 6" BELOW PIPE UNLESS OTHERWISE NOTED ON PLANS.



2012 EDITION



RECOMMENDED BY:

*Arturo Vela* 12-12-12  
ARTURO VELA, P.E., SR. ENGINEER

APPROVED BY:

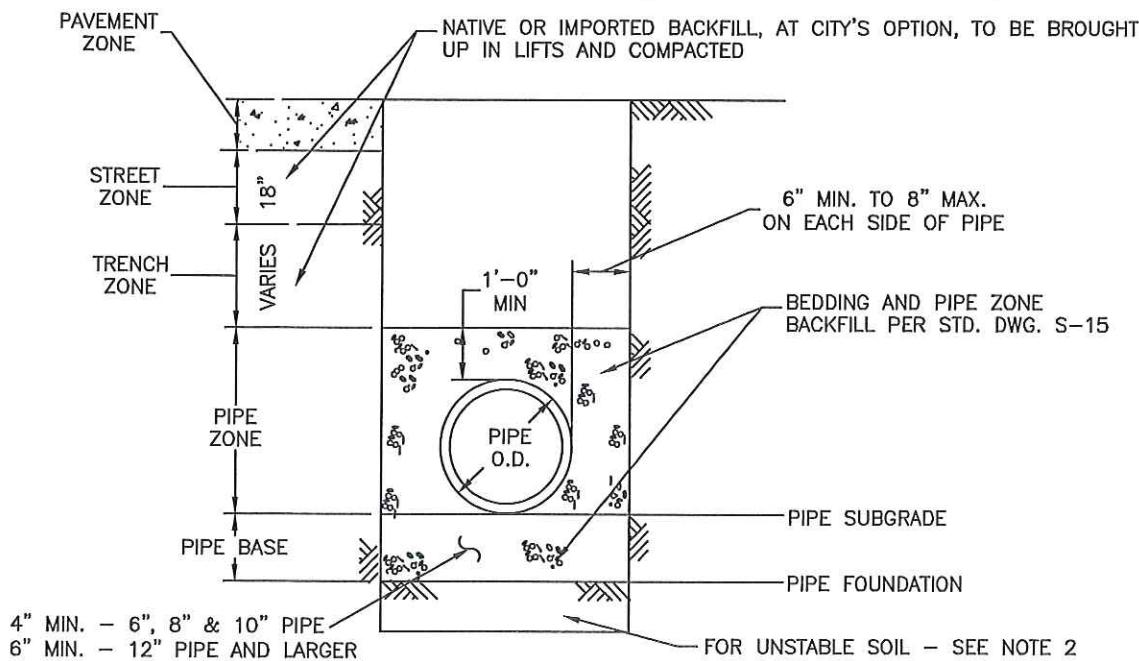
*Ch* 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER

**CITY OF BANNING**

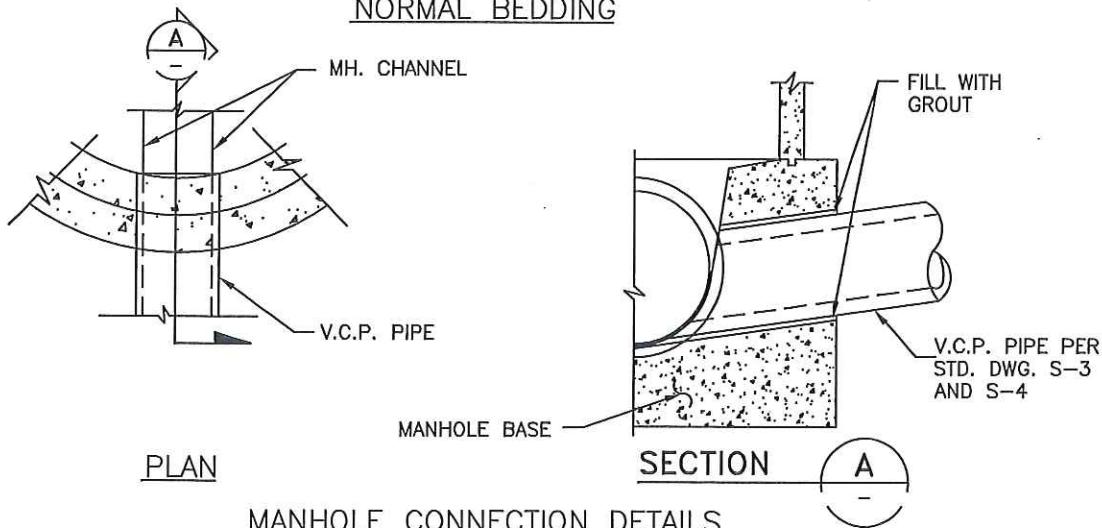
STANDARD  
NO.

V.C.P. PIPE BEDDING  
DETAILS

**S-15**  
2 OF 2



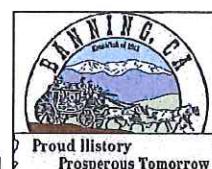
NORMAL BEDDING



MANHOLE CONNECTION DETAILS

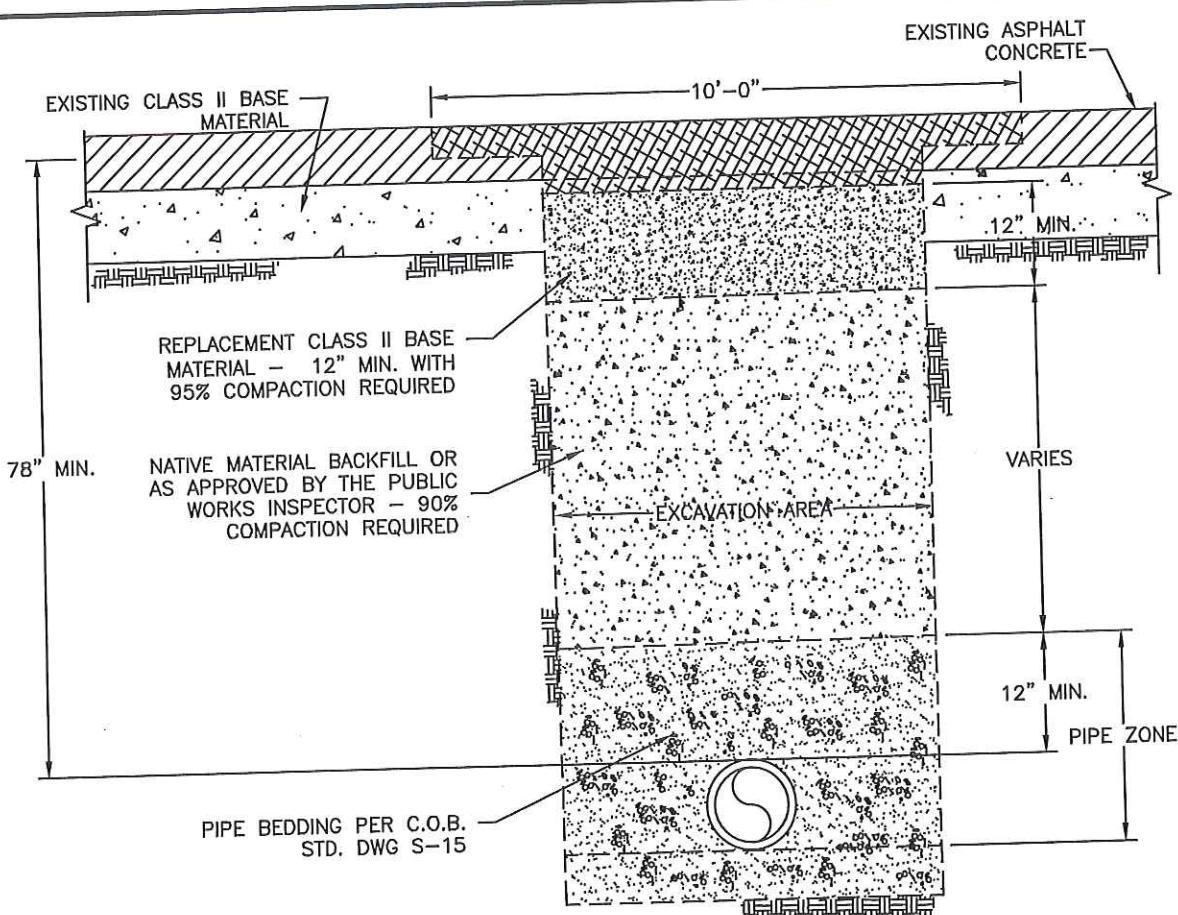
NOTES:

1. IF UNSTABLE SOIL IS ENCOUNTERED, CITY REPRESENTATIVE SHALL DETERMINE DEPTH OF REMOVAL AND SIZE OF FOUNDATION ROCK REFILL MATERIAL.
2. SEE C.O.B. STD. DWGS. S-3, S-4, AND S-5 FOR MANHOLE DETAILS.



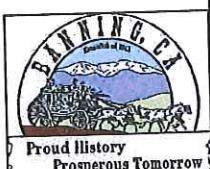
2012 EDITION

 <p>REGISTERED PROFESSIONAL ENGINEER KAHONO OEI No. 52652 Exp. 12-31-12 CIVIL STATE OF CALIFORNIA</p>	 <p>RECOMMENDED BY: ARTURO VELA, P.E., SR. ENGINEER</p>	 <p>APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER</p>	<p><b>CITY OF BANNING</b></p>	STANDARD NO.
			<p><b>PIPE BEDDING AND SPECIAL DETAILS</b></p>	S-16 1 OF 1



NOTES:

1. NO TRENCHING, CUTTING, POTHOLES, GRINDING OR CORING WILL BE ALLOWED, EXCEPT FOR EMERGENCIES OR TO PROVIDE SERVICE CONNECTIONS, IF THE STREET HAS BEEN PAVED OR RESURFACED WITHIN THE PREVIOUS THREE YEARS.
2. WHEN TRENCHING OR CUTTING INTO ANY STREET, FULL LANE WIDTH (10 FEET WIDE MINIMUM) ASPHALT CONCRETE (AC) PAVEMENT REPLACEMENT, AC COLD MILLING (0.10 FEET THICK) AND AC OVERLAY, SHALL BE REQUIRED.
3. REPLACEMENT AC PAVEMENT SHALL BE 1 INCH GREATER THAN EXISTING AC PAVEMENT THICKNESS OR 5 INCHES THICK, WHICHEVER IS GREATER.
4. OUTSIDE OF STREET RIGHT OF WAY, COMPACTION SHALL BE 90%.
5. ADDITIONAL ARTERIAL STREET BACKFILL MAY BE REQUIRED.
6. TRENCHES SHALL BE PAVED WITH TEMPORARY AC PAVEMENT IMMEDIATELY FOLLOWING WORK. ALL TEMPORARY ASPHALT SHALL BE A MINIMUM 3 INCHES THICK AND SHALL BE PROPERLY COMPAKTED FLUSH WITH EXISTING ASPHALT. ALL TEMPORARY ASPHALT MUST BE KEPT UP DAILY PAVING USING A VIBRATORY ROLLER OR VIBRATORY PLATE. PERMANENT PAVING IS REQUIRED WITHIN 2 WEEKS OF EXCAVATION. AT THE CONTRACTOR'S EXPENSE.
7. SEE SHEET 2 OF 2 FOR PIPE VS. TRENCH SIZES.

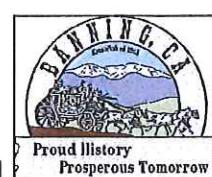


2012 EDITION

REGISTERED PROFESSIONAL ENGINEER KAHONO OEI No. 52652 Exp. 12-31-12 CIVIL STATE OF CALIFORNIA	RECOMMENDED BY: ARTURO VELA, P.E., SR. ENGINEER APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER	CITY OF BANNING TRENCH REPAIR DETAIL	STANDARD NO. S-17 1 OF 2

TRENCH REPAIR-PIPE SIZE VS TRENCH SIZE		
PIPE SIZE-INCHES (INSIDE DIAMETER)	TRENCH WIDTH-INCHES	
	MINIMUM	MAXIMUM
4	20	28
6	22	32
8	24	32
10	26	36
12	30	36
14	32	42
16	34	42

2012 EDITION



Proud History  
Prosperous Tomorrow



RECOMMENDED BY:

*Arturo Vela* 12-12-12  
ARTURO VELA, P.E., SR. ENGINEER DATE

APPROVED BY:

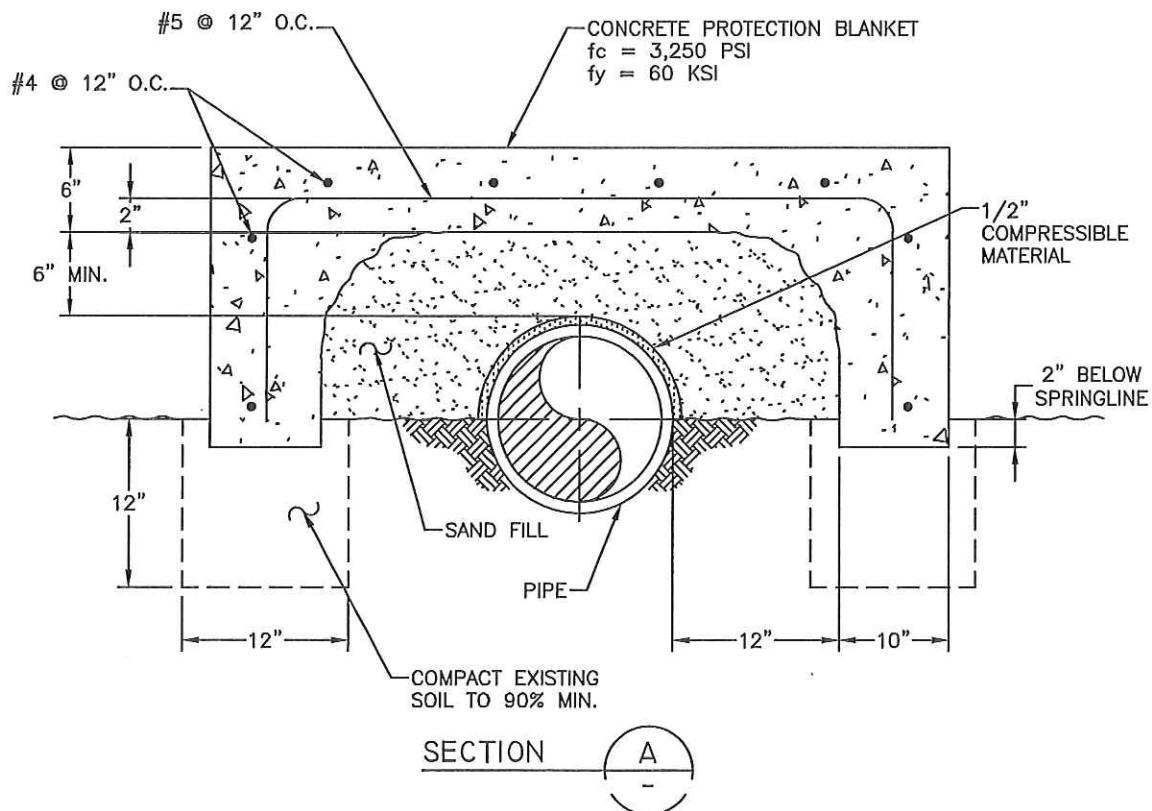
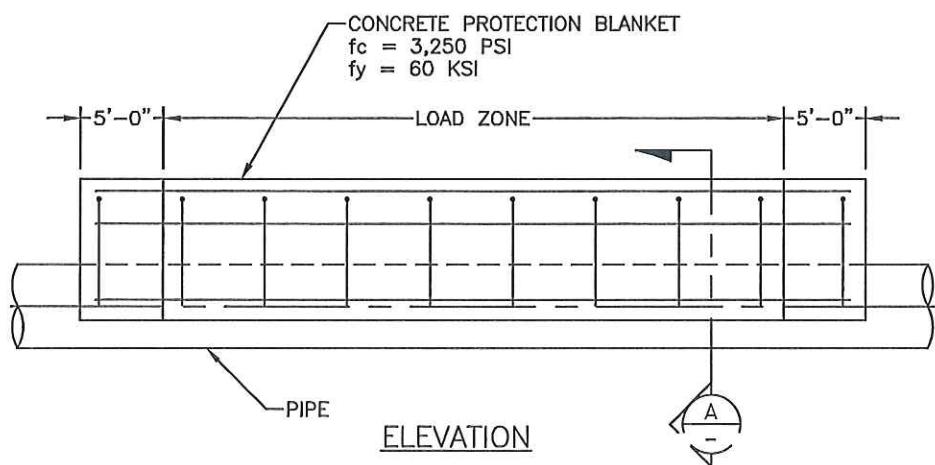
*Chu* 12-12-12  
KAHONO OEI, P.E., CITY ENGINEER DATE

**CITY OF BANNING**

STANDARD  
NO.

**TRENCH REPAIR DETAIL**

**S-17**  
2 OF 2



2012 EDITION

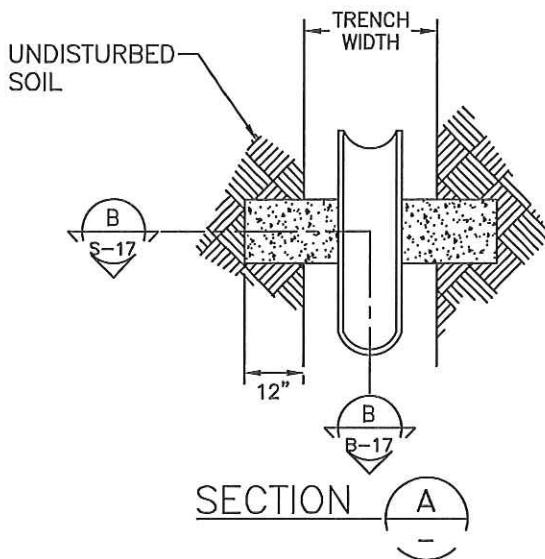
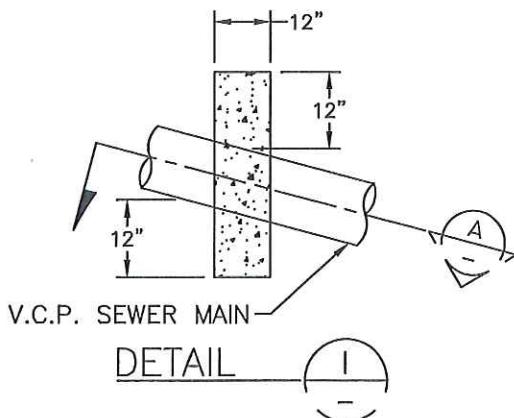
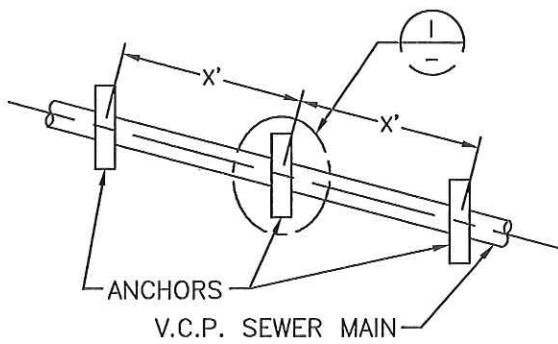


RECOMMENDED BY:  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
12-12-12  
APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
12-12-12

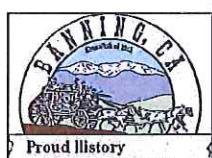
**CITY OF BANNING**

SEWER MAIN  
PROTECTION DETAIL

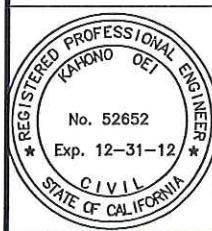
STANDARD  
NO.  
S-18  
1 OF 1



SEE C.O.B. STD. DWG. S-17 SHEET 2 OF 2 FOR SECTION B, REINFORCING STEEL PATTERN, PIPE SLOPE SCHEDULE, AND NOTES.



2012 EDITION

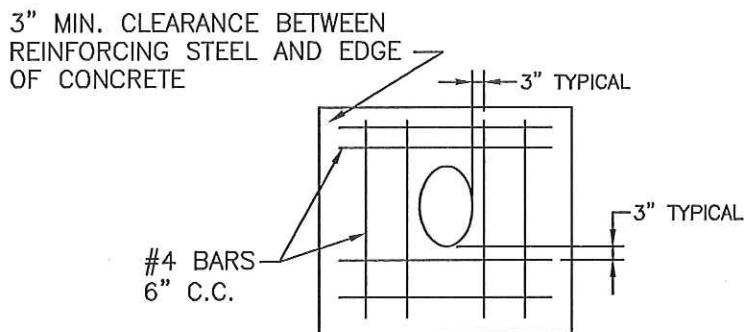
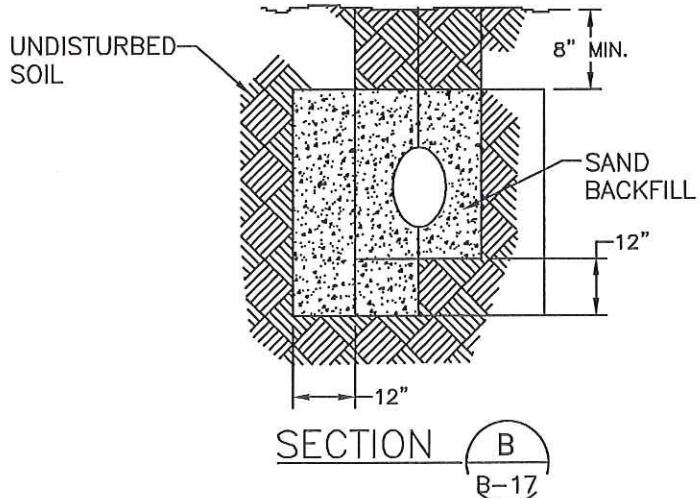


RECOMMENDED BY:  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
12-12-12  
APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
CH 12-12-12

**CITY OF BANNING**

CONCRETE SLOPE  
ANCHORS

STANDARD  
NO.  
S-19  
1 OF 2

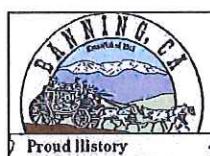


### REINFORCING STEEL PATTERN

PIPE SLOPE	PIPE SLOPE	X DISTANCE
100%	1:1	12'-0"
66.6%	1-1/2:1	14'-0"
50%	2:1	16'-0"
40%	2-1/2:1	18'-0"
33.3%	3:1	20'-0"

#### NOTES:

1. PIPE ANCHORS REQUIRED ON ALL SLOPES OF 3:1 OR STEEPER.
2. ANCHOR SHALL EXTEND 12" INTO NATURAL UNDISTURBED SOIL.
3. CONCRETE SHALL BE 3250 PSI MINIMUM.
4. ANCHORS FOR TRAPEZOIDAL TRENCH SECTIONS WILL CONFORM TO TRENCH CROSS SECTION AND EXTEND 12" INTO UNDISTURBED SOIL.



2012 EDITION



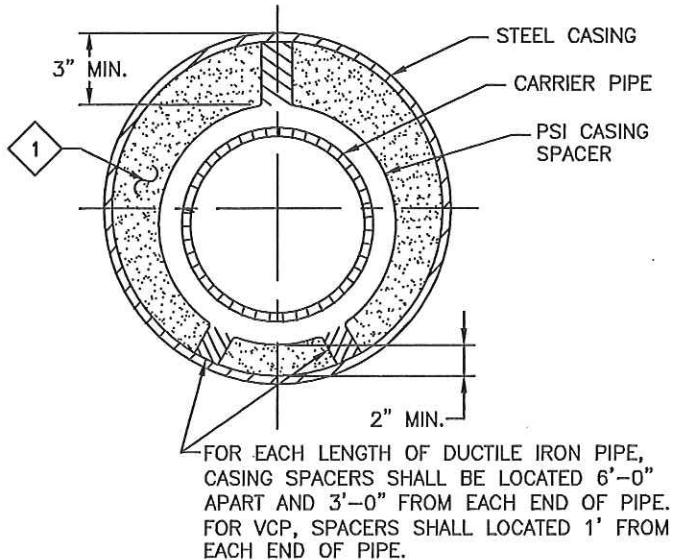
RECOMMENDED BY:	12-12-12
ARTURO VELA, P.E., SENIOR ENGINEER	DATE
APPROVED BY:	12-12-12
KAHONO OEI, P.E., CITY ENGINEER	DATE

**CITY OF BANNING**

STANDARD NO.

CONCRETE SLOPE  
ANCHORS

S-19  
2 OF 2



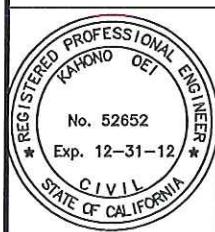
STEEL CASING SCHEDULE		
V.C.P. SIZE	MINIMUM CASING SIZE	MIN. WALL THICK.
6"	16" I.D.	1/4"
8"	18" I.D.	1/4"
10"	21" I.D.	5/16"
12"	24" I.D.	5/16"

NOTES:

1. THE ANNULAR SPACE BETWEEN THE CASING AND THE CARRIER PIPE SHALL BE FILLED WITH AIR BLOWN SAND.
2. UNLESS OTHERWISE NOTED, CASING SHALL BE INSTALLED BY THE BORE, JACK AND/OR TUNNEL METHOD. IF OPEN-CUT INSTALLATION OF CASING IS ALLOWED, BACKFILL SHALL BE IN ACCORDANCE WITH C.O.B. STD. DWG S-17.
3. SIZE AND THICKNESS OF CASING SHALL BE AS SHOWN IN SCHEDULE.
4. ALL STEEL CASING PIPE FIELD JOINTS SHALL BE WELDED FULL-CIRCUMFERENCE.
5. PSI CASING SPACERS SHALL BE PROVIDED PER DETAIL ABOVE.
6. CARRIER PIPE SHALL BE AIR PRESSURE TESTED PRIOR TO FILLING CASING AND AGAIN WITH ENTIRE ENTIER PIPELINE
7. UPSTREAM AND DOWNSTREAM ELEVATIONS OF CARRIER PIPE TO BE VERIFIED PRIOR TO FILLING.
8. EACH END OF CASING SHALL BE SEALED WITH CONCRETE MORTAR.



2012 EDITION



RECOMMENDED BY:  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
12-12-12

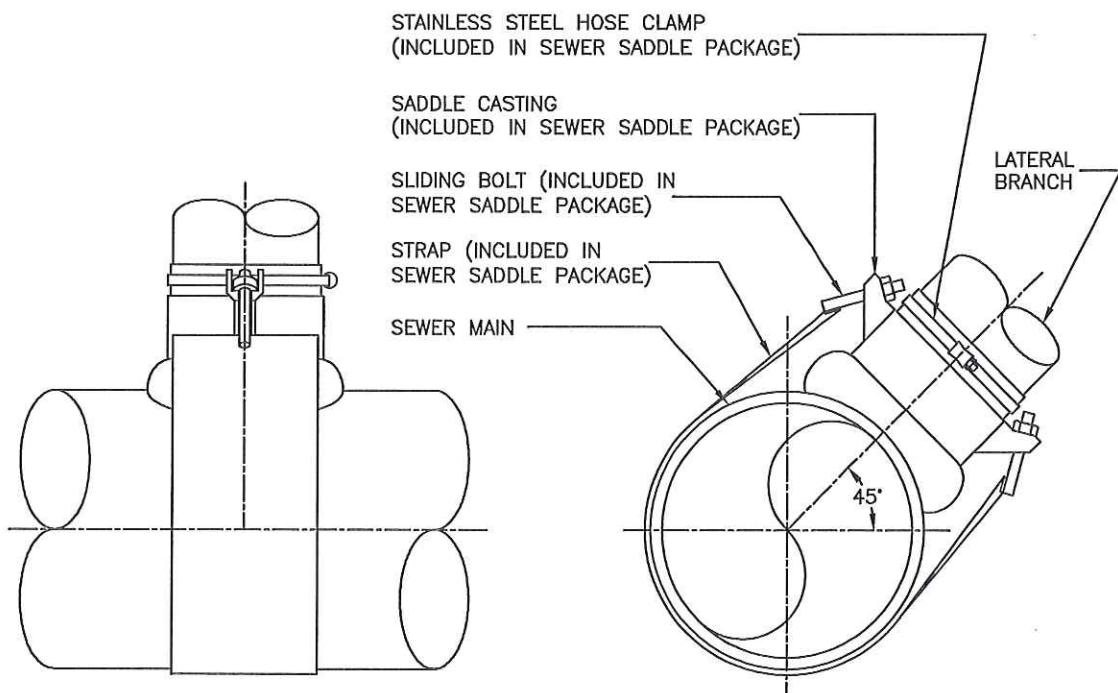
APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
12-12-12

**CITY OF BANNING**

STANDARD  
NO.

STEEL CASING PIPE

S-20  
1 OF 1



### SEWER SADDLE FOR 4" - 6" CLAY PIPE LATERAL CONNECTION

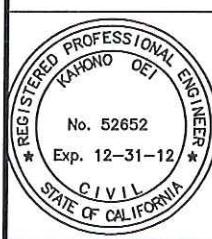
SEWER DIAMETER	ROMAC INDUSTRIES, INC. PART NUMBER	
	4" LATERAL BRANCH	6" LATERAL BRANCH
8" - 12"	CB-5.38	CB-7.56
14" - 24"	CB-5.38LS	CB-7.56LS
24" - 48"	CB-5.38XLS	CB-7.56XLS

#### NOTES:

1. LATERAL CONNECTION BY SADDLE METHOD SHALL BE USED ON PIPES 8" IN DIAMETER AND LARGER.
2. THE HOLE FOR THE COLLAR WYE FITTING FOR A SEWER SADDLE SHALL BE MADE WITH A TAPPING MACHINE. THE HOLE SHALL BE CLEANLY MACHINED, AND IF NECESSARY, WORKED BY HAND WITH A RASP OR SANDED TO ACCOMPLISH A TRUE AND NEAT OPENING FOR THE COLLAR WYE.
3. THE COLLAR WYE SADDLE SHALL BE SECURED TO THE SEWER MECHANICALLY.
4. DAMAGED PIPE SHALL BE REPAIRED AS DIRECTED BY THE CITY REPRESENTATIVE.



2012 EDITION



RECOMMENDED BY:

ARTURO VELA, P.E., SENIOR ENGINEER

12-12-12

APPROVED BY:

KAHONO OEI, P.E., CITY ENGINEER

12-12-12

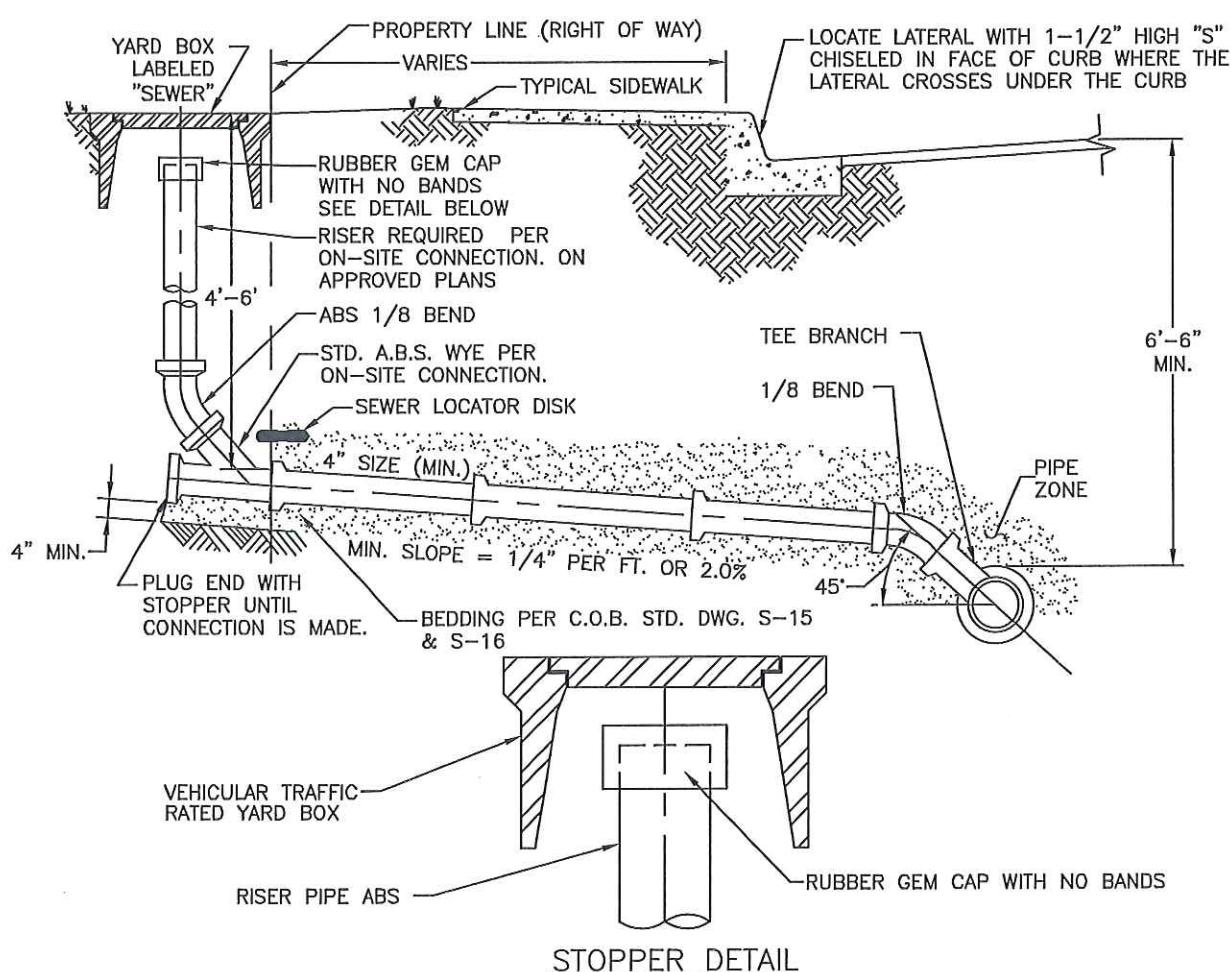
**CITY OF BANNING**

**4" AND 6" SEWER SADDLE  
CONNECTION TO EXISTING  
MAINS**

STANDARD  
NO.

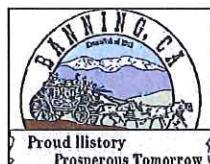
**S-21**

1 OF 1

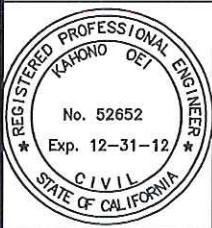


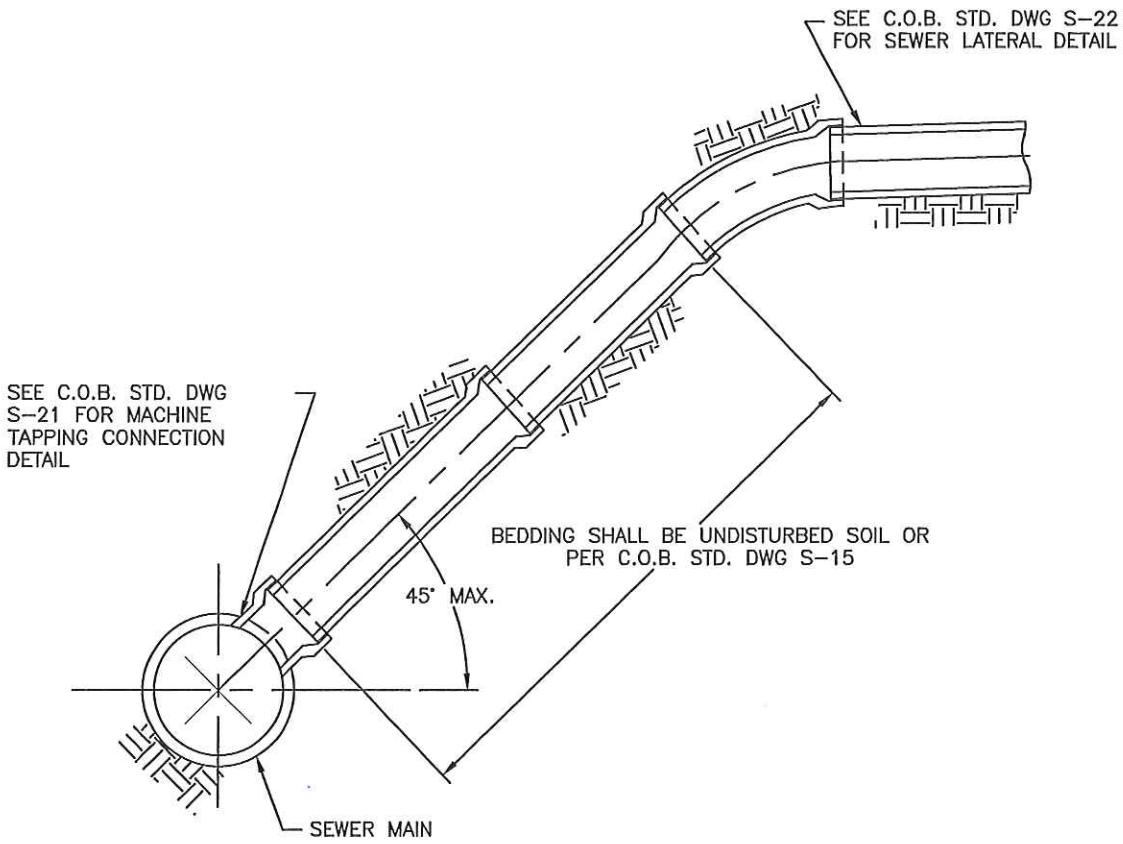
NOTES:

1. LATERAL SIZE TO BE DETERMINED ON THE BASIS OF TOTAL NUMBER OF FIXTURE UNITS DRAINED, BUT IN NO CASE SHALL THE LATERAL DIAMETER BE LESS THAN FOUR INCHES FOR SINGLE OR MULTIPLE FAMILY RESIDENTIAL AND SIX INCHES FOR COMMERCIAL OR INDUSTRIAL. RISERS SHALL BE THE SAME SIZE AS THE LATERAL.
2. LATERAL TO BE INSTALLED TO PROPERTY LINE. ALL LATERALS ARE TO BE CONSTRUCTED OF EXTRA STRENGTH VITRIFIED CLAY PIPE. MUST BE INSTALLED WITH A MINIMUM HORIZONTAL OFFSET OF 36" FROM ALL OTHER UTILITIES.
3. PLACE SAND (SE 30 OR BETTER) A MINIMUM OF 4" BELOW THE PIPE AND 1' ABOVE THE TEE OR WYE, AND LATERAL.
4. IF RISER IS NOT BUILT, PLUG WYE BRANCH WITH STOPPER.
5. INSTALL A SEWER LOCATOR DISK AT THE END OF ALL LATERAL RUNS AT RIGHT OF WAY.
6. ONLY LATERAL RUNS ARE PERMITTED TO BE EITHER "BELL AND SPIGOT", OR "BAND SEAL".



2012 EDITION

	<p>RECOMMENDED BY: ARTURO VELA, P.E., SENIOR ENGINEER DATE 12-12-12</p>	<p><b>CITY OF BANNING</b></p>	<p>STANDARD NO. S-22 1 OF 1</p>
	<p>APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER DATE 12-12-12</p>	<p>V.C.P. HOUSE LATERAL</p>	



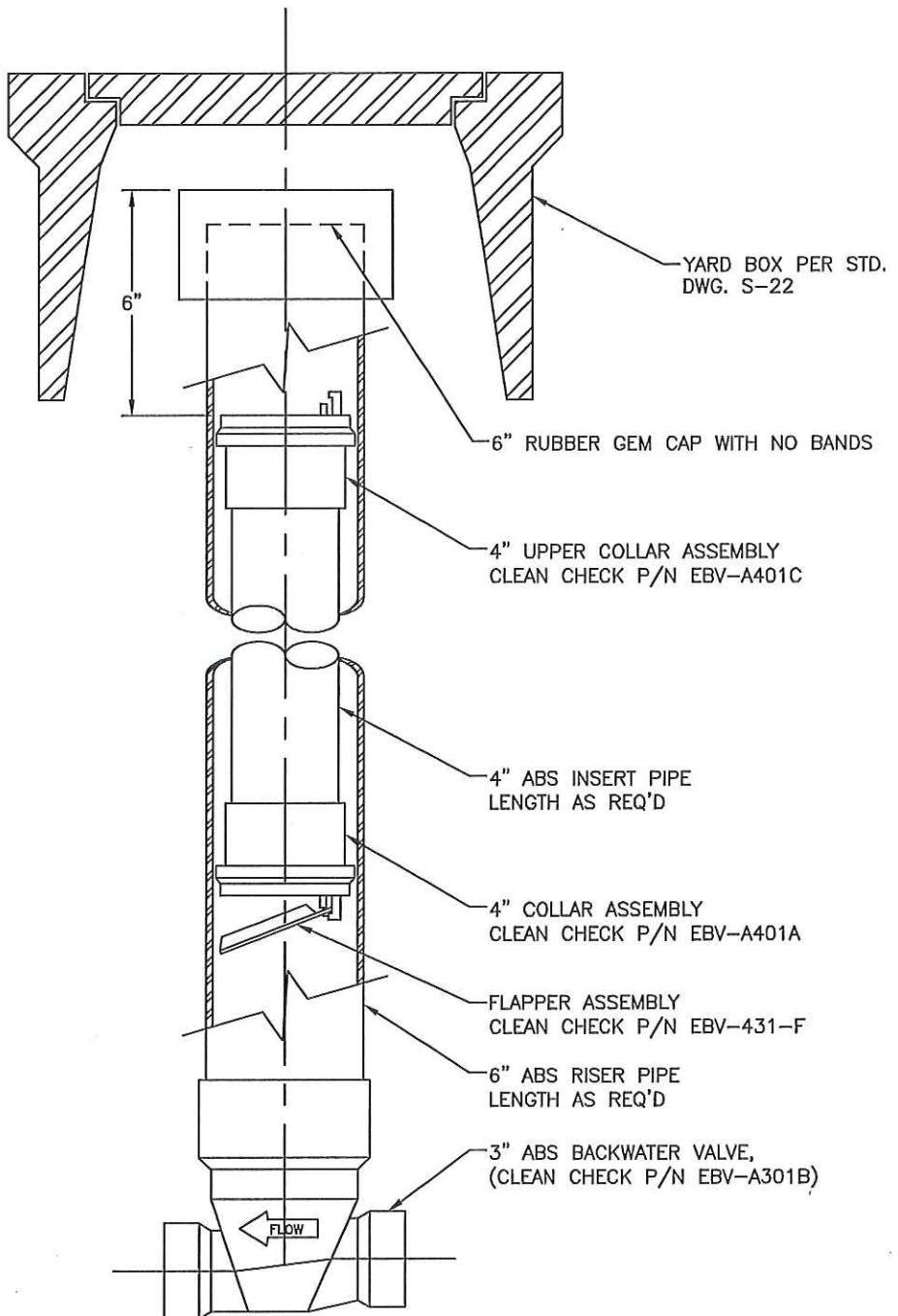
NOTES:

1. SEE CONSTRUCTION DRAWINGS FOR LOCATION AND SIZE OF LATERALS.
2. IF THE SEWER MAIN IS IN AN EASEMENT AND IT IS GREATER THAN 7'-0" DEEP, A LATERAL EXTENSION PER THIS DETAIL WILL BE REQUIRED TO BRING END OF CONNECTION PIPE TO 5'-0" OF SURFACE, EXCEPT IN CASES WHERE DEPTH IS NEEDED TO SERVE PROPERTY.



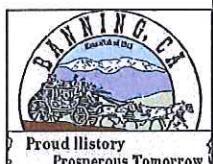
2012 EDITION

 <p>REGISTERED PROFESSIONAL KAHONO OEI ENGINEER No. 52652 Exp. 12-31-12 CIVIL STATE OF CALIFORNIA</p>	<p>RECOMMENDED BY: ARTURO VELA, P.E., SENIOR ENGINEER DATE 12-12-12</p>	<p><b>CITY OF BANNING</b></p>	<p>STANDARD NO.</p>
	<p>APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER DATE 12-12-12</p>	<p><b>DEEP SEWER LATERAL DETAIL</b></p>	<p><b>S-23</b> 1 OF 1</p>

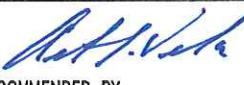


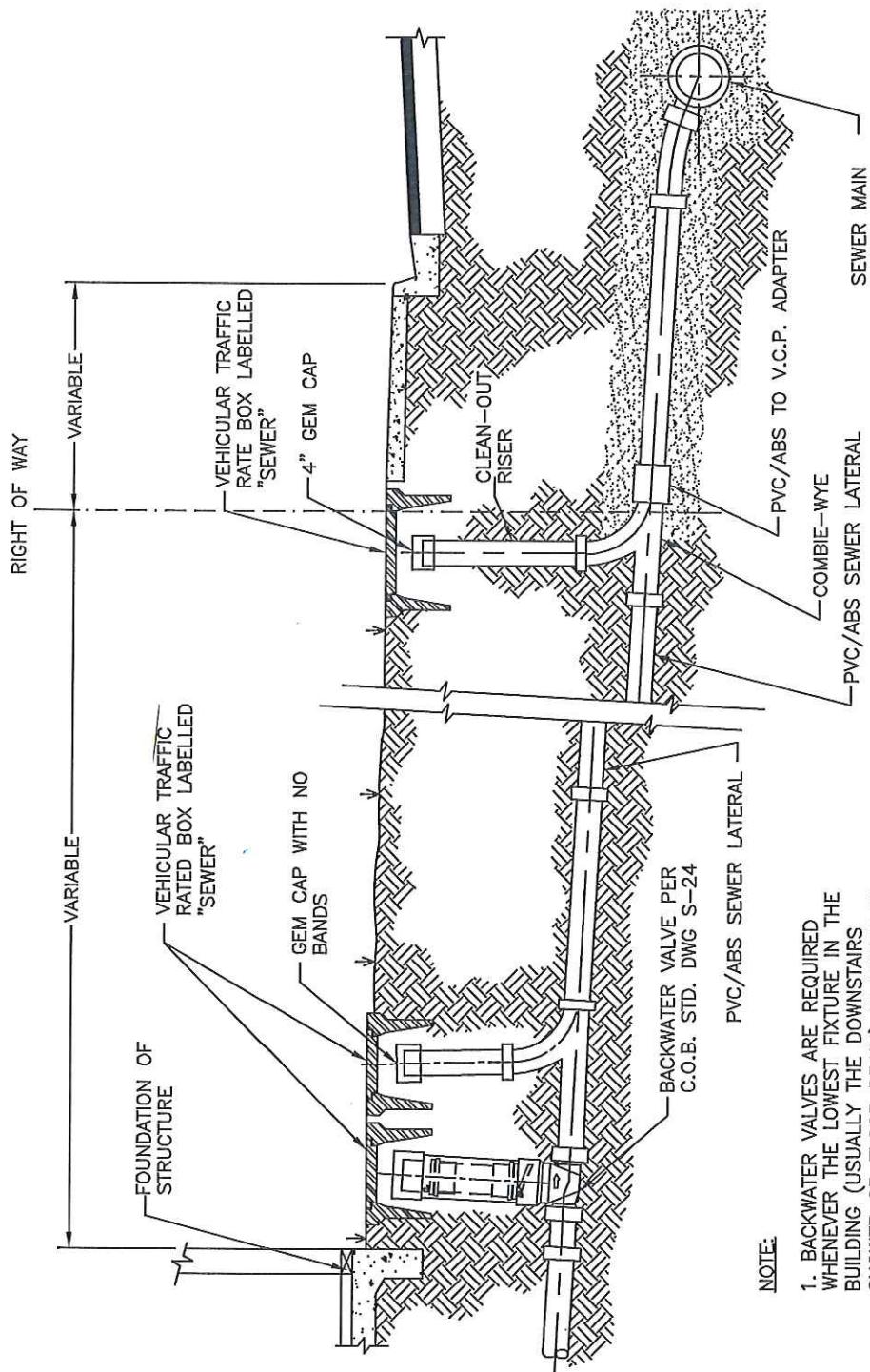
NOTES:

1. THE REQUIRED MATERIALS ARE AS SHOWN OR AS APPROVED EQUAL.



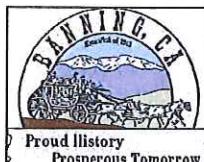
2012 EDITION

 <p>REGISTERED PROFESSIONAL KAHONO OEI ENGINEER No. 52652 Exp. 12-31-12 CIVIL STATE OF CALIFORNIA</p>	 <p>RECOMMENDED BY: ARTURO VELA, P.E., SENIOR ENGINEER DATE: 12-12-12</p>	<p><b>CITY OF BANNING</b></p>	<p>STANDARD NO.</p>
	 <p>APPROVED BY: KAHONO OEI, P.E., CITY ENGINEER DATE: 12-12-12</p>	<p><b>BACKWATER VALVE DETAIL</b></p>	<p><b>S-24</b> 1 OF 1</p>

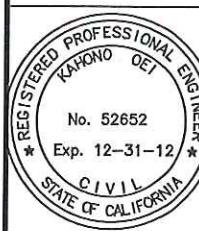


NOTE:

1. BACKWATER VALVES ARE REQUIRED WHENEVER THE LOWEST FIXTURE IN THE BUILDING (USUALLY THE DOWNSTAIRS SHOWER OR FLOOR DRAIN) IS LOWER IN ELEVATION THAN THE RIM OF THE NEAREST UPSTREAM SEWER MANHOLE FROM WHERE THE LATERAL TIES INTO.



2012 EDITION



RECOMMENDED BY:  
ARTURO VELA, P.E., SENIOR ENGINEER DATE  
12-12-12

APPROVED BY:  
KAHONO OEI, P.E., CITY ENGINEER DATE  
12-12-12

**CITY OF BANNING**

**BACKWATER VALVE  
INSTALLATION DETAIL**

STANDARD  
NO.

**S-25**  
1 OF 1