

**D**

**R**

**A**

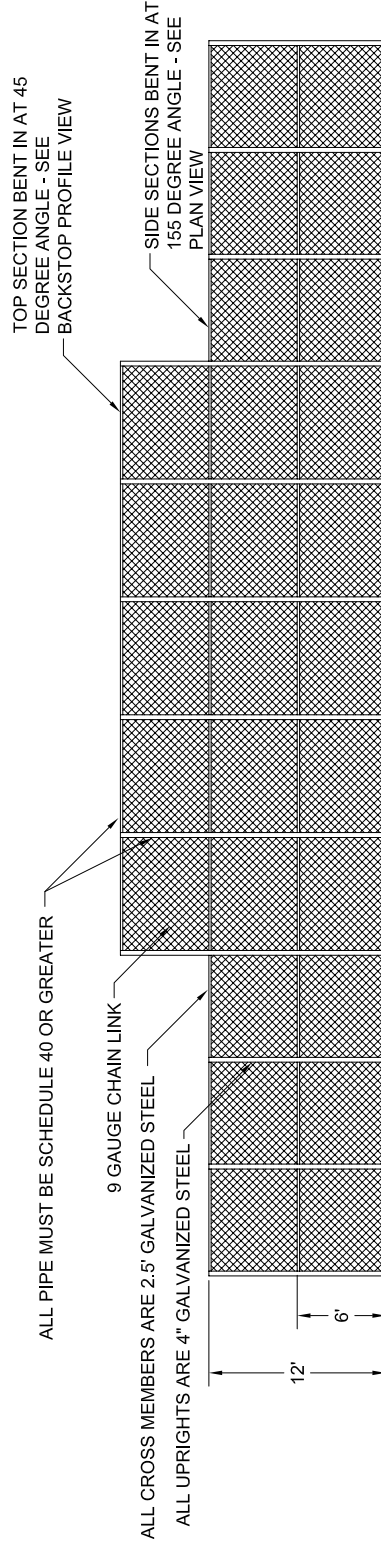
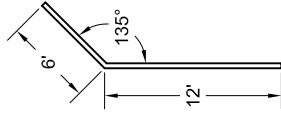
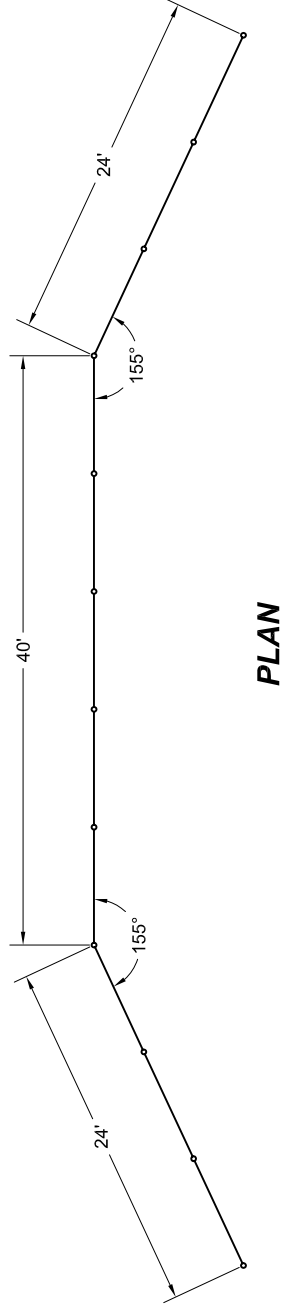
**W**

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**NOTE:**

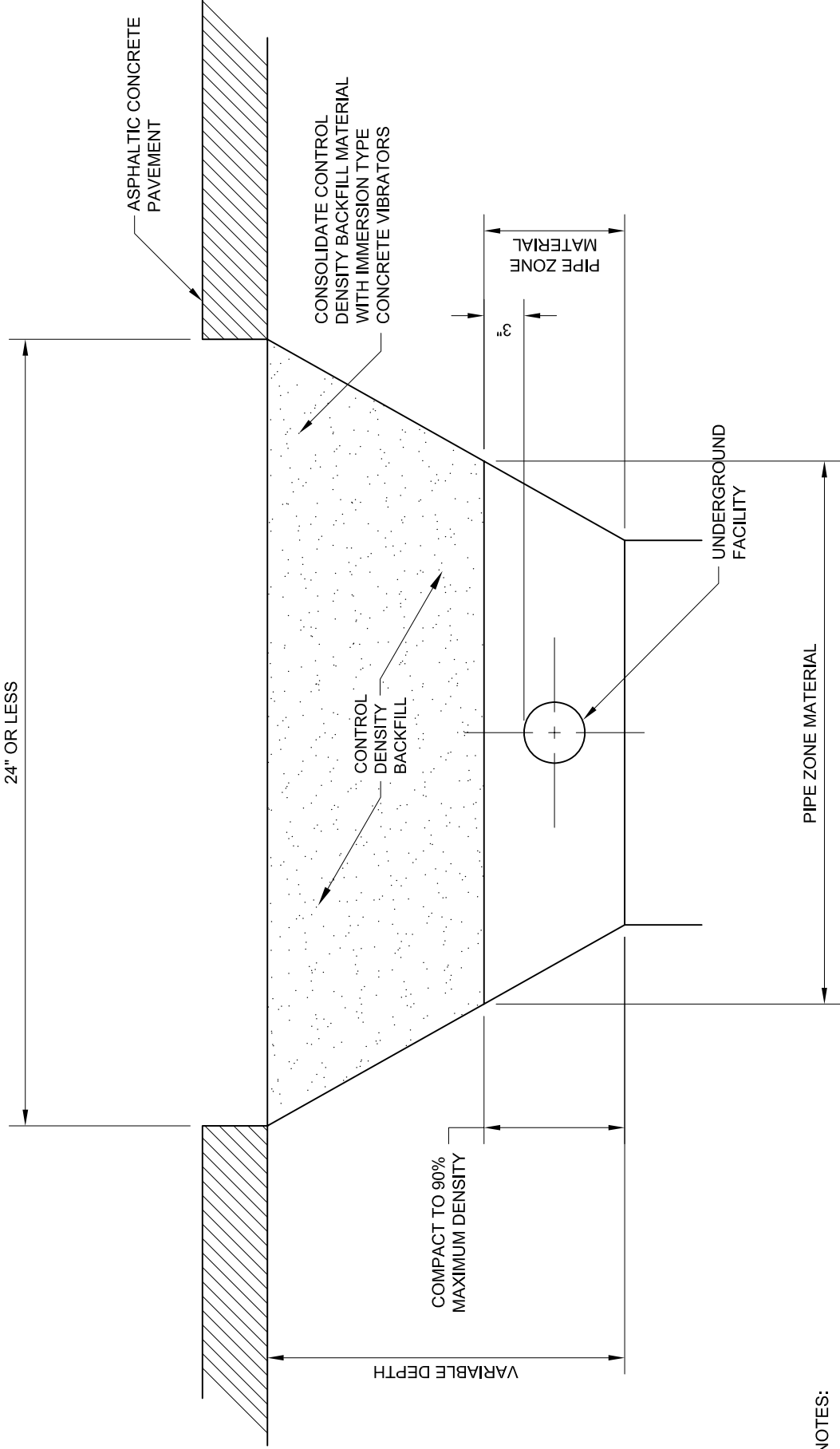
ALL OPEN PIPES MUST BE CAPPED OFF.  
ALL INTERSECTING PIPE MUST BE WELDED.

**CITY OF CASPER  
ENGINEERING DIVISION**

**BACKSTOP DETAIL**

NOT TO SCALE

REV.	DESCRIPTION	DATE
1	DRAFTED ONTO COMPUTER- G.D.W.	3/28/03
2	DRAWING STANDARDS REVISIONS	JAN 06
204		1



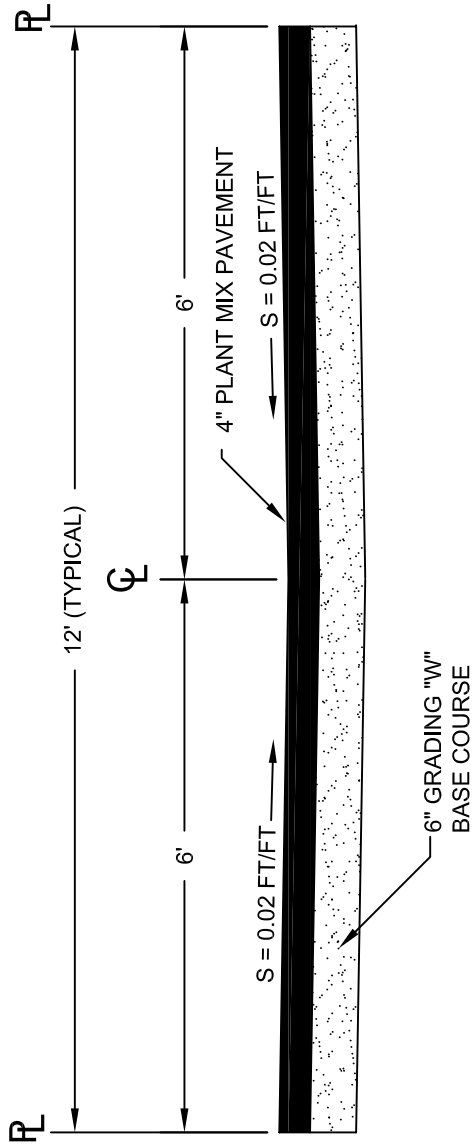
NOTES:

1. THIS TRENCH DETAIL IS ONLY APPLICABLE TO UNDERGROUND FACILITIES AS DEFINED BY ARTICLE 13 STANDARD SPECIFICATION FOR STREET CONSTRUCTION.
2. TRIM EDGES OF ASPHALT PAVEMENT TO A VERTICAL EDGE.
3. BITUMINOUS TAC COAT ALL EXPOSED EDGES OF CURB, GUTTER, MANHOLES, AND EDGES OF ASPHALT PAVEMENT.

CITY OF CASPER	
ENGINEERING DIVISION	
STANDARD TRENCH DETAIL	
FOR UTILITY CUTS	
205	1
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER- Z.T.L.
2	DRAWING STANDARDS REVISIONS
	DATE
	6/14/01
	JAN 06

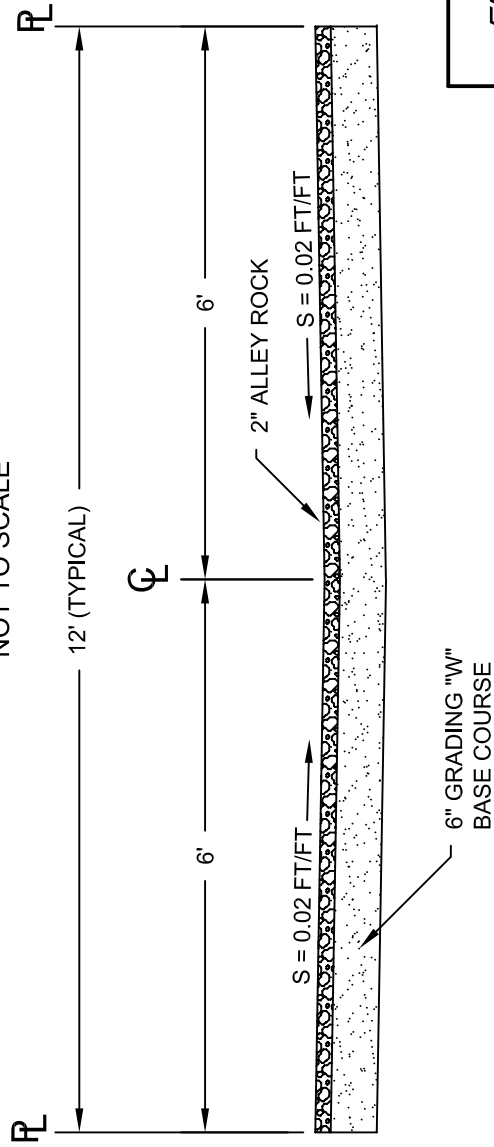
STANDARD TRENCH DETAIL  
FOR UTILITY CUTS

NOT TO SCALE



### TYPICAL PAVED ALLEY SECTION

NOT TO SCALE



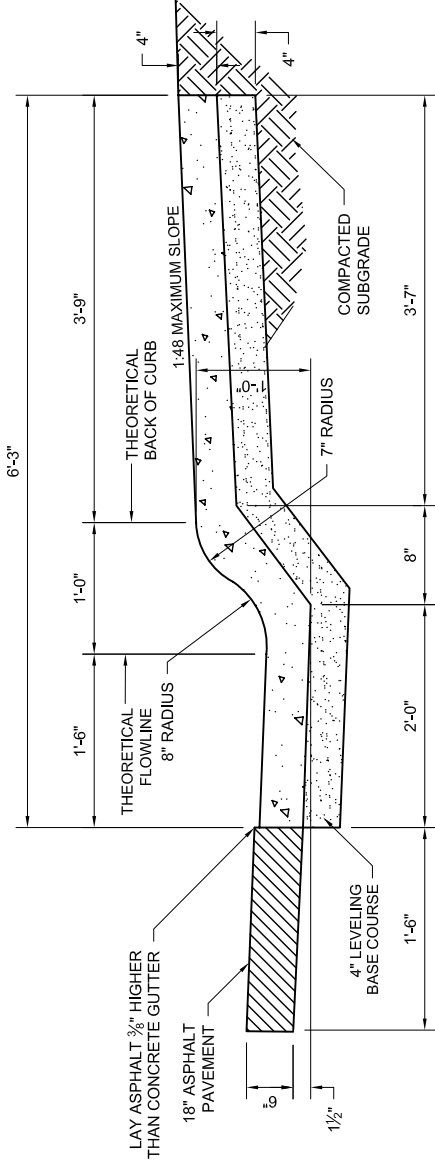
### TYPICAL UNPAVED ALLEY SECTION

NOT TO SCALE

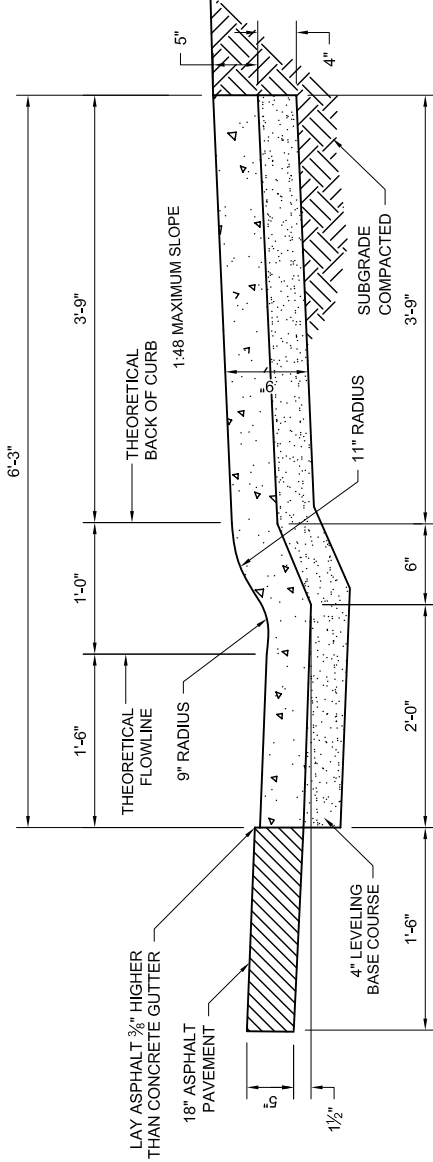
CITY OF CASPER  
ENGINEERING DIVISION

STANDARD ALLEY SECTIONS

208 1	
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER- Z.T.L.
2	UNPAVED ALLEY SECTION ADDED
3	DRAWING STANDARDS REVISIONS
	DATE
	6/10/02
	1/14/03
	JAN 06



EXISTING RIGHT-OF-WAY CONSTRUCTION  
STANDARD CONCRETE CURBWALK



EXISTING RIGHT-OF-WAY CONSTRUCTION  
STANDARD CONCRETE CURBWALK  
(ALTERNATE PROFILE DETAIL)

NOTES:

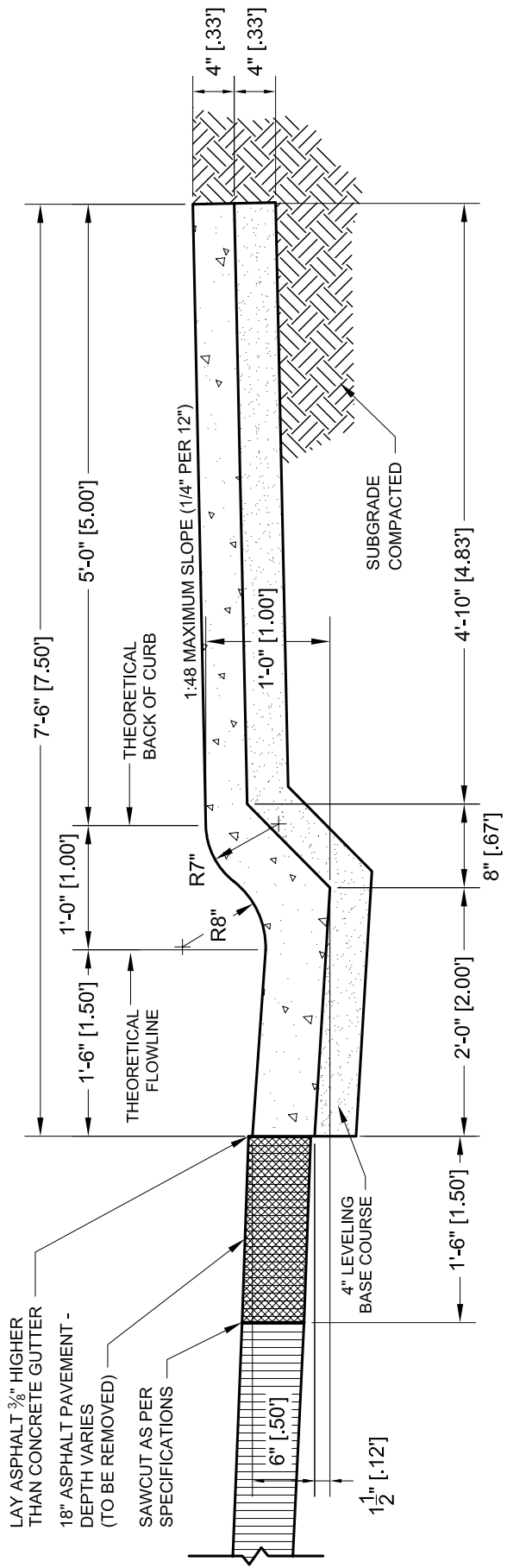
1. CUT AND REMOVE EXISTING ASPHALT 18" BACK FROM LIP OF GUTTER. PLACE GRADING "W" BASE COURSE, BACKFILL AND COMPACT TO TOP ASPHALT ELEVATION. EXCEPTIONS MAY BE GRANTED BY CITY ENGINEERING.
2. THE CITY OF CASPER DOES NOT PAVE BACK THE 18" CUT BACK FOR COMMERCIAL PROPERTIES, SITE PLANS, SUBDIVISION DEVELOPMENT, NEW CONSTRUCTION, ETC.

CITY OF CASPER  
ENGINEERING DIVISION

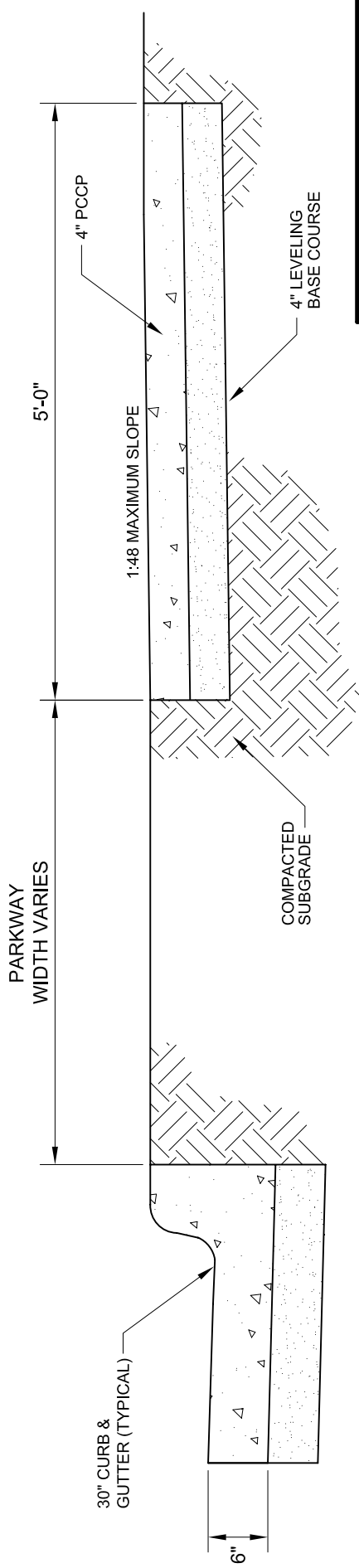
STANDARD CURBWALK  
DETAILS FOR EXISTING  
CONSTRUCTION

302 1

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**NEW RIGHT-OF-WAY CONSTRUCTION  
STANDARD CONCRETE CURBWALK  
(ALTERNATE PROFILE DETAIL)**

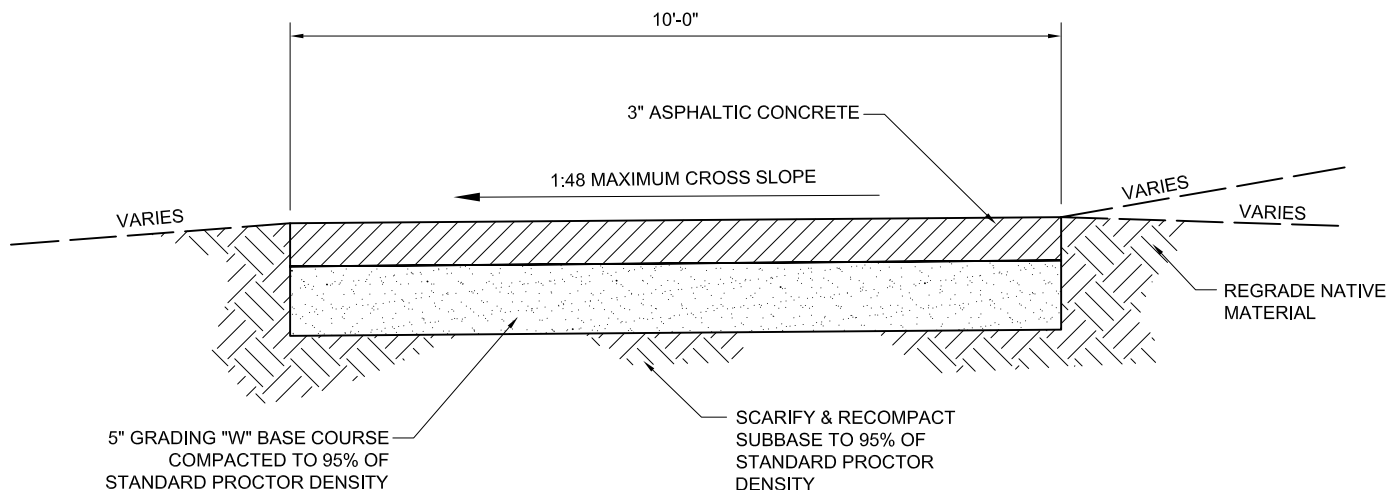


**NEW RIGHT-OF-WAY CONSTRUCTION  
STANDARD CONCRETE CURB AND SIDEWALK**

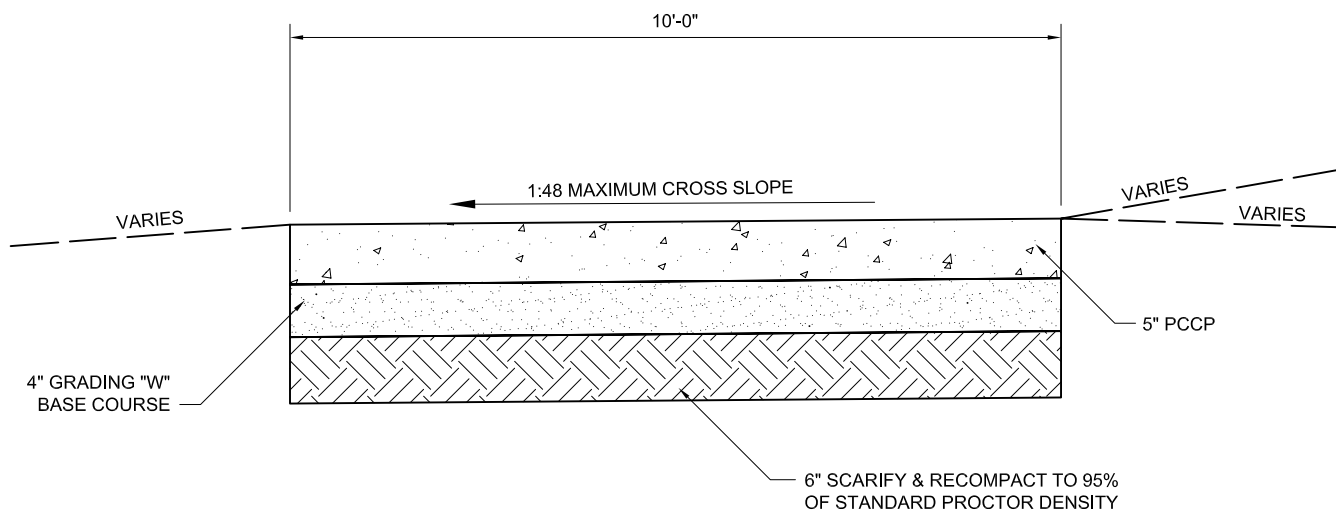
CITY OF CASPER	
ENGINEERING DIVISION	
STANDARD CURBWALK AND SIDEWALK DETAILS	
302	2
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER - Z.T.L.
2	DRAWING STANDARDS REVISIONS
DATE	
5/5/01	
JAN 06	

**STANDARD CURBWALK AND SIDEWALK DETAILS**

NOT TO SCALE



**STANDARD ASPHALT  
PATHWAY SECTION**



**STANDARD CONCRETE  
PATHWAY SECTION**

**STANDARD PATHWAY  
SECTIONS**

NOT TO SCALE

NOTE:

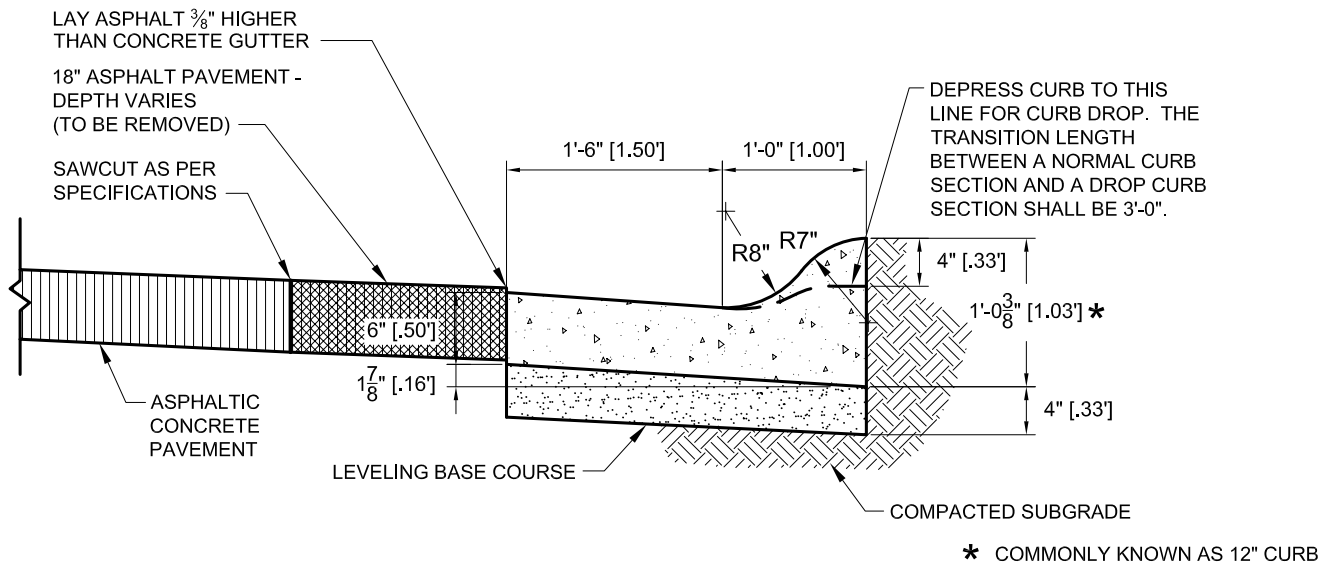
5' CONCRETE PATHWAY  
TYPICAL SECTION SHALL  
CONSIST OF 4" PCCP  
AND 4" BASE COURSE.

*CITY OF CASPER  
ENGINEERING DIVISION*

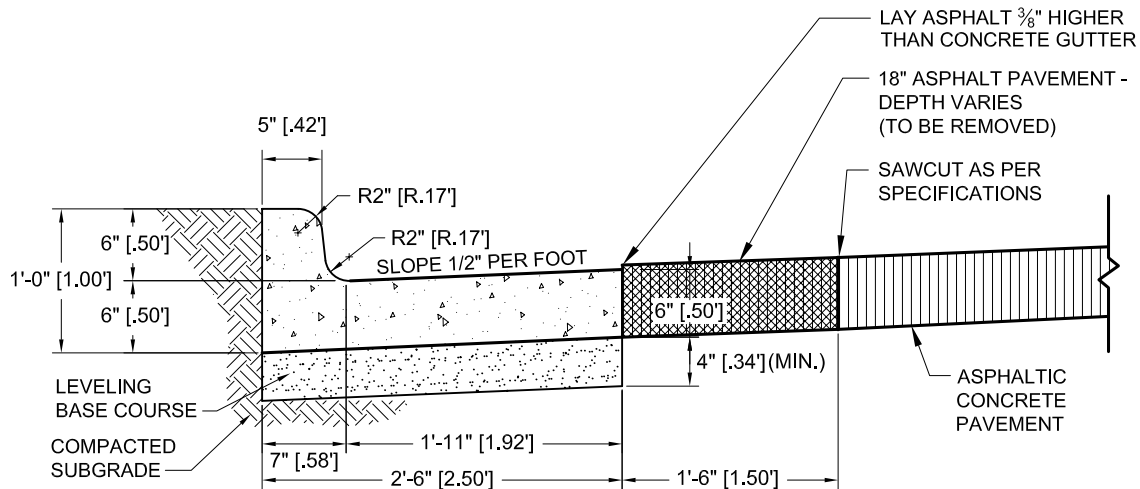
**STANDARD PATHWAY  
SECTIONS**

**302  
3**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**30" CONCRETE CURB & GUTTER  
TYPE A**



**30" CONCRETE CURB & GUTTER  
TYPE B**

**TYPICAL CONCRETE CURB  
& GUTTER SECTIONS**  
NOT TO SCALE

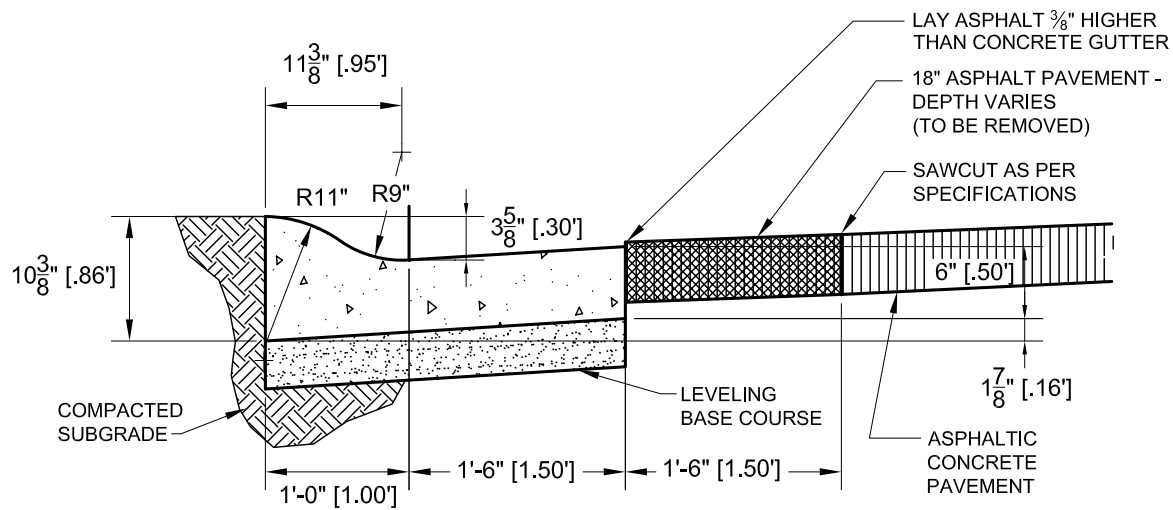
*CITY OF CASPER  
ENGINEERING DIVISION*

**STANDARD CURB WALK  
DETAILS FOR EXISTING  
CONSTRUCTION**

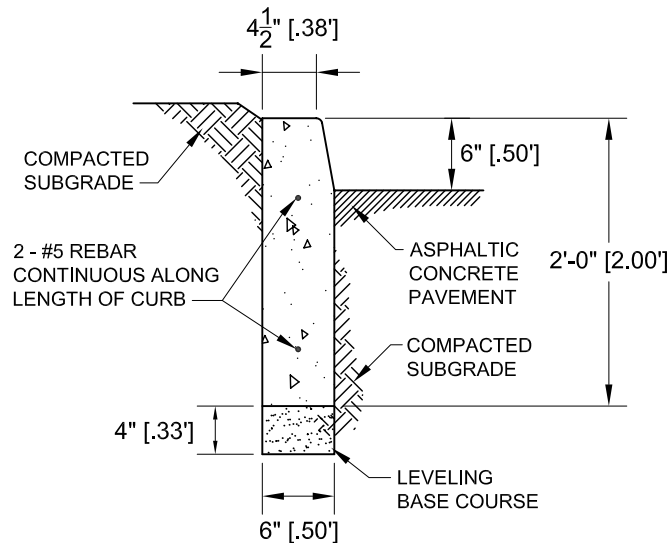
**302  
4**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER - Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06





**TYPE A-1  
30" CONCRETE CURB & GUTTER**

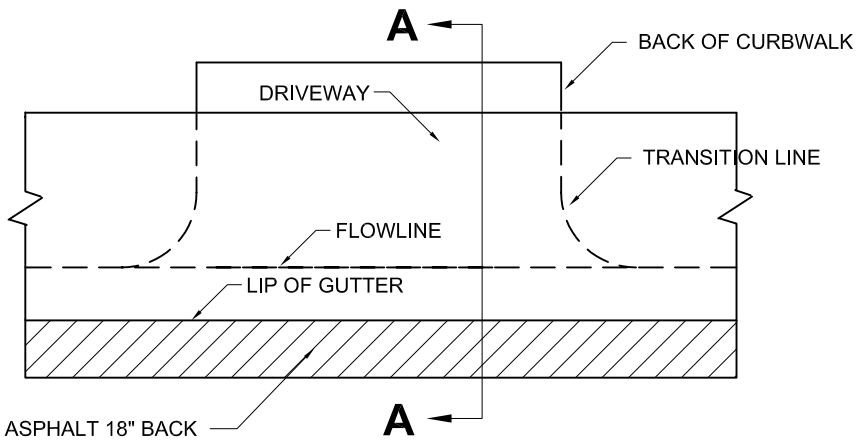


**VERTICAL 24" CONCRETE  
CURB & GUTTER**

**TYPICAL CONCRETE CURB  
& GUTTER SECTIONS**

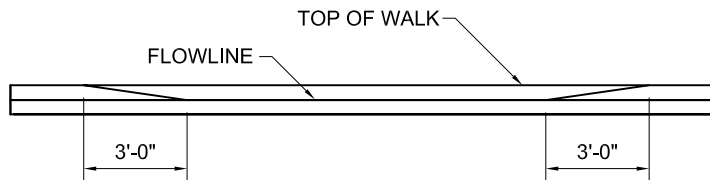
NOT TO SCALE

CITY OF CASPER ENGINEERING DIVISION		
STANDARD CURBWALK DETAILS FOR EXISTING CONSTRUCTION		
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER - Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06
		302/5

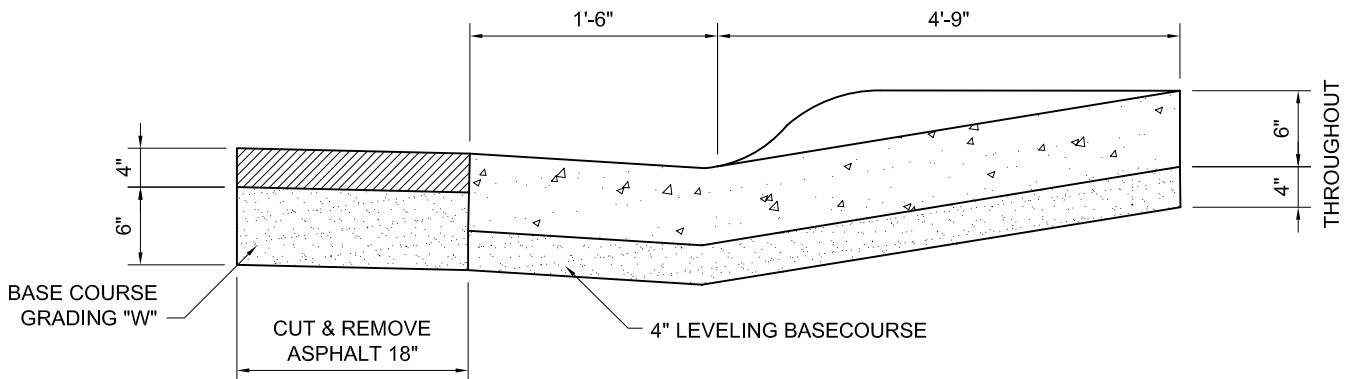


CUT AND REMOVE ASPHALT 18" BACK FROM LIP OF GUTTER. PLACE GRADING "W" BASECOURSE, BACKFILL AND COMPACT TO TOP ASPHALT ELEVATION. EXCEPTIONS MAY BE GRANTED BY CITY ENGINEER.

### CURBWALK PLAN AT DRIVEWAY



### ELEVATION



### SECTION A-A

### TYPICAL CURB CUT SECTION FOR EXISTING CONSTRUCTION

NOT TO SCALE

#### NOTES:

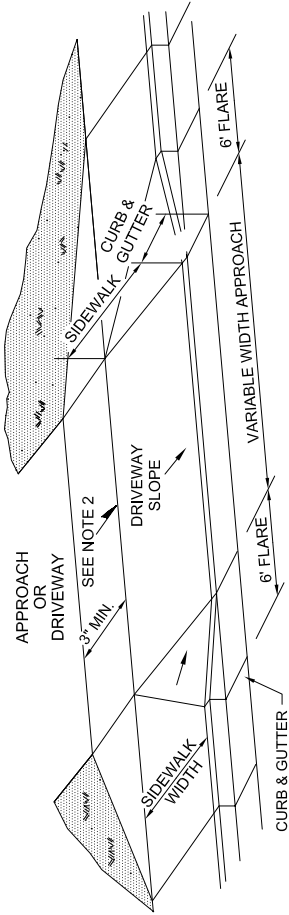
1. REINFORCING FOR DRIVEWAY SECTIONS SHALL CONSIST OF NO. 3 REBAR AT 18" ON CENTER EACH WAY OR FIBER-REINFORCED CONCRETE.
2. THE CITY OF CASPER DOES NOT PAVE BACK FOR COMMERCIAL PROPERTIES, SITE PLANS, SUBDIVISION DEVELOPMENT, NEW CONSTRUCTION, ETC.

*CITY OF CASPER  
ENGINEERING DIVISION*

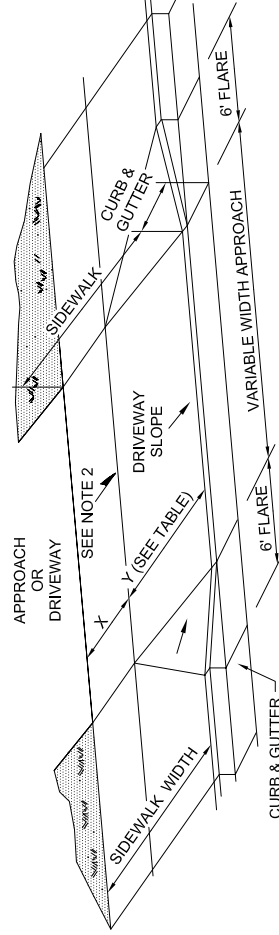
TYPICAL CURB CUT SECTION FOR EXISTING CONSTRUCTION

302  
6

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DRAWING STANDARDS REVISIONS	JAN 06

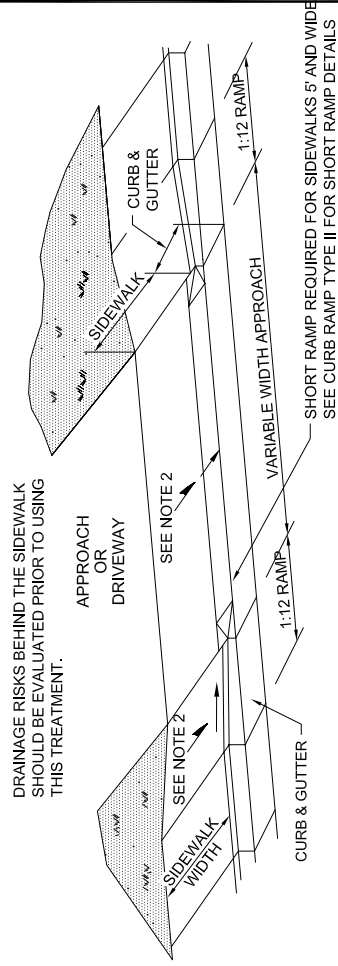


**PEDESTRIAN SIDEWALK WITH EXTERNAL BYPASS**  
(PREFERRED APPROACH FOR SIDEWALK ADJACENT TO CURB  
AND WHERE RIGHT-OF-WAY PERMITS CONSTRUCTION)

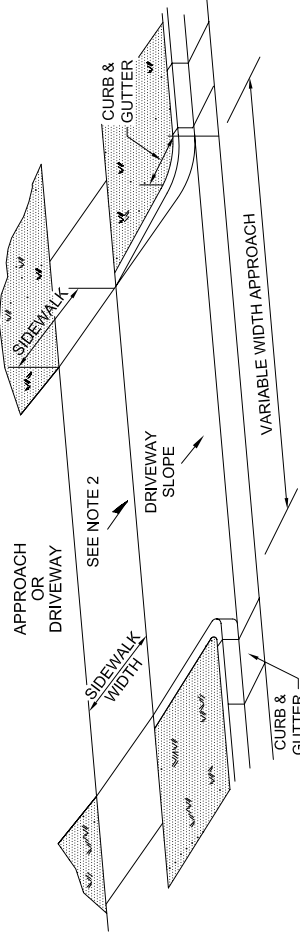


**PEDESTRIAN SIDEWALK WITH INTERNAL BYPASS**  
(DESIRABLE TO USE WITH SIDEWALK WIDTHS 8' AND WIDER, BUT  
ACCEPTABLE FOR NARROWER SIDEWALKS WHEN EXTERNAL  
BYPASS OR DEPRESSED SIDEWALK IS NOT FEASIBLE DUE TO  
AVAILABLE RIGHT-OF-WAY OR DRAINAGE CONCERNS)

SIDEWALK WIDTH	X	Y
5'	3'	2'
6'	4'	2'
7'	4'	3'
8'	4'	4'
9'	4.5'	4.5'
>9'	VARIES	5'

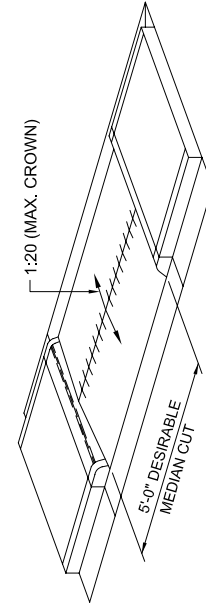


**DEPRESSED PEDESTRIAN SIDEWALK**  
(DESIRABLE APPROACH WHEN DRAINAGE  
BEHIND SIDEWALK IS NOT A PROBLEM)



**DETACHED PEDESTRIAN SIDEWALK**  
(MOST DESIRABLE TREATMENT)

## TYPICAL SIDEWALK AND/OR DOUBLE GUTTER TREATMENT AT APPROACHES



### NOTES:

1. RAMP SLOPE: RAMP SLOPE SHALL BE 1:12. RAMP SLOPE SHALL NOT EXCEED 1:12.
2. CROSS SLOPE: POSITIVE DRAINAGE SHALL BE PROVIDED BY SLOPING SIDEWALK AND/OR RAMP TOWARDS THE STREET AT 1:48. CROSS SLOPE SHALL NOT EXCEED 1:48.

## MEDIAN OR ISLAND CUT

## DRIVEWAYS, APPROACHES AND MEDIAN CUTS

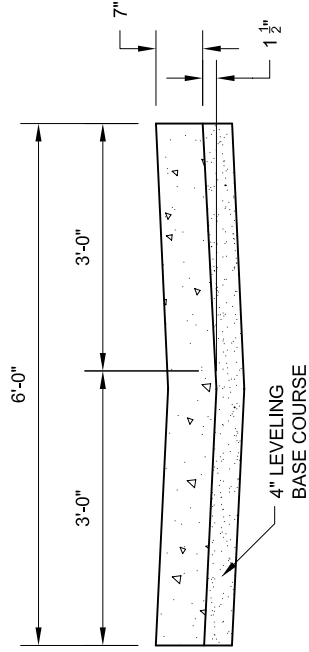
NOT TO SCALE

## CITY OF CASPER ENGINEERING DIVISION

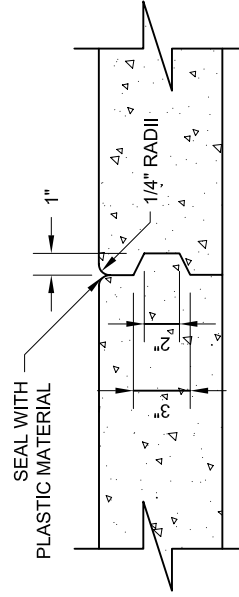
## DRIVEWAYS, APPROACHES & MEDIAN CUTS FOR ADA ACCESSIBILITY

302 7

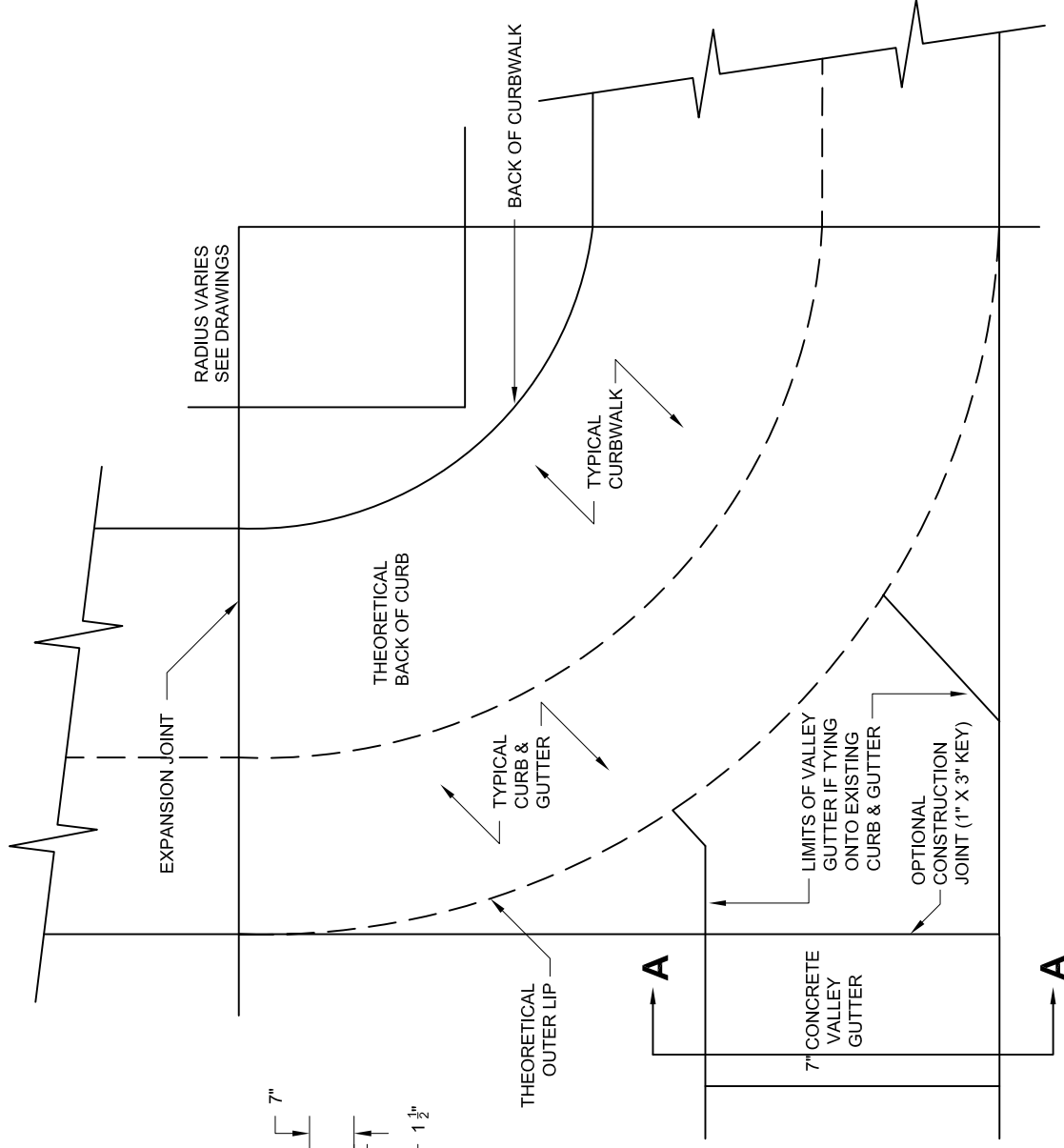
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	8/14/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**SECTION A-A**



**TYPICAL KEYED  
CONSTRUCTION JOINT**



**CITY OF CASPER  
ENGINEERING DIVISION**

**STANDARD VALLEY  
GUTTER SECTIONS**

**302 / 8**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DIMENSION CHANGE	6/17/03
3	DRAWING STANDARDS REVISIONS	JAN 06

**STANDARD VALLEY  
GUTTER SECTIONS  
NOT TO SCALE**

NOTES:

1. RADIUS LENGTH SHALL BE AS SPECIFIED IN SUBDIVISION ORDINANCE.
2. VALLEY GUTTERS SHALL BE REINFORCED WITH WWF 4 X 4 X W4 X W4 OR POLYPROPYLENE FIBERS OR #3 REBAR AT 18" ON CENTER EACH WAY.

GENERAL SIDEWALK REQUIREMENTS

SIDEWALKS SHALL BE CONSTRUCTED TO PROVIDE ACCESSIBILITY CONSISTENT WITH THESE SPECIFICATIONS AND ADA STANDARDS UNLESS OTHERWISE SHOWN IN THE PLANS OR DIRECTED BY THE ENGINEER.

MINIMUM SIDEWALK WIDTH SHALL BE 5 FEET WHENEVER POSSIBLE. SIDEWALKS NARROWER THAN 5 FEET SHALL PROVIDE PASSING ZONES SPACED NO GREATER THAN 200 FEET AND MUST BE A MINIMUM OF 5 FEET BY 5 FEET. THE MINIMUM WIDTH FOR AN ACCESSIBILITY ROUTE IS 36".

THE CROSS-SLOPE ON SIDEWALKS AND CURB RAMPS SHALL NOT EXCEED 1:48. ALL SIDEWALKS SHALL BE SLOPED 1:48 TOWARDS THE CURB AND GUTTER, UNLESS OTHERWISE INDICATED TO PROVIDE POSITIVE DRAINAGE. SIDEWALKS SHALL PROVIDE A MINIMUM OF 36" CLEAR PASSAGE AROUND DRIVEWAYS AND OTHER FEATURES TO PREVENT EXCEEDING THE MAXIMUM CROSS-SLOPE.

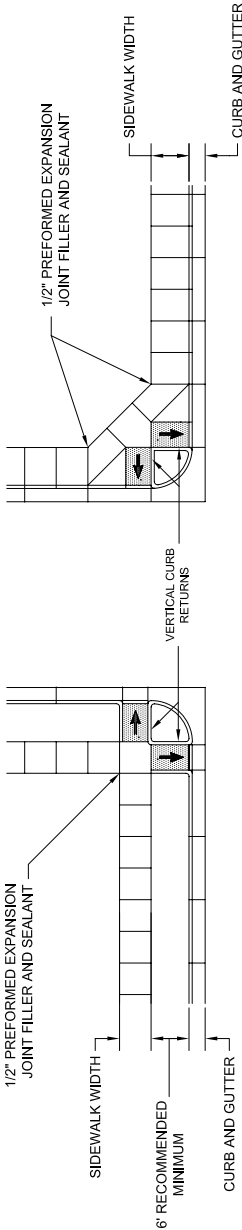
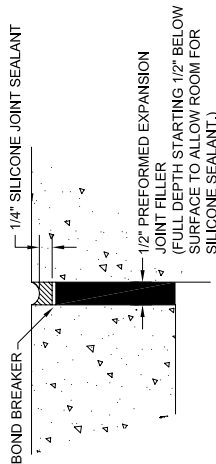
CURB RAMPS SHALL BE PROVIDED AT STREET INTERSECTIONS AND ELSEWHERE AS SHOWN ON THE PLANS. RAMPS SHALL ALSO BE PROVIDED MID BLOCK IN THE VICINITY OF HOSPITALS, MEDICAL CENTERS, ATHLETIC STADIUMS, REST AREAS, DESIGNATED HANDICAP PARKING AREAS AND AT ANY OTHER LOCATION WHERE A CROSSWALK OR WHEELCHAIR ACCESS IS NEEDED AS DETERMINED BY THE ENGINEER.

CURB RAMPS SHALL BE MEASURED AND PAID FOR AS CONCRETE SIDEWALK AND WILL INCLUDE CURB RETURNS AND INTERIOR CURBS. THE AREA OF THE CURB RAMP THAT FALLS ON THE STREET SIDE OF THE BACK OF CURB LINE WILL BE MEASURED AND PAID FOR AS CURB AND GUTTER OR AS DETERMINED BY THE ENGINEER.

STREET DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH CURB RAMPS NOR IN THE PATH OF PEDESTRIANS. GRATINGS AND ACCESS COVERS SHALL NOT BE PLACED IN SIDEWALK CURB RAMPS.

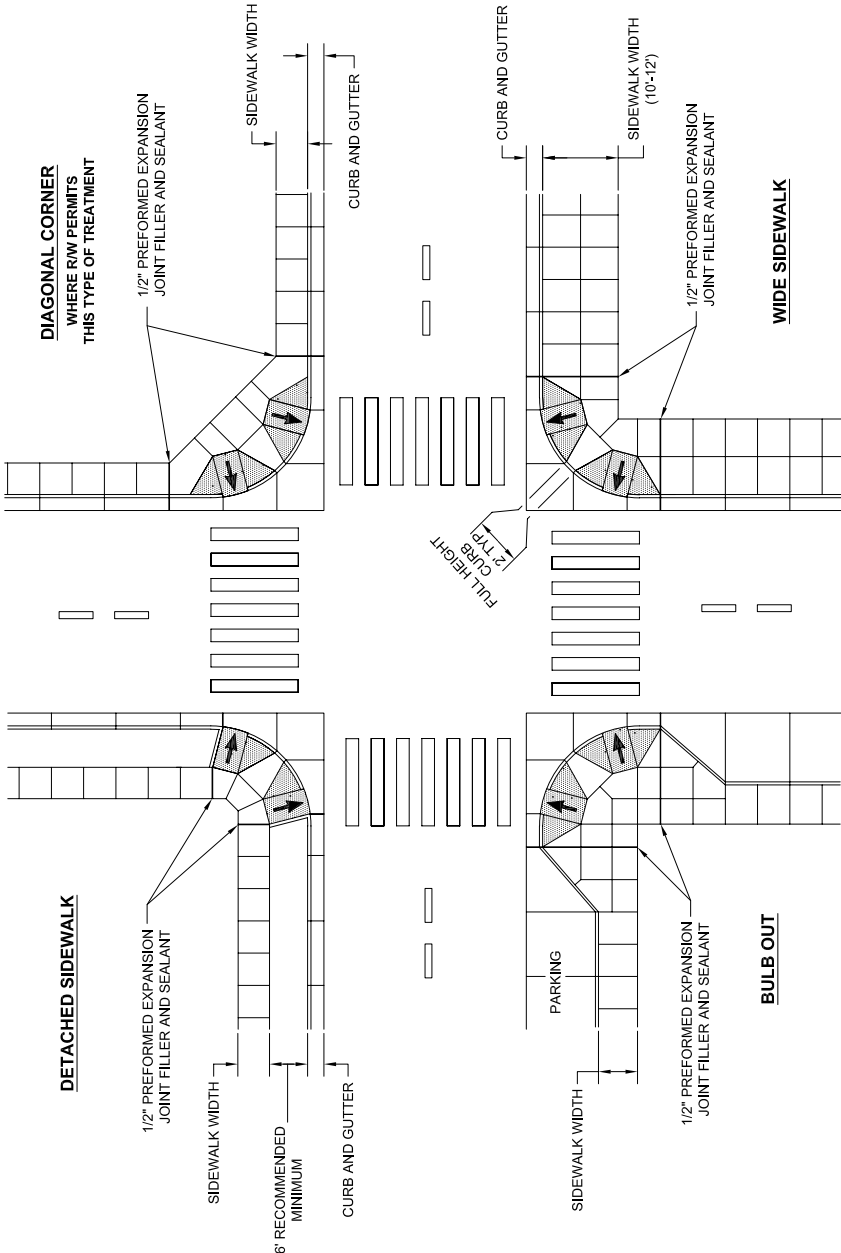
SIDEWALKS AND CURB AND GUTTER SHALL BE CONSTRUCTED WITH 1/2" PREFORMED EXPANSION JOINT FILLER AT RADIUS POINTS, JUNCTIONS WITH EXISTING CONCRETE, INTERSECTIONS OF CONCRETE SIDEWALK RUNS, AT THE JUNCTURE OF CURB AND GUTTER AND SIDEWALK WHEN THE STREET PAVEMENT IS CONCRETE, AROUND INLETS, AROUND MANHOLES, AROUND OTHER STRUCTURES AND AT INTERVALS. PREFORMED EXPANSION JOINTS SHALL BE SEALED WITH AN APPROVED SILICONE JOINT SEALANT.

CURB RAMPS SHALL BE TYPE I OR TYPE II MODIFIED UNLESS OTHERWISE SHOWN IN PLANS. IF NO RAMP TYPE IS SPECIFIED AND EXISTING CONDITIONS DO NOT PERMIT ADEQUATE CLEAR RIGHT OF WAY, TYPE II OR TYPE III RAMPS MAY BE INSTALLED DEPENDING ON THE GIVEN SIDEWALK WIDTH.



DETACHED SIDEWALK - BACK TO BACK RAMPS

DIAGONAL CORNER- BACK TO BACK RAMP

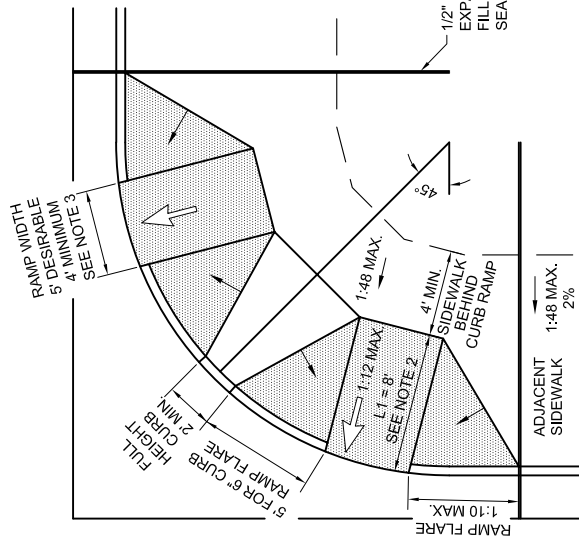


TYPICAL CURB RAMP TYPE I TREATMENTS

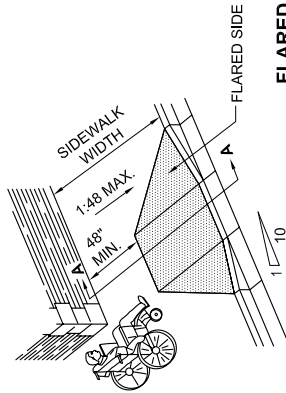
GENERAL SIDEWALK REQUIREMENTS FOR ADA ACCESSIBILITY

NOT TO SCALE

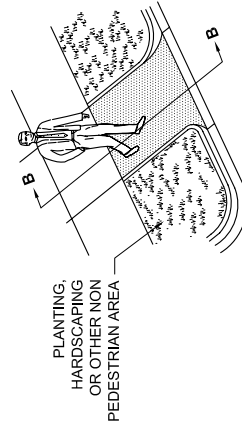
CITY OF CASPER ENGINEERING DIVISION		GENERAL SIDEWALK REQUIREMENTS FOR ADA ACCESSIBILITY		302	9
REV.	DESCRIPTION	DATE			
1	REDRAFTED ONTO COMPUTER- Z.T.L.	8/7/01			
2	DRAWING STANDARDS REVISIONS	JAN 06			



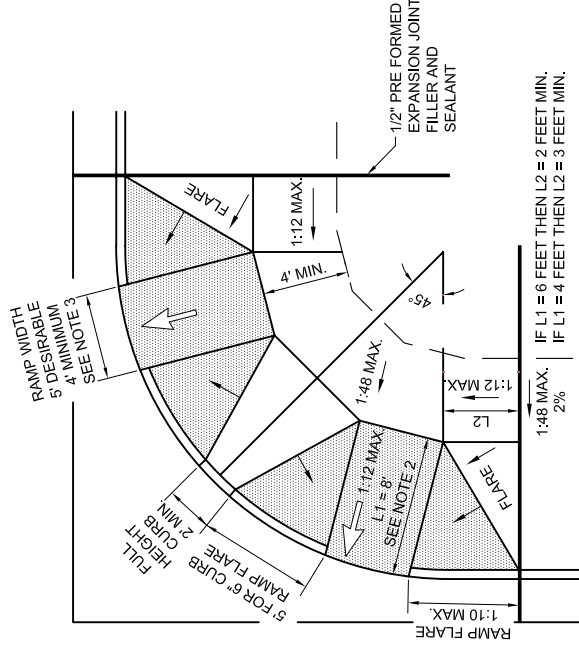
**TYPICAL TYPE I (PERPENDICULAR) CORNER RAMPS**



**FLARED CURB TREATMENT**

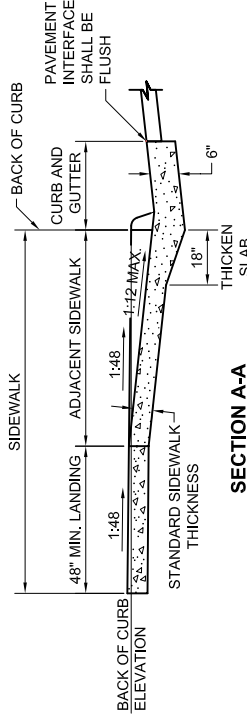


**VERTICAL CURB RETURNS**

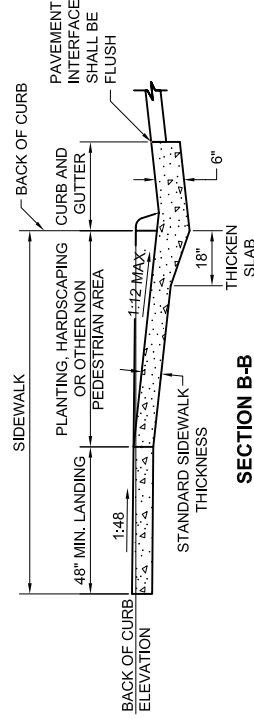


**MODIFIED TYPE I (COMBINED) CORNER RAMPS**

SEE NOTES 2A & 2B



**SECTION A-A**



**SECTION B-B**

**TYPE I (PERPENDICULAR) CURB RAMP REQUIREMENTS**  
TYPE I CURB RAMPS SHALL BE CONSTRUCTED WHEN AVAILABLE RIGHT-OF-WAY PERMITS THEIR USE.

- RAMP SLOPE:** THE RAMP SLOPE SHOULD NOT EXCEED 1:12. ADA ALLOWS A MAXIMUM SLOPE OF 1:10 IN EXISTING FACILITIES WHERE A 1:12 IS NOT POSSIBLE AS DEFINED IN ADA AS SITE INFEASIBILITY.
- RAMP LENGTH:** THE RAMP LENGTH BECOMES 8' FOR A 6" CURB WHEN THE RAMP RISES ON A 1:12 TO CATCH THE ADJACENT SIDEWALK WHICH IS ALSO RISING ABOVE THE TOP OF CURB ELEVATION ON A 1:48 CROSS SLOPE. IF A PLANTING OR OTHER NON PEDESTRIAN AREA IS ADJACENT TO THE SIDEWALK AND THE RAMP ONLY HAS TO RISE 6" THE RAMP LENGTH IS 6'.
- RAMP LENGTH:** WARPING THE INTERSECTION USING A COMBINED RAMP SYSTEM REDUCES THE HEIGHT THE RAMP MUST RISE THEREBY REDUCING THE LENGTH OF THE PERPENDICULAR RAMP.
- RAMP WIDTH:** PERPENDICULAR RAMPS SHOULD BE 5' WHERE POSSIBLE, 4' IN OTHER LOCATIONS, AND WHERE SITE INFEASIBILITY EXISTS ABSOLUTELY NO NARROWER THAN 3'.
- LEVEL LANDINGS:** A LEVEL LANDING (I.E. MAX. SLOPE IN ANY DIRECTION DOES NOT EXCEED 1:48) SHALL BE PROVIDED AT THE TOP OF THE RAMP AND BE 48" MINIMUM IN THE LONGITUDINAL DIRECTION OF THE RAMP TO ALLOW FOR WHEELCHAIRS TURNING ONTO THE RAMP.

**5. FLARED VS VERTICAL CURB RETURNS:** FLARED SIDE RETURNS ARE REQUIRED WHEN SIDEWALK IS LOCATED ADJACENT TO THE RAMP (SEE DETAIL). THE FLARE RATE ALONG THE CURB LINE SHALL NOT EXCEED 1:10. IF THE SIDES OF THE RAMP ARE ADJACENT TO A PLANTING, STRUCTURE OR OTHER NON PEDESTRIAN SURFACE, THE CURB RETURNS CAN BE VERTICAL. CURB RETURNS AND FLARES WILL BE MEASURED AND PAID FOR AS SIDEWALK.

**6. DIAGONAL VS DUAL CURB RAMPS:** SINGLE DIAGONAL WHEELCHAIR RAMPS FOR INTERSECTIONS WITH TWO DIRECTIONS OF PEDESTRIAN MOVEMENT TEND TO CREATE MORE MOTOR VEHICLE CONFLICTS WITH PEDESTRIANS AND ARE DISCOURAGED. SITE INFEASIBILITY CONDITIONS MAY DICTATE A SINGLE DIAGONAL WHEELCHAIR BUT IS ONLY PERMITTED WHERE SHOWN IN THE PLANS OR DETERMINED BY THE ENGINEER.

**7. INTERSECTION LOCATION:** CURB RAMPS SHALL BE LOCATED AS CLOSE TO THE INTERSECTION AS POSSIBLE AND SHALL BE FULLY CONTAINED WITHIN PEDESTRIAN CROSSING MARKINGS WHERE PRESENT. CURB RAMPS SHALL BE PERPENDICULAR TO THE CURB AS SHOWN.

**8. COLORED CURB RAMPS:** SHADED AREAS REPRESENT WHERE COLORED CONCRETE IS REQUIRED TO PROVIDE CONTRAST. FOR TYPICAL "GREY CONCRETE", CURB RAMPS SHALL BE COLORED WITH RED PIGMENT IN THE CONCRETE UNLESS OTHERWISE SHOWN IN PLANS.

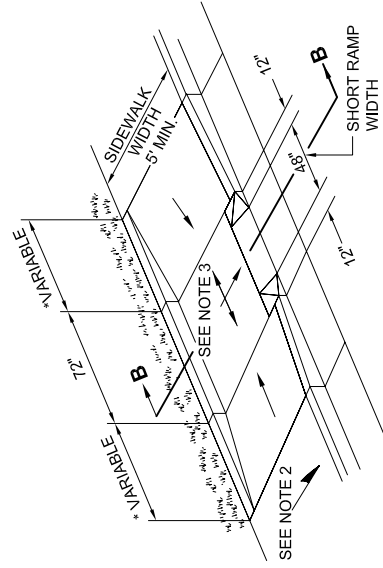
**CITY OF CASPER  
ENGINEERING DIVISION**

**TYPE I PERPENDICULAR CURB RAMPS  
FOR ADA ACCESSIBILITY**

**302 10**

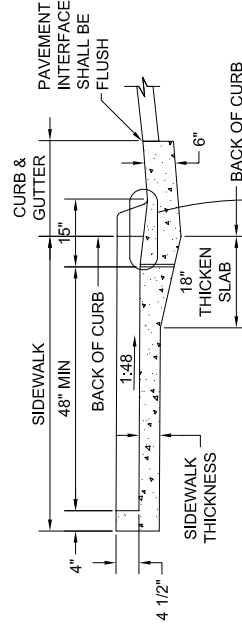
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	8/13/01
2	DRAWING STANDARDS REVISIONS	JAN 06

**TYPE I (PERPENDICULAR) CURB RAMPS  
NOT TO SCALE**

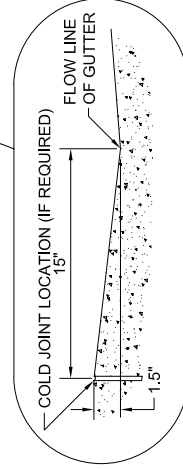


\* VARIABLE LENGTH BASED ON RUNNING SLOPE OF SIDEWALK.  
FOR FLAT CONDITIONS AND CURB HEIGHT = 6";  
ELEVATION OF FLOW LINE = 0"  
ELEVATION OF LANDING = 1.5"  
RISE OF PARALLEL RAMPS = 4.5"  
VARIABLE DIMENSION = 4.5'

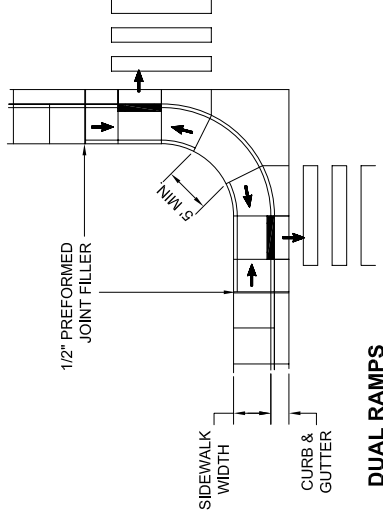
**CURB RAMP TYPE II**  
(MODIFIED PARALLEL CURB RAMP)



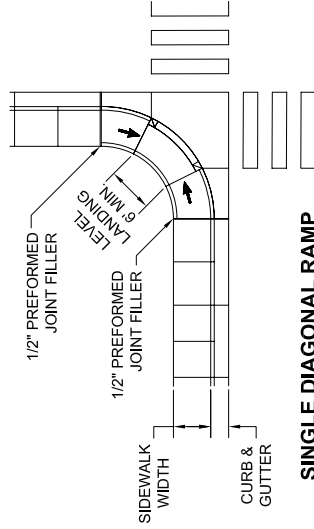
**SECTION B-B**



**SHORT RAMP DETAIL**



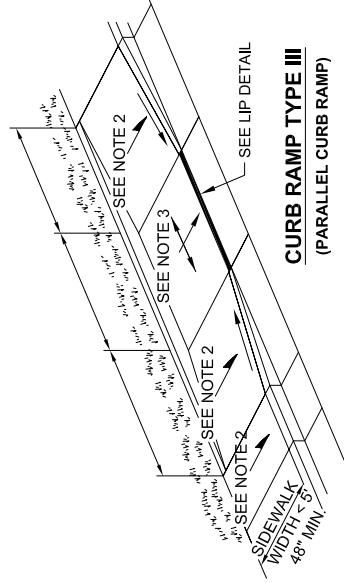
**DUAL RAMPS**



**SINGLE DIAGONAL RAMP**

**TYPICAL CURB RAMP TYPE II & TYPE III TREATMENTS**  
(TYPE II RAMPS SHOWN)

FOR SIDEWALK WIDTHS 5' AND GREATER - USE TYPE II  
FOR SIDEWALK WIDTHS LESS THAN 5' - USE TYPE III



**CURB RAMP TYPE III**  
(PARALLEL CURB RAMP)

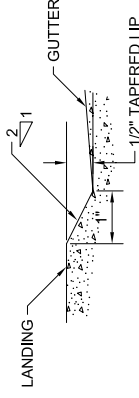
## TYPE II & TYPE III (PARALLEL) CURB RAMPS

NOT TO SCALE

### TYPE II & TYPE III (PARALLEL) CURB RAMP REQUIREMENTS

TYPE II AND TYPE III (PARALLEL) CURB RAMPS SHALL BE CONSTRUCTED ONLY WHEN EXISTING SIRE CONDITIONS DO NOT PERMIT THE USE OF TYPE I OR TYPE I MODIFIED CURB RAMPS. TYPE II AND III RAMPS ARE LESS DESIRABLE DUE TO STRAINED TURNING MOVEMENTS IN WHEELCHAIRS AND DRAINAGE (INCLUDING ICING) PROBLEMS ASSOCIATED WITH THE LANDING AREA.

- RAMP SLOPE:** RAMP SLOPE SHALL BE 1:12. RAMP SLOPE SHALL NOT EXCEED 1:12 EXCEPT FOR SHORT RAMPS AS SHOWN HEREIN.
- CROSS SLOPE:** POSITIVE DRAINAGE SHALL BE PROVIDED BY SLOPING SIDEWALK AND/OR RAMP TOWARDS STREET AT 1:48. CROSS SLOPE SHALL NOT EXCEED 1:48.
- LANDING SLOPE:** LANDING SLOPE SHALL NOT EXCEED 1:48 IN ANY DIRECTION. POSITIVE DRAINAGE SHALL BE PROVIDED TOWARDS THE STREET AS SHOWN BY SINGLE TIP ARROW. LANDING CAN BE SLOPED IN EITHER DIRECTION TO A MAXIMUM OF 1:48 AS SHOWN BY DOUBLE TIP ARROW.
- SINGLE DIAGONAL VS. DUAL CURB RAMPS:** DUAL CURB RAMPS ARE STRONGLY PREFERRED, HOWEVER, WITH TYPE II AND TYPE III RAMPS, IT MAY BE NECESSARY AT SOME LOCATIONS TO PROVIDE ONLY ONE SINGLE DIAGONAL RAMP AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
- COLORS CURB RAMPS:** SHADED AREAS REPRESENT WHERE COLORED CONCRETE IS REQUIRED TO PROVIDE CONTRAST. FOR TYPICAL "GREY CONCRETE" CURB RAMPS SHALL BE COLORED WITH A RED PIGMENT IN THE CONCRETE UNLESS OTHERWISE SHOWN IN THE PLANS.
- LIP DETAIL:** TYPE III CURB RAMPS WILL REQUIRE THE FOLLOWING LIP DETAIL TO REDUCE THE AMOUNT OF NUISANCE DRAINAGE IN THE LANDING AREA.

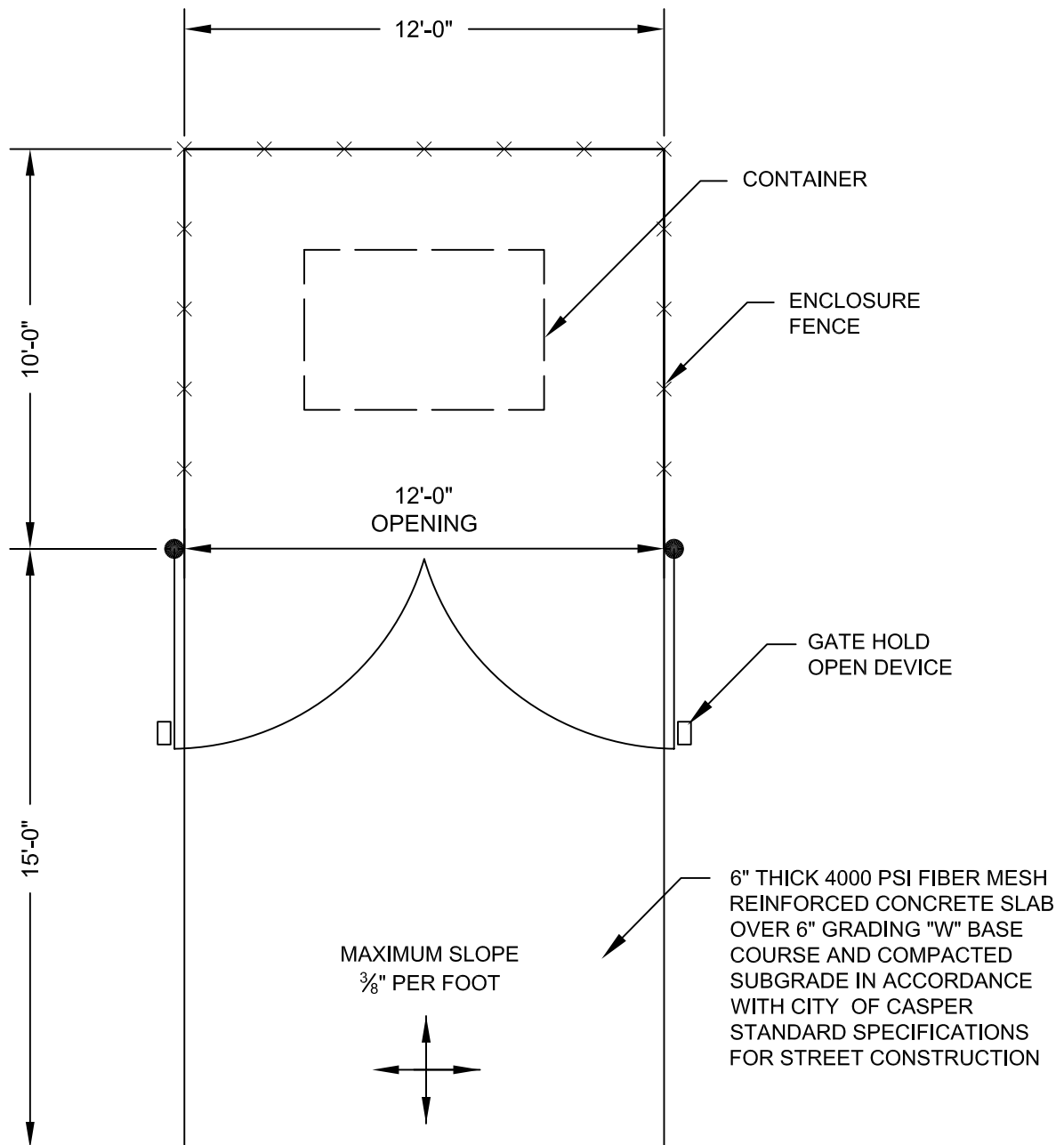


**LIP DETAIL**

## CITY OF CASPER ENGINEERING DIVISION

TYPE II & TYPE III (PARALLEL) CURB RAMPS  
FOR ADA ACCESSIBILITY **302.11**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	8/15/01
2	DRAWING STANDARDS REVISIONS	JAN 06



## **MINIMUM STANDARDS FOR COMMERCIAL SANITATION CONTAINER FACILITY**

### **NOTES:**

1. PROVIDE FOR STRAIGHT APPROACH TO CONTAINER BY SERVICE VEHICLE.
2. PROVIDE FOR A MINIMUM OVERHEAD CLEARANCE OF 15' ABOVE GRADE.
3. ORIENT TO MINIMIZE BACKING MOVEMENTS REQUIRED BY SERVICE VEHICLE.

NOT TO SCALE

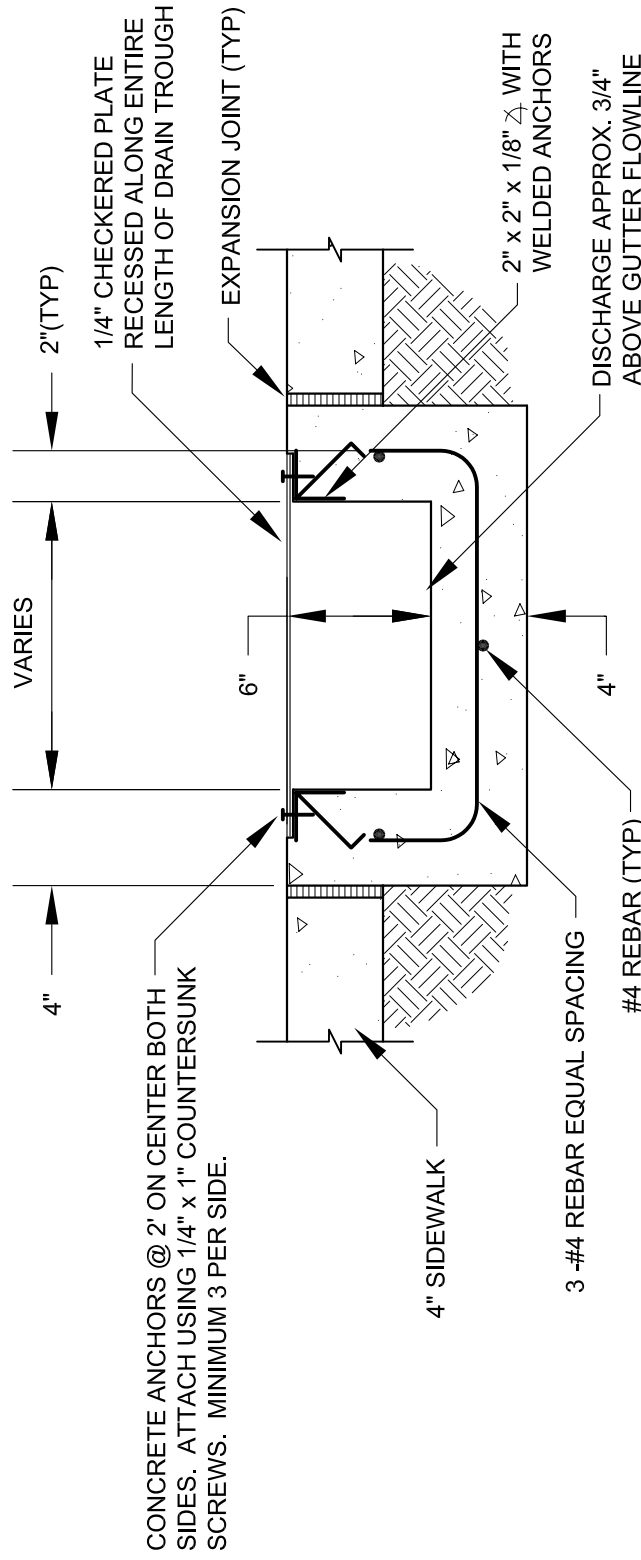
*CITY OF CASPER  
ENGINEERING DIVISION*

**MINIMUM STANDARDS FOR  
COMMERCIAL SANITATION  
CONTAINER FACILITY**

**302  
12**

REV.	DESCRIPTION	DATE
1	DRAFTED ONTO COMPUTER- Z.T.L.	4/03/01
2	INCREASE WIDTH OF OPENING TO 12'	3/18/02
3	DRAWING STANDARDS REVISIONS	JAN 06



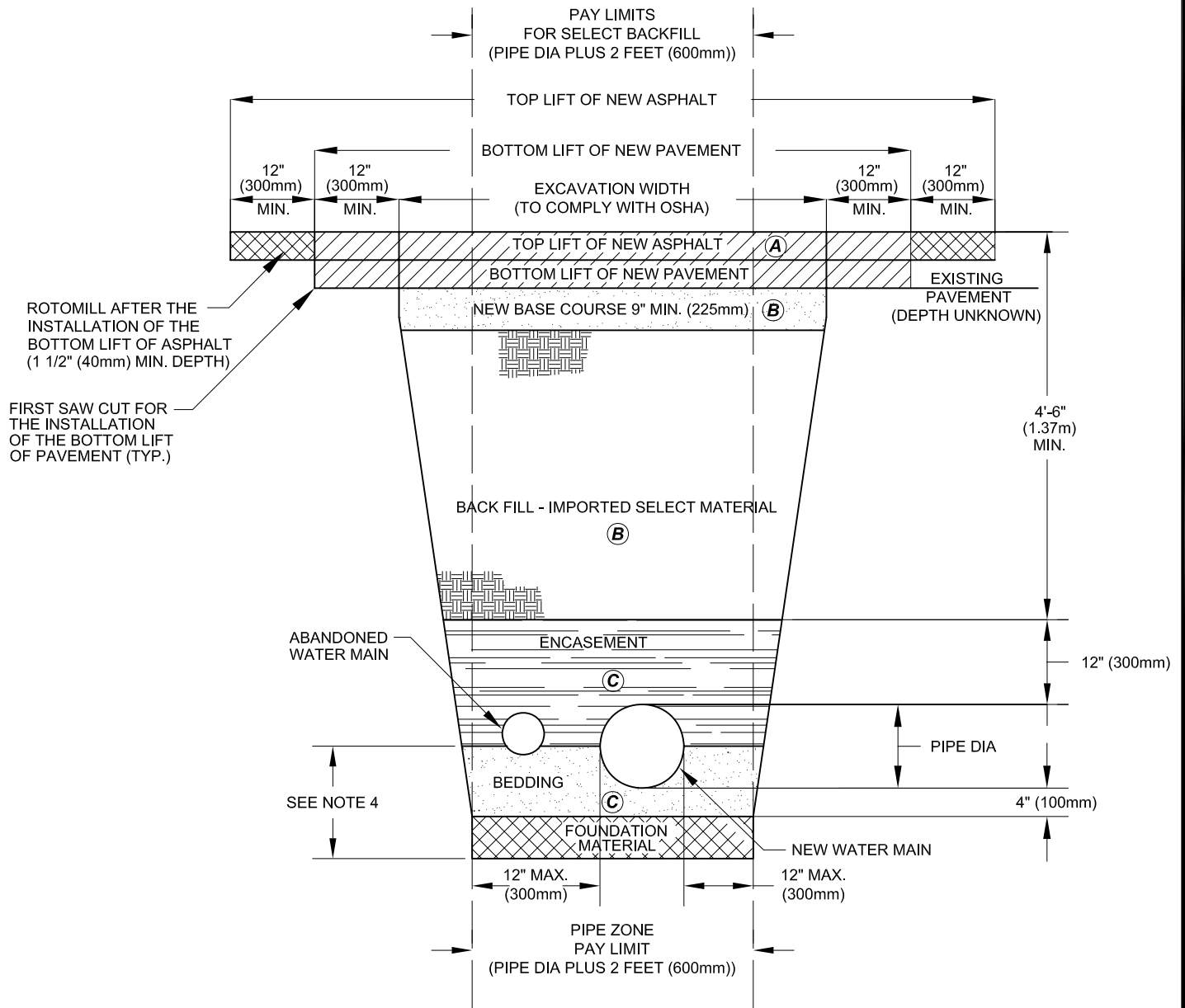


NOTES:

1. CHECKERED PLATE TO BE PAINTED WITH 2 COATS OF RUST-PROOF PAINT PRIOR TO INSTALLATION. COLOR TO MATCH CONCRETE.
2. CONTRACTOR MAY PROPOSE AN OR-EQUAL METHOD OF CONSTRUCTING THE CHECKERED PLATE SYSTEM. MUST BE APPROVED.

CITY OF CASPER ENGINEERING DIVISION	
CONCRETE DRAIN TROUGH DETAILS	
302	13
REV.	DESCRIPTION
1	DRAFTED ONTO COMPUTER- G.D.W.
2	DRAWING STANDARDS REVISIONS
	DATE
	3/28/03
	JAN 06

CONCRETE DRAIN TROUGH DETAIL  
NOT TO SCALE



## TYPICAL STREET CUT SECTION ASPHALT SURFACING

NOT TO SCALE

### NOTES:

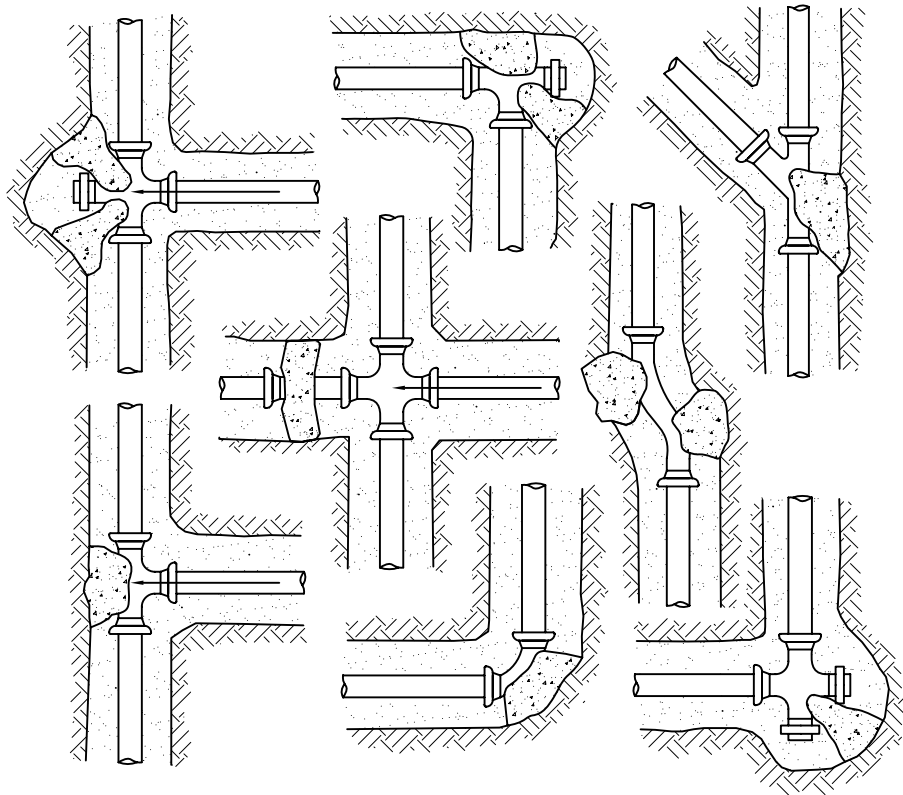
- TACK COAT SHALL BE APPLIED ON ALL SAW CUT AND MILLED INTERFACES BETWEEN EXISTING AND NEW ASPHALT.
- NEW PAVEMENT THICKNESS SHALL MATCH EXISTING.
- DENSITY REQUIRED:
  - (A) =97% MARSHALL DENSITY
  - (B) =95% STANDARD PROCTOR
  - (C) =90% STANDARD PROCTOR
- GRANULAR FOUNDATION MATERIAL IF USED SHALL BE PLACED BELOW AND TO THE MIDPOINT OF THE PIPE.

*CITY OF CASPER  
ENGINEERING DIVISION*

### TYPICAL STREET CUT SECTION ASPHALT SURFACING

**501**  
**1**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DRAWING STANDARDS REVISIONS	JAN 06



**CONCRETE AREA REQUIRED FOR THRUST BLOCKS  
(IN CUBIC FEET)**

<b>FITTING SIZE</b>	<b>TEE &amp; PLUG</b>	<b>90° BEND &amp; FIRE HYDRANT</b>	<b>45 ° BEND</b>	<b>22 1/2° BENDS &amp; REDUCERS</b>	<b>11 1/4° BEND</b>
4" (100mm)	1.50	2.00	1.00	1.00	0.50
6" (150mm)	3.00	4.00	2.50	1.50	1.00
8" (200mm)	5.00	7.00	4.00	2.00	1.00
10" (250mm)	7.50	10.50	6.00	3.00	1.50
12" (300mm)	10.50	14.50	8.00	4.00	2.00
14" (350mm)	14.00	19.50	11.00	5.50	3.00
16" (400mm)	18.00	25.50	14.00	7.00	3.50

THIS TABLE IS BASED ON 150 PSI TEST PRESSURE AND 2000 PSF SOIL BEARING PRESSURE.  
CONTRACTOR SHALL ADJUST SIZE IF NECESSARY TO CONFORM TO EXISTING SOIL CONDITIONS.

**NOTES:**

1. WRAP ALL METALLIC FITTINGS WITH POLYETHYLENE.
2. KEEP CONCRETE AWAY FROM MJ BOLTS.
3. THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED SOIL.
4. THRUST BLOCKS FOR FITTINGS OVER 16" (400mm) SHALL BE SPECIALLY DESIGNED.
5. THRUST BLOCKS FOR REDUCERS FOR PIPES WITH MORE THAN 2" (50mm) DIA DIFFERENCE SHALL BE SPECIALLY DESIGNED.

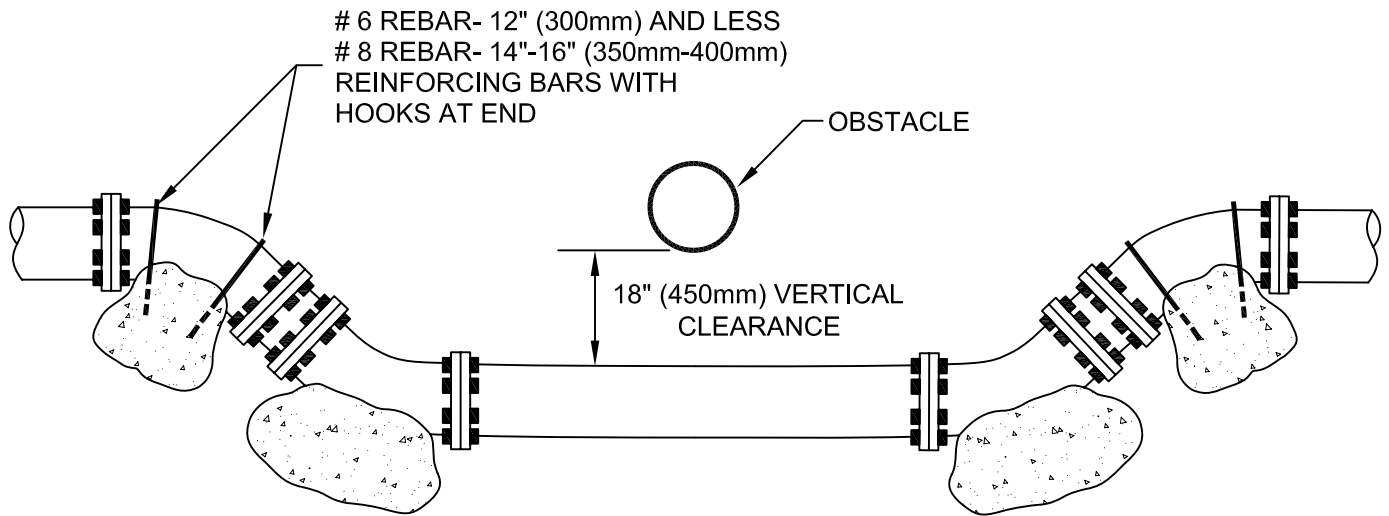
**STANDARD THRUST  
BLOCK DETAIL**  
NOT TO SCALE

*CITY OF CASPER  
ENGINEERING DIVISION*

**STANDARD THRUST  
BLOCK DETAILS**

**501  
2**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/11/01
2	ADD NOTE 5	1/18/05
3	DRAWING STANDARDS REVISIONS	JAN 06



<b>VOLUME OF BLOCK IN CUBIC YARDS FOR UPPER VERTICAL BENDS</b>			
<b>SIZE</b>	<b>45° BEND</b>	<b>22 1/2° BEND</b>	<b>11 1/4° BEND</b>
4" (100mm)	1.10	0.40	0.20
6" (150mm)	2.70	1.00	0.40
8" (200mm)	4.00	1.50	0.60
10" (250mm)	6.00	2.30	0.90
12" (300mm)	8.50	3.20	1.30
14" (350mm)	11.50	4.30	1.80
16" (400mm)	14.80	5.60	2.30

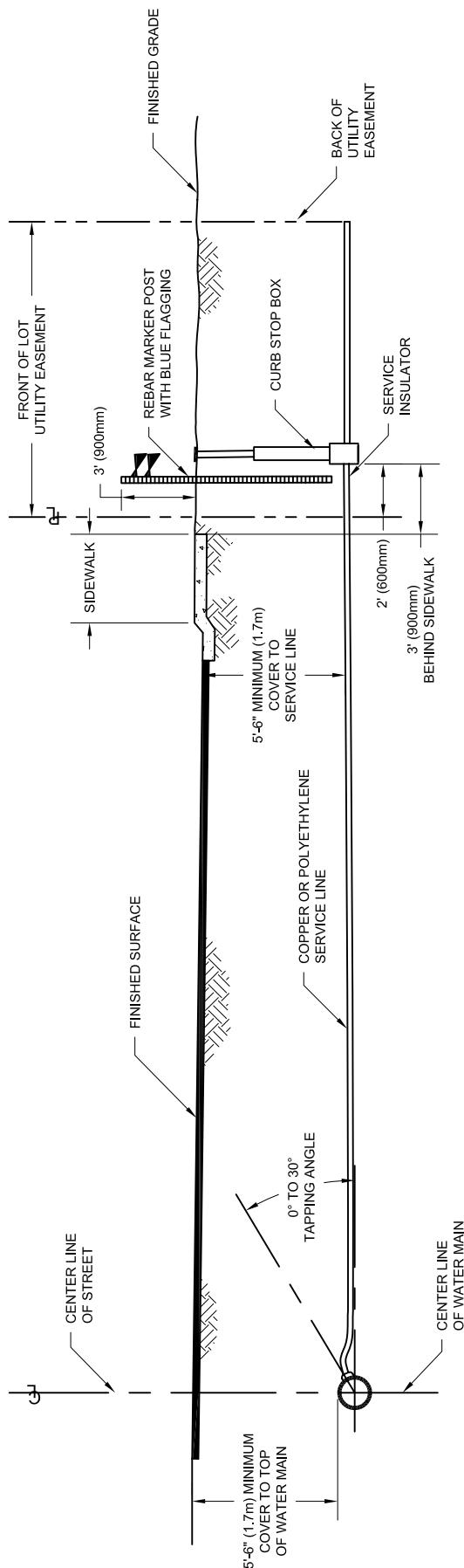
### **TYPICAL WATER MAIN LOWERING DETAIL**

NOT TO SCALE

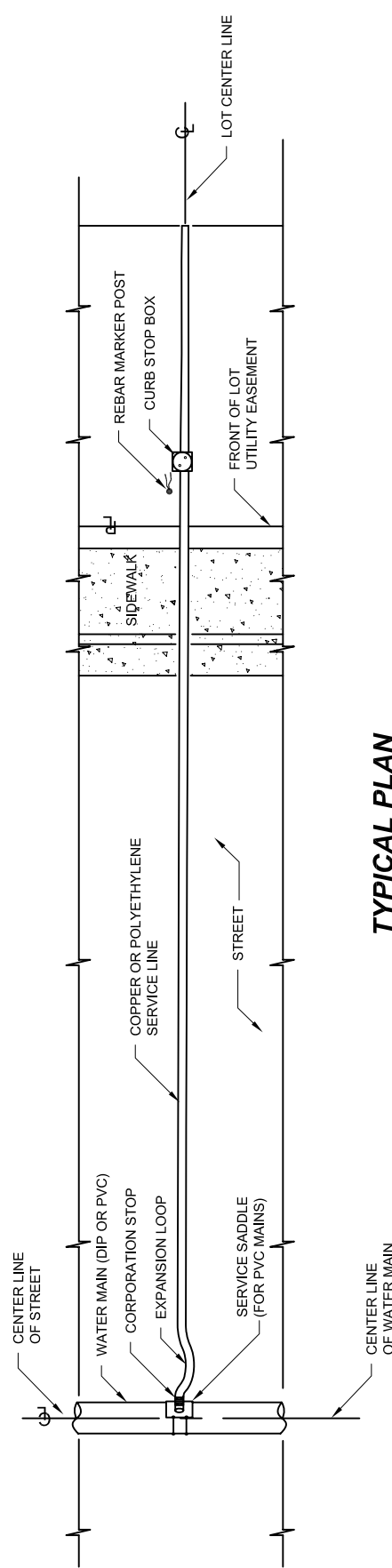
#### **NOTES:**

1. KEEP CONCRETE AWAY FORM MJ BOLTS.
2. COAT EXPOSED REINFORCED BARS, STAINLESS STEEL RODS OR STRAPS WITH BITUMASTIC COATING IN ACCORDANCE WITH SPECIFICATIONS.
3. THRUST BLOCKS FOR LOWER VERTICAL BENDS SHALL ADHERE TO STANDARD THRUST BLOCK DETAILS (DRAWING 501-2.
4. THRUST BLOCKS FOR FITTINGS OVER 16" (400 mm) SHALL BE SPECIALLY DESIGNED.

<b>CITY OF CASPER ENGINEERING DIVISION</b>		
<b>TYPICAL WATER MAIN LOWERING DETAIL</b>		
		<b>501 3</b>
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/12/01
2	ADD NOTE 4	1/17/05
3	DRAWING STANDARDS REVISIONS	JAN 06



**TYPICAL SECTION**



**TYPICAL PLAN**

**NOTES:**

1. WATER SERVICE TO BE LOCATED ON LOT CENTER LINE.
2. SEWER SERVICE TO BE LOCATED AT LEAST 10 FEET (3m) FROM WATER SERVICE LINE ON THE DOWNHILL FLOW SIDE OF SEWER MAIN.
3. A GROUNDWATER BARRIER SHALL BE INSTALLED IN THE SERVICE LINE TRENCH ON THE PROPERTY LINE.

CITY OF CASPER  
ENGINEERING DIVISION

501

4

DATE

1/16/01

REDRAFTED ONTO COMPUTER- Z.T.L.

JAN 06

REV.

1

DESCRIPTION

REBARS ONTO COMPUTER- Z.T.L.

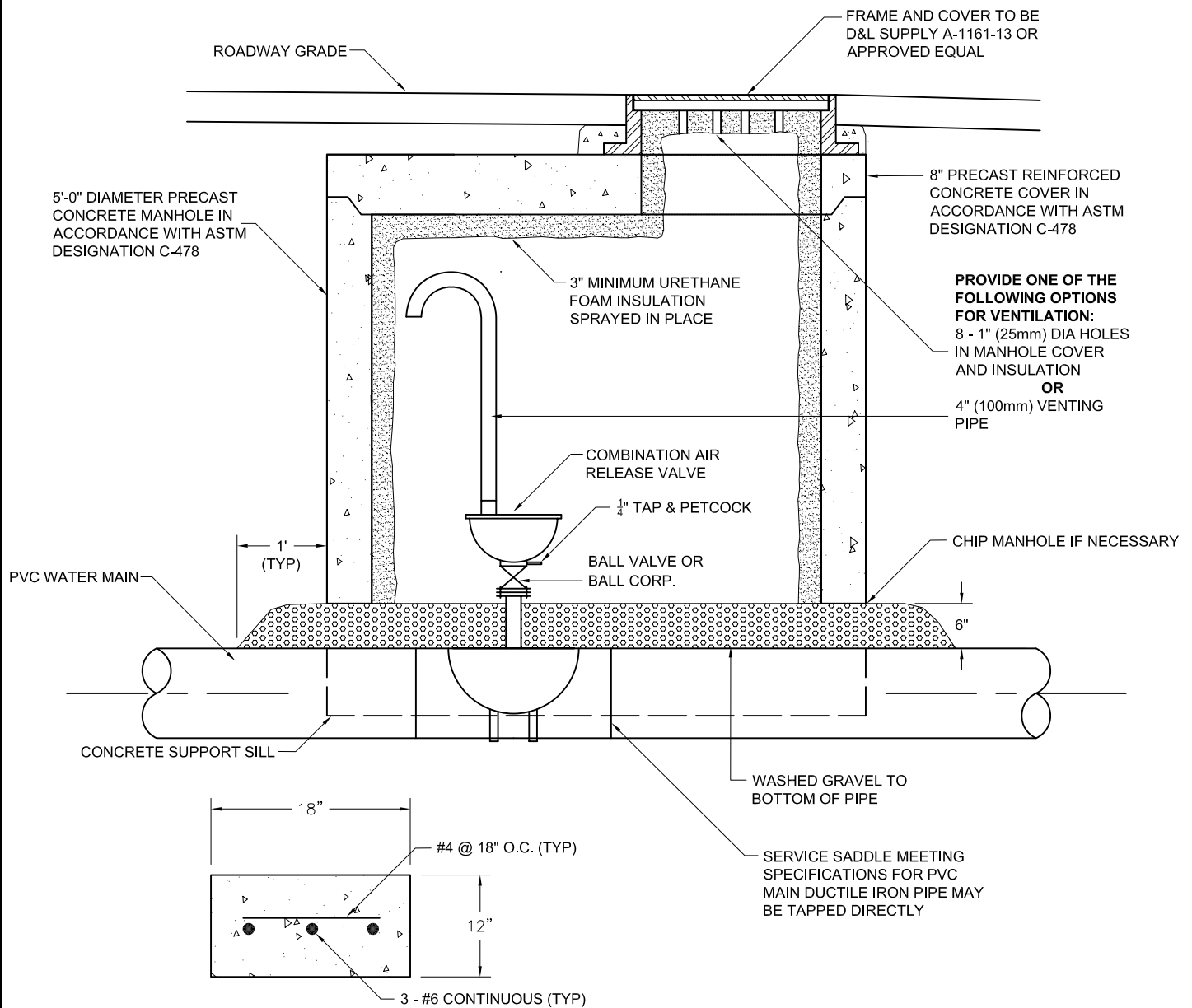
2

DRAWING STANDARDS REVISIONS

WATER SERVICE

LINE DETAIL

NOT TO SCALE



**SILL DETAIL**  
NOT TO SCALE

**COMBINATION AIR  
RELEASE/VACUUM RELIEF  
MANHOLE DETAIL**  
NOT TO SCALE

**NOTES:**

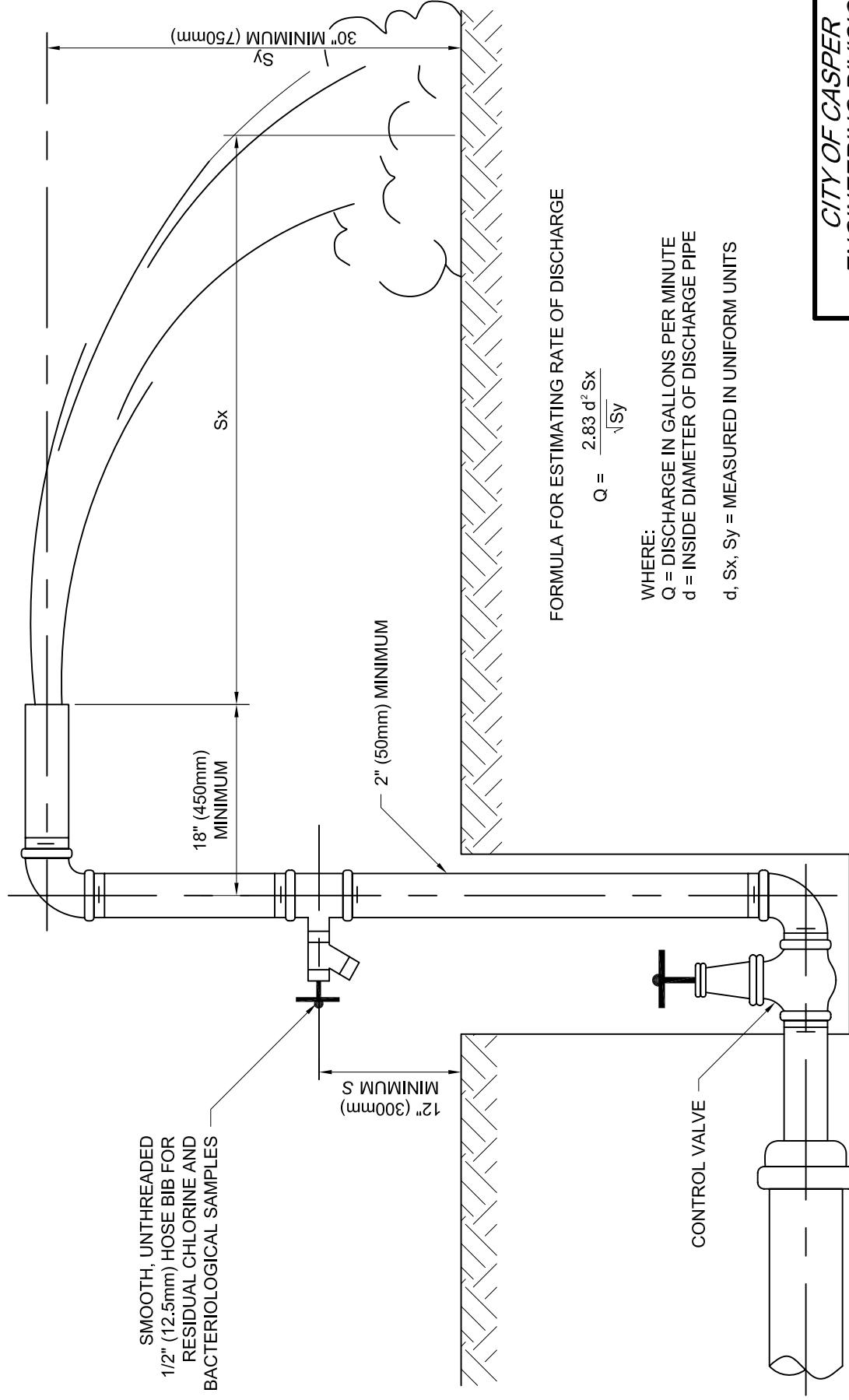
- MANHOLE CASTING SHALL CONFORM TO THE SPECIFIED CASTINGS THE WORD "WATER" CAST ON TOP OF COVER.
- ALL PIPE, VALVES, AND FITTINGS UP TO THE COMBINATION AIR RELEASE/VACUUM RELIEF VALVE SHALL BE COPPER, BRASS, OR BRONZE. AIR RELEASE/VACUUM RELIEF VALVE AND VENTING PIPE SHALL BE FUSION BONDED EPOXY COATED.
- FULL DEPTH MANHOLES WITH FLOORS SHALL BE REQUIRED WHEN GROUND WATER IS PRESENT.
- MASS CONCRETE SUPPORT SILLS SHALL BE PLACED ON EACH SIDE OF THE WATER MAIN TO SUPPORT THE MANHOLE SECTION. SILL TO BE 12" (300mm) X 18" (450mm) WITH REINFORCEMENT.
- THREE INCH (3") (75mm) URETHANE FOAM INSULATION SHALL BE SPRAYED ON ALL INSIDE SURFACES OF THE VAULTS.
- CONCRETE SUPPORT SILLS SHOULD HAVE A MINIMUM LENGTH OF 7 FEET.
- PROVIDE A MINIMUM 4" (100 mm) VENTING PIPE OR 8 - 1" (25mm) HOLES IN THE MANHOLE COVER AND INSULATION FOR VENTILATION.

**CITY OF CASPER  
ENGINEERING DIVISION**

**COMBINATION AIR  
RELEASE/VACUUM RELIEF  
MANHOLE DETAIL**

**501  
5**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/16/01
2	MODIFIED RELIEF VALVE PIPING	4/22/03
3	MODIFIED VENTILATION OPTIONS	1/17/05
4	DRAWING STANDARDS REVISIONS	JAN 06



FORMULA FOR ESTIMATING RATE OF DISCHARGE

$$Q = \frac{2.83 d^2 S_x}{\sqrt{S_y}}$$

WHERE:

Q = DISCHARGE IN GALLONS PER MINUTE

d = INSIDE DIAMETER OF DISCHARGE PIPE

d, Sx, Sy = MEASURED IN UNIFORM UNITS

## TEMPORARY COMBINATION FLUSHING AND SAMPLING TAP DETAIL

NOT TO SCALE

### NOTE:

1. THIS FIGURE APPLIES TO MAINS UP TO AND INCLUDING 8" (200mm) DIAMETER.

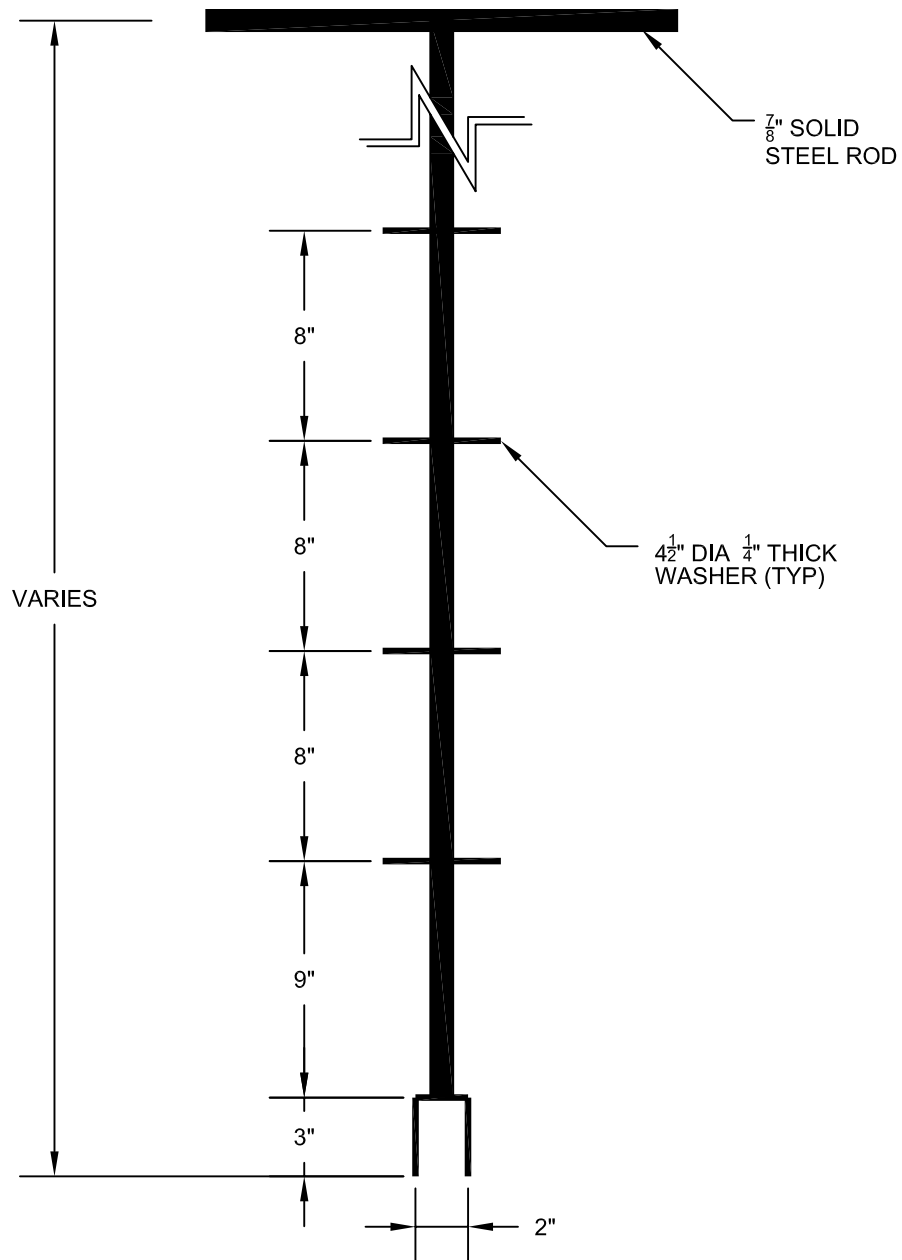
CITY OF CASPER  
ENGINEERING DIVISION

TEMPORARY COMBINATION FLUSHING  
AND SAMPLING TAP DETAIL

501

6

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/26/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**VALVE BOX ACCEPTANCE  
KEY DETAIL**

NOT TO SCALE

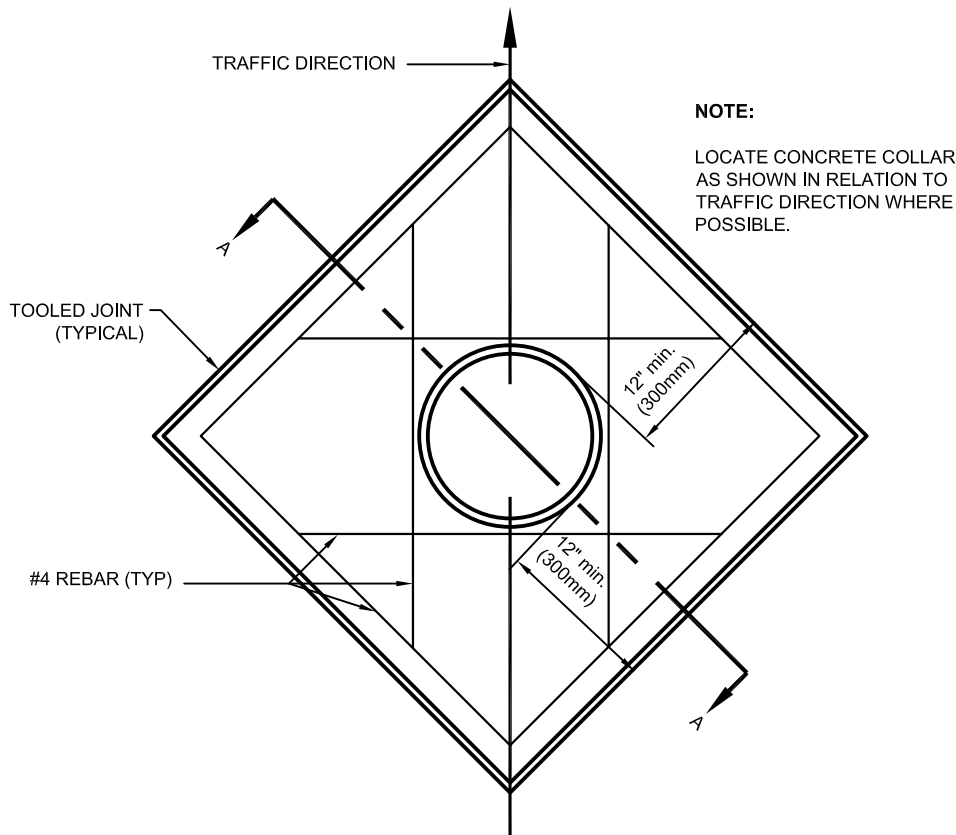
*CITY OF CASPER  
ENGINEERING DIVISION*

**VALVE BOX ACCEPTANCE  
KEY DETAIL**

**501  
7**

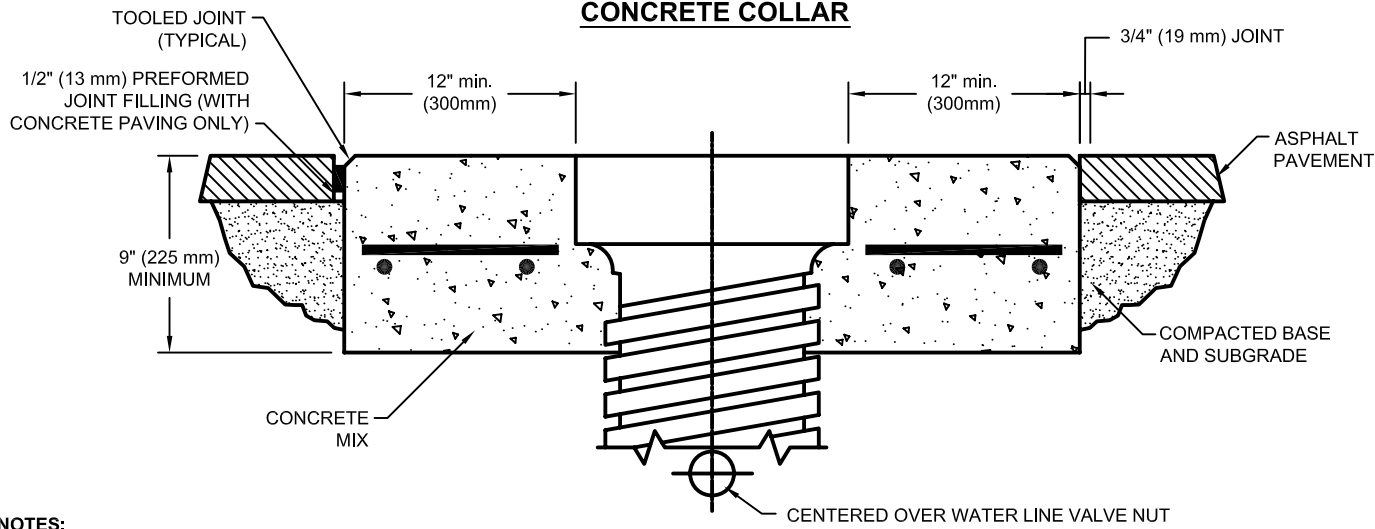
REV.	DESCRIPTION	DATE
1	DRAFTED ONTO COMPUTER-Z.T.L.	2/21/03
2	DRAWING STANDARDS REVISIONS	JAN 06





**NOTE:**  
LOCATE CONCRETE COLLAR  
AS SHOWN IN RELATION TO  
TRAFFIC DIRECTION WHERE  
POSSIBLE.

**CONCRETE COLLAR**



**NOTES:**

1. SEE DIVISION 500, SECTION 501.07 OF THE CITY OF CASPER STANDARD SPECIFICATIONS FOR ADJUSTMENTS.
2. SLOPE VALVE BOX COLLAR AS REQUIRED TO MATCH LONGITUDINAL AND TRANSVERSE GRADE ON STREET.
3. FINAL VALVE BOX ADJUSTMENT WILL BE MADE AFTER PAVING.
4. NO PAYMENT SHALL BE MADE FOR ADJUSTMENT OF NEW VALVE BOXES TO FINAL GRADE.

**SECTION A-A**

**CONCRETE VALVE BOX COLLAR**  
NOT TO SCALE

***CITY OF CASPER  
ENGINEERING DIVISION***

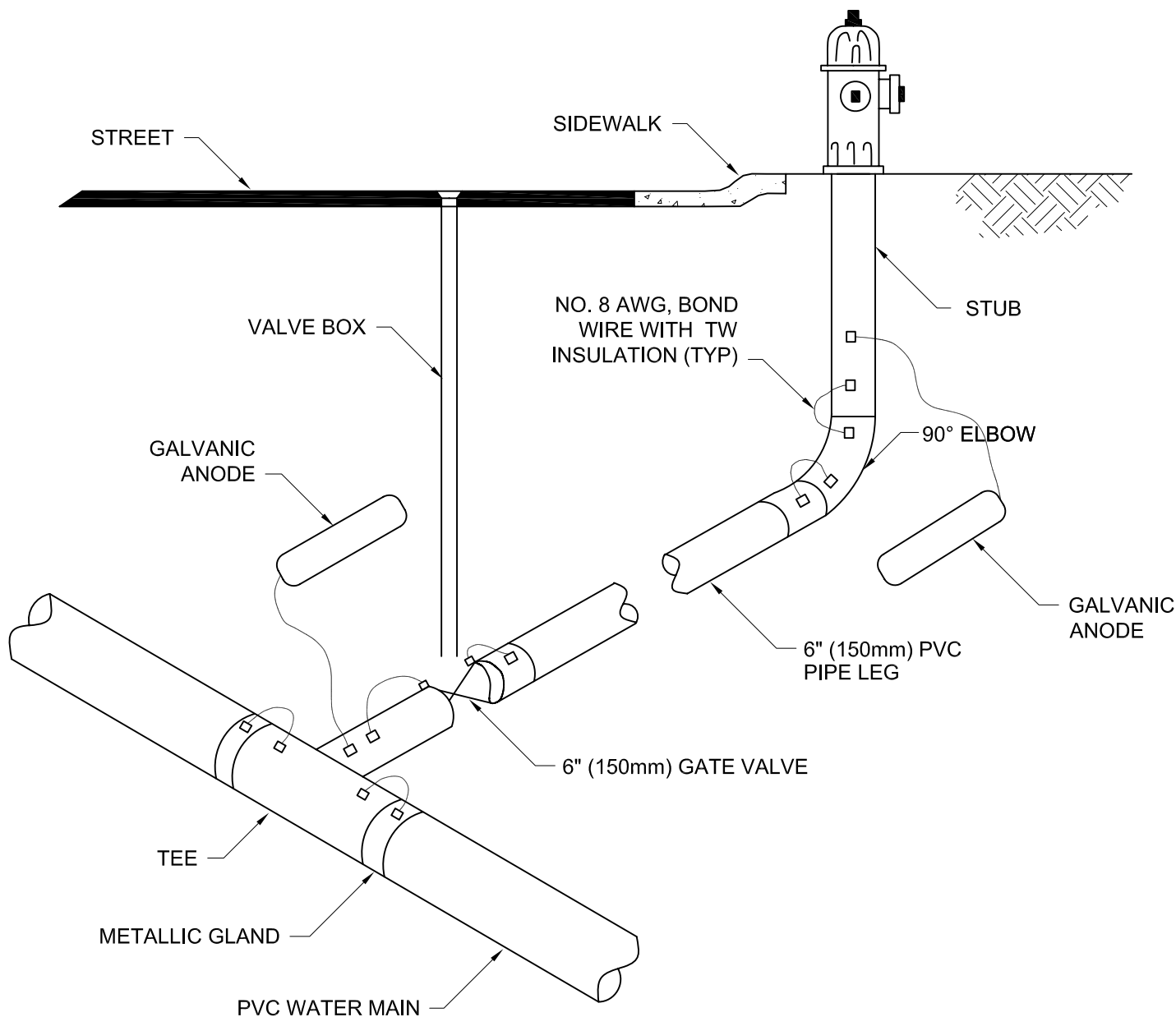
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**CONCRETE VALVE BOX COLLAR**

**501**  
**8**

REV.	DESCRIPTION	DATE
1	DRAWING STANDARDS REVISIONS	JAN 06





**TYPICAL GALVANIC ANODE  
INSTALLATION AT IRON FITTINGS  
ON PVC WATER MAINS DETAIL**

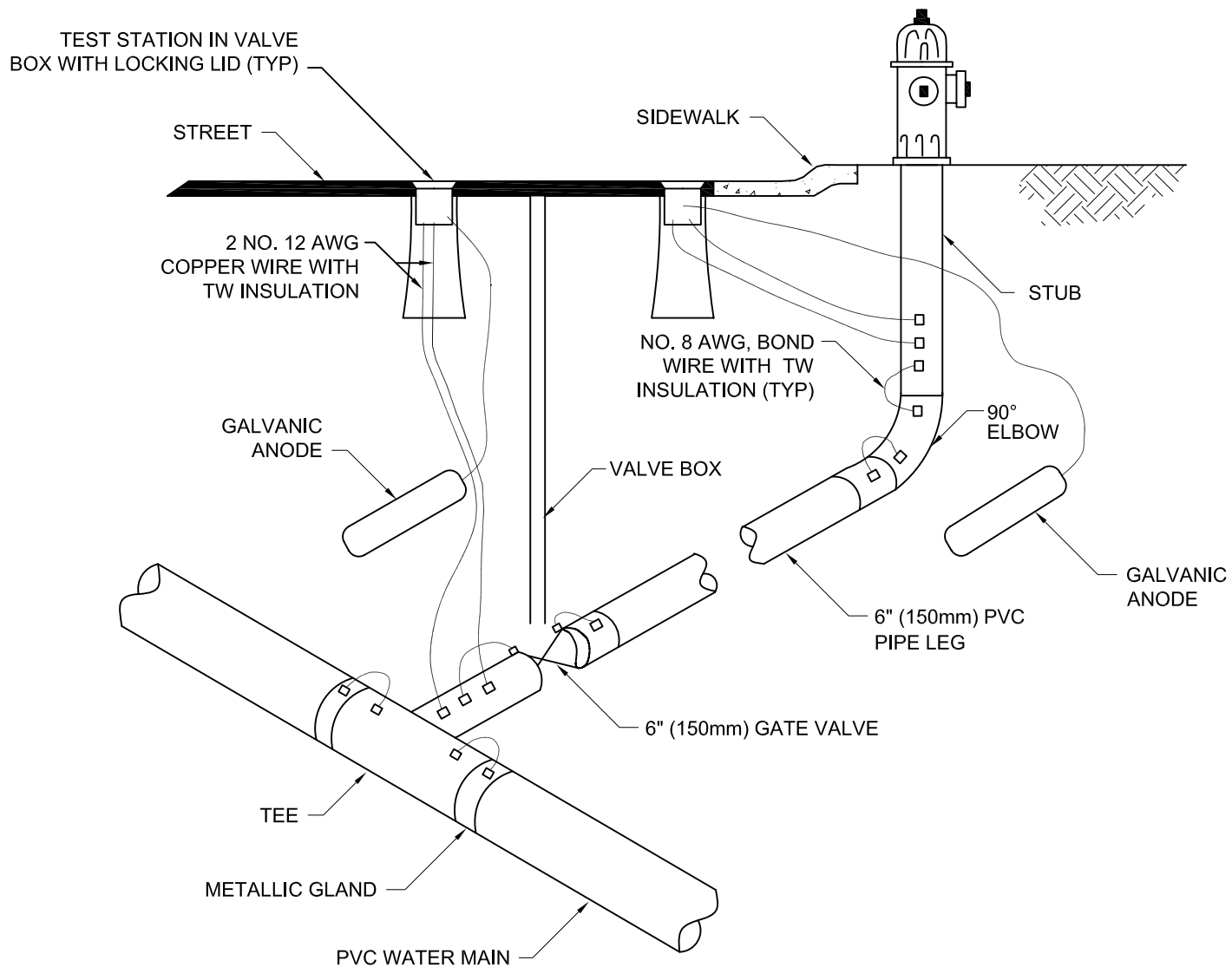
NOT TO SCALE

*CITY OF CASPER  
ENGINEERING DIVISION*

**TYPICAL GALVANIC ANODE  
INSTALLATION AT IRON FITTINGS  
ON PVC WATER MAINS DETAIL**

**503  
1**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/26/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**TYPICAL GALVANIC ANODE AND TEST  
STATION INSTALLATIONS AT IRON FITTINGS  
ON PVC WATER MAINS DETAIL**

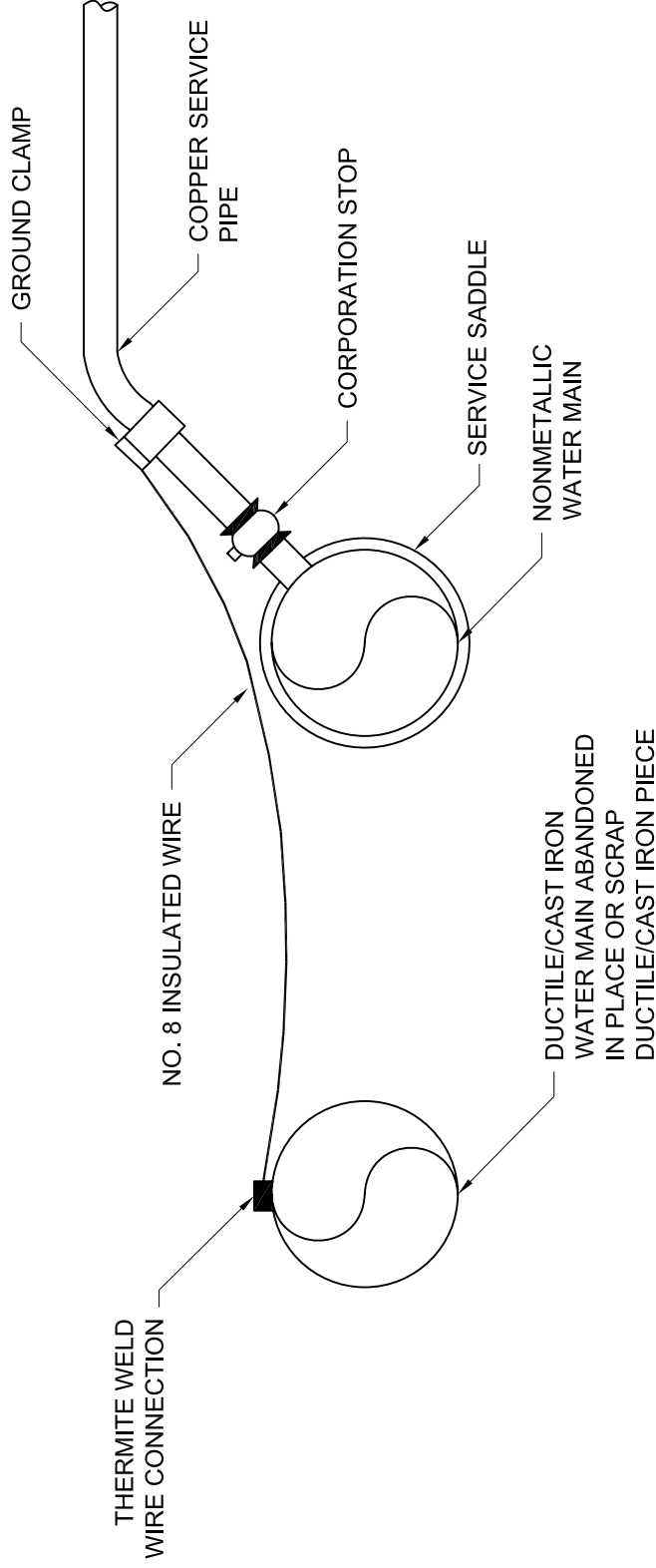
NOT TO SCALE

*CITY OF CASPER  
ENGINEERING DIVISION*

**TYPICAL GALVANIC ANODE AND TEST  
STATION INSTALLATIONS AT IRON FITTINGS  
ON PVC WATER MAINS**

**503  
2**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/26/01
2	DRAWING STANDARDS REVISIONS	JAN 06



# NOTES:

1. PIPE ANODE SHALL BE 6" (150mm) DIAMETER MIN CAST OR DUCTILE IRON PIPE, 10' (3m) MIN LENGTH. AS AN ALTERNATIVE, GALVANIC ANODES MAY BE USED.
2. THE SERVICE SADDLE, CORPORATION STOP, AND GROUND CLAMP SHALL BE COATED WITH POLYGUARD CA-114 MASTIC AND 400 WRAP OR APPROVED EQUAL. THE COATING SHALL BE PROTECTED FROM TRENCH BACKFILLING DAMAGE BY TWO LAYERS OF POLYETHYLENE WRAP MEETING AWWA C105 SPECIFICATIONS.

## DUCTILE OR CAST IRON PIPE ANODE DETAIL

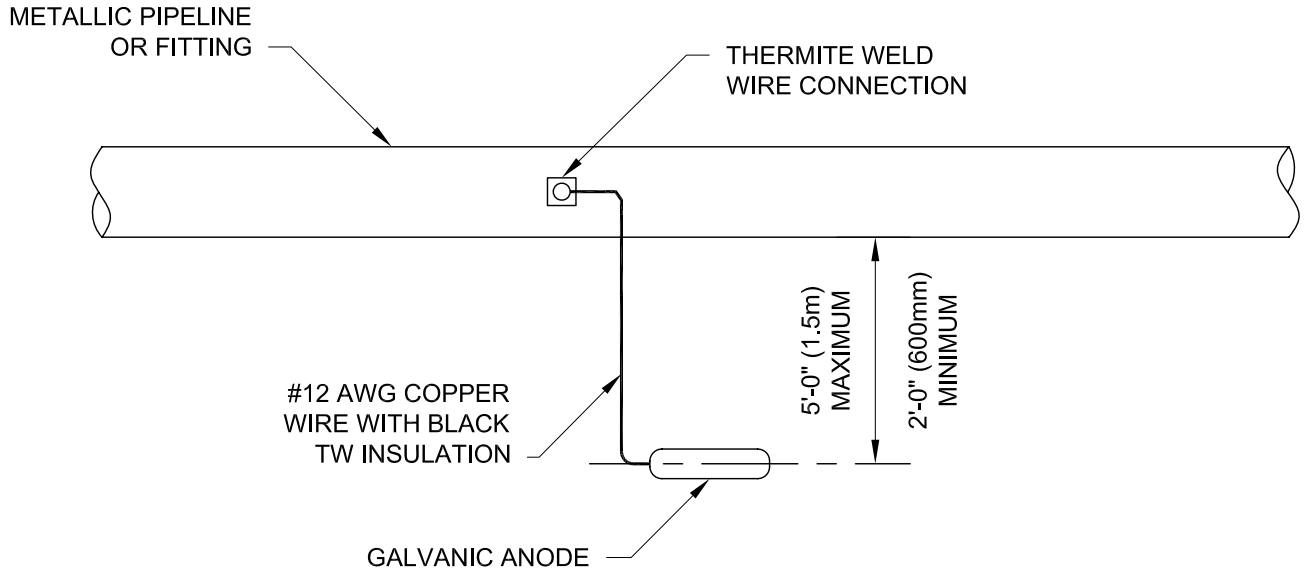
NOT TO SCALE

CITY OF CASPER  
ENGINEERING DIVISION

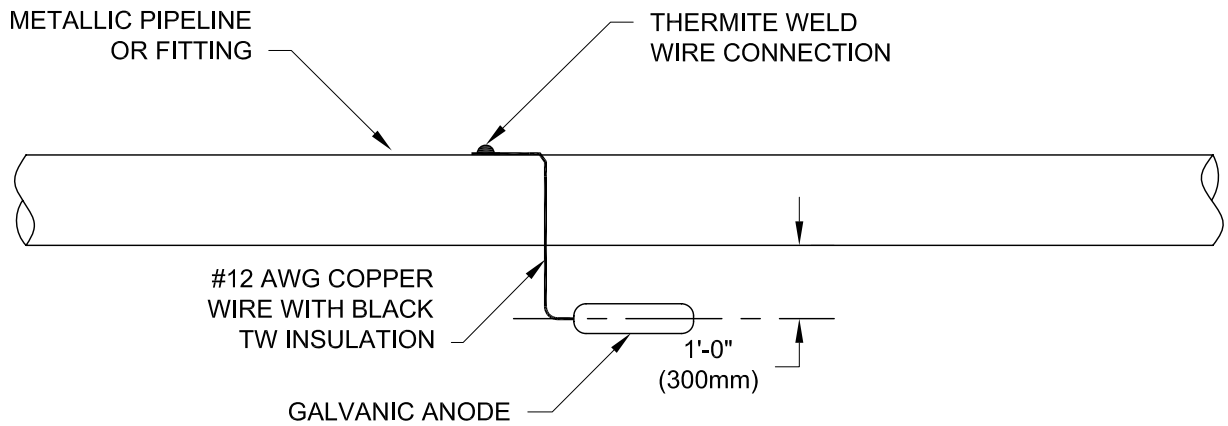
DUCTILE OR CAST IRON  
PIPE ANODE DETAIL

503 3

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/26/00
2	DRAWING STANDARDS REVISIONS	JAN 06



**PLAN**



**ELEVATION**

**GALVANIC ANODE  
INSTALLATION DETAIL**  
NOT TO SCALE

**NOTE:**

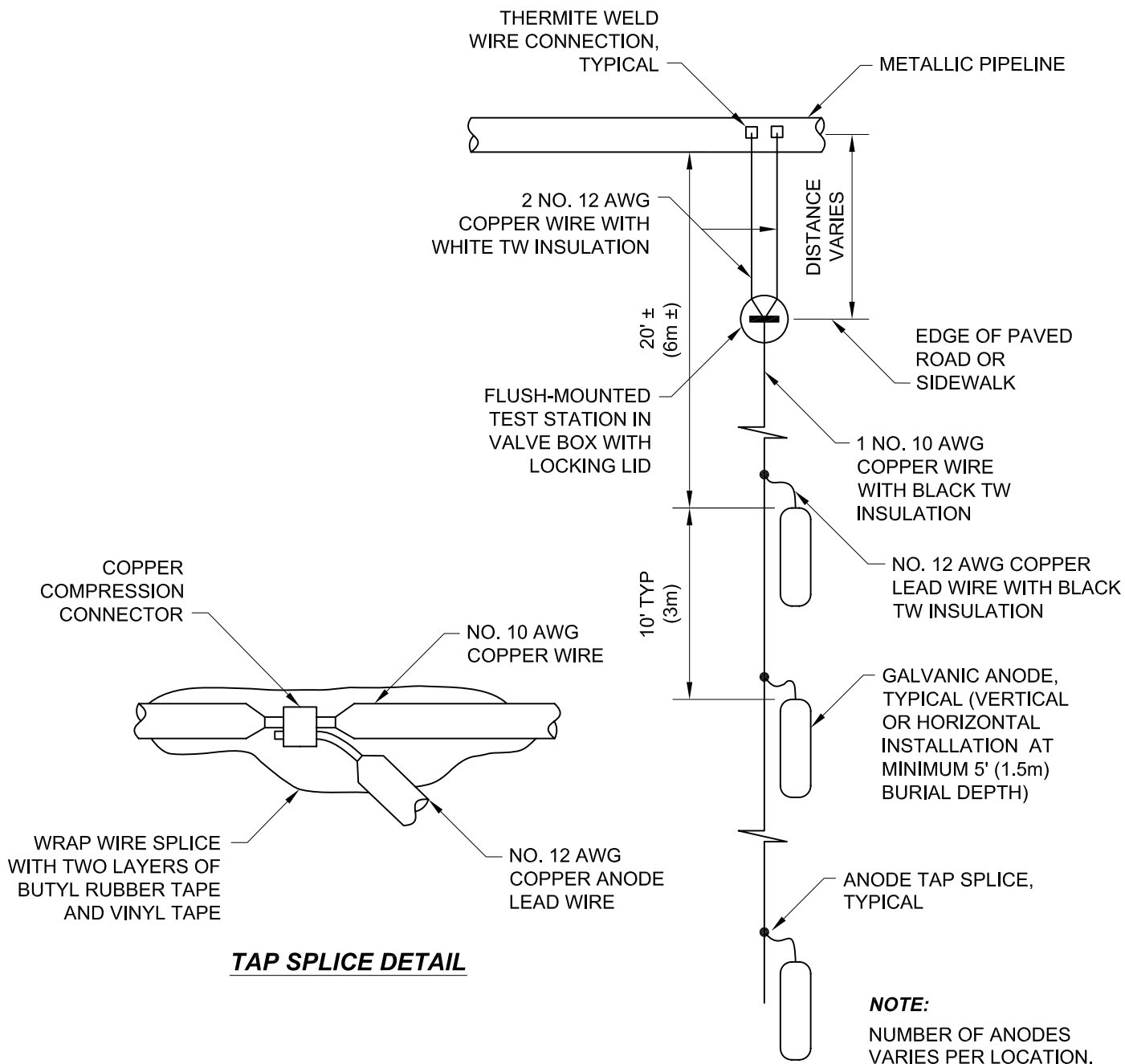
GALVANIC ANODE CAN ALSO  
BE INSTALLED VERTICALLY.

*CITY OF CASPER  
ENGINEERING DIVISION*

**GALVANIC ANODE  
INSTALLATION DETAIL**

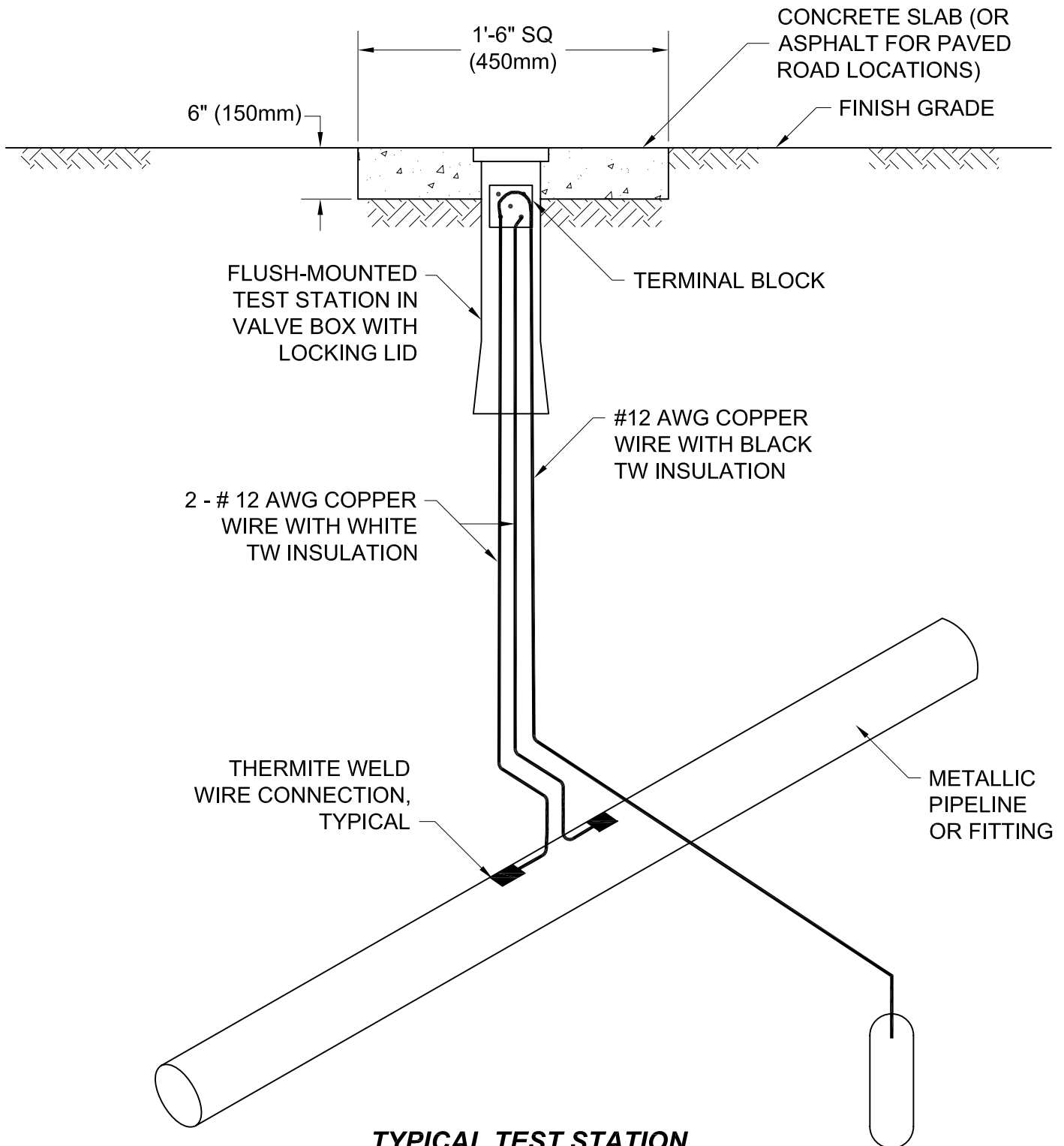
**503  
4**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/26/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**GALVANIC ANODE STRING  
INSTALLATION DETAIL**  
NOT TO SCALE

CITY OF CASPER ENGINEERING DIVISION		
GALVANIC ANODE STRING INSTALLATION DETAIL		
503		5
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/29/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**TYPICAL TEST STATION  
INSTALLATION DETAIL**  
NOT TO SCALE

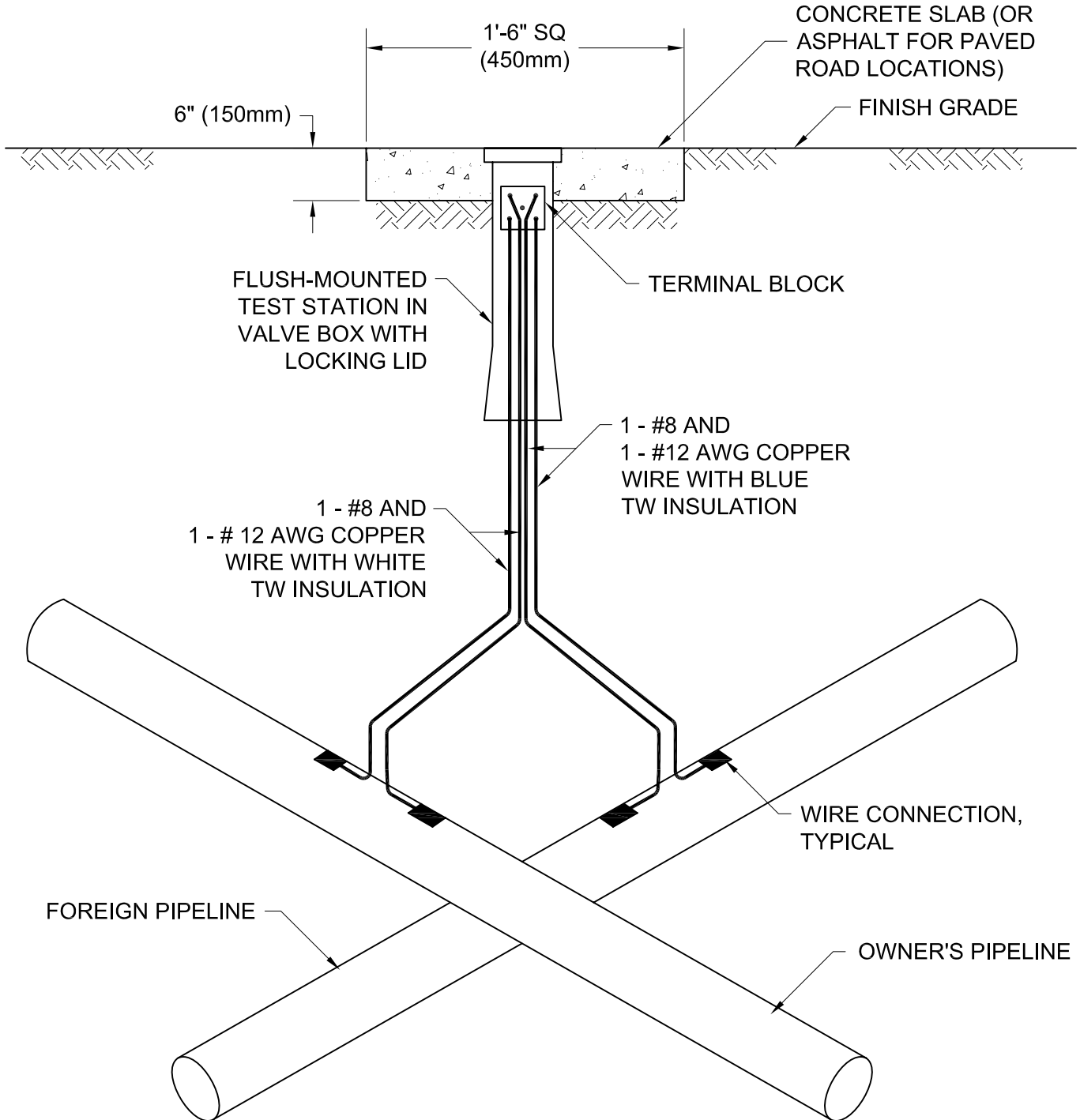
CITY OF CASPER ENGINEERING DIVISION		
TYPICAL TEST STATION INSTALLATION DETAIL		
		503 6
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06





**NOTE:**

PRIOR TO MAKING WIRE CONNECTIONS CONTACT FOREIGN PIPELINE  
OWNER FOR APPROVAL.



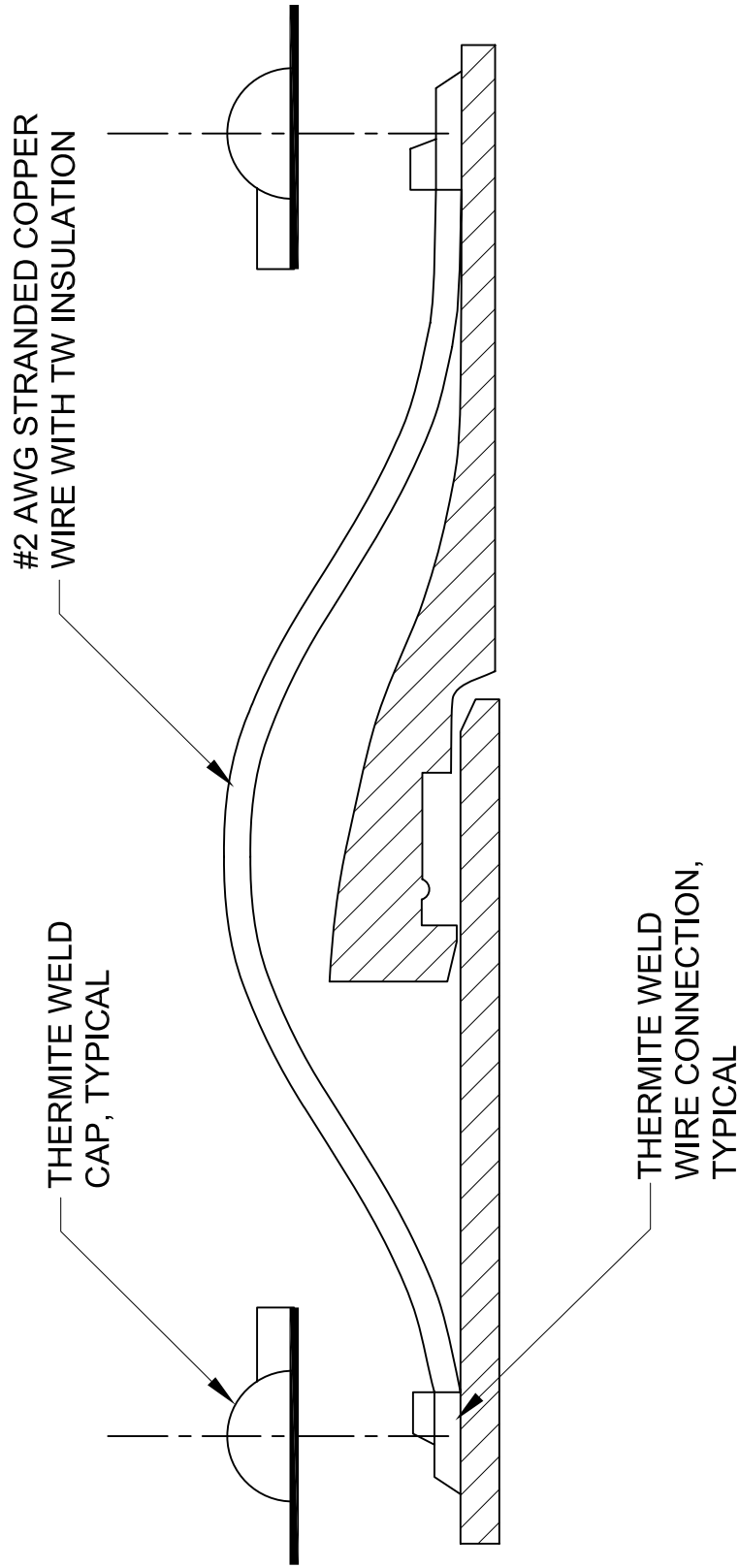
**TEST STATION FOR  
FOREIGN PIPELINE DETAIL**  
NOT TO SCALE

*CITY OF CASPER  
ENGINEERING DIVISION*

**TEST STATION FOR  
FOREIGN PIPELINE DETAIL**

**503  
8**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06



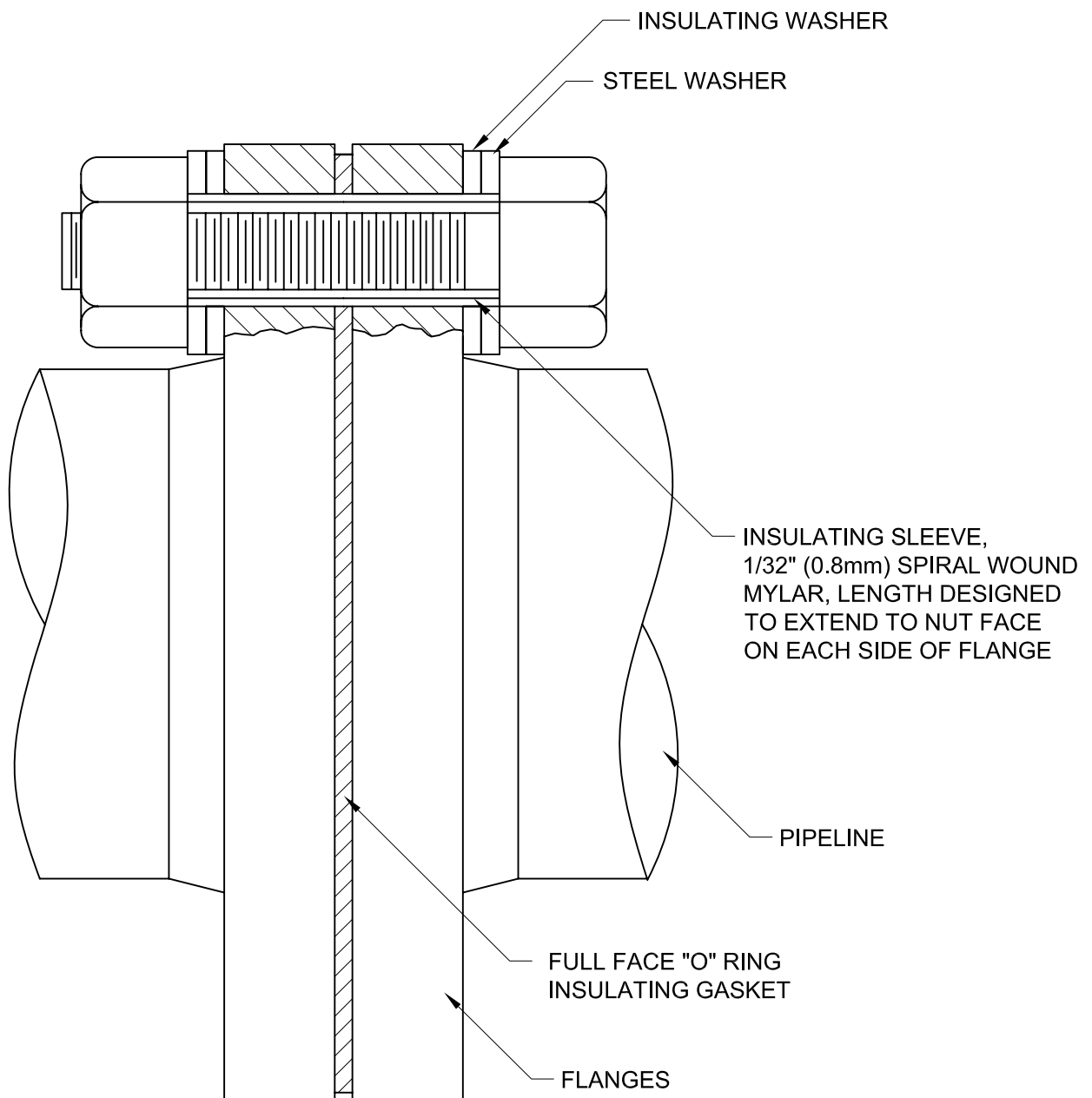
# TYPICAL JOINT BOND DETAIL

NOT TO SCALE

CITY OF CASPER  
ENGINEERING DIVISION

TYPICAL JOINT BOND DETAIL

503		9
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06



### **INSULATING FLANGE DETAIL (BURIED)**

NOT TO SCALE

**NOTES:**

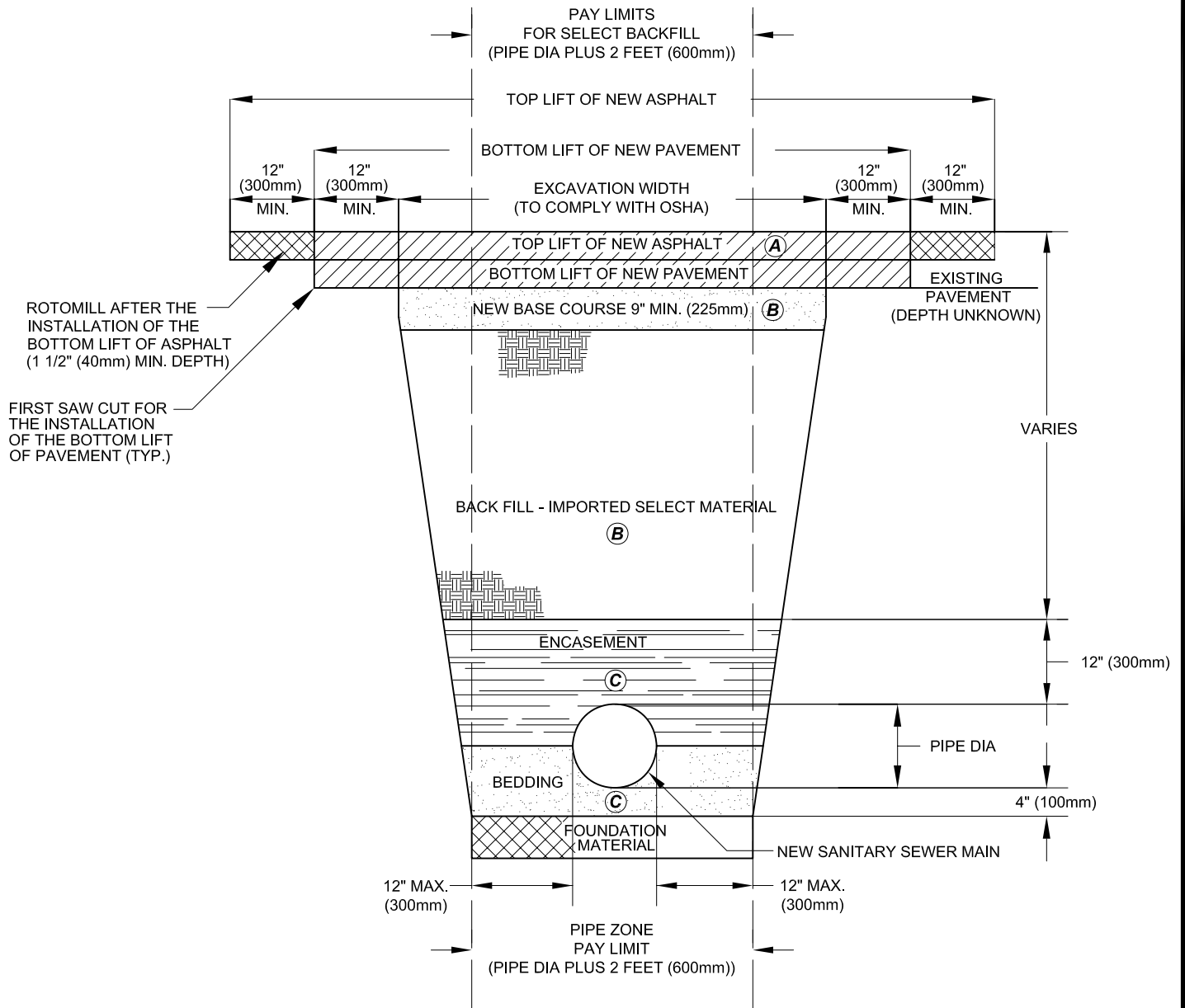
1. COAT WITH 100 PERCENT SOLIDS EPOXY AFTER ASSEMBLING JOINT AND WRAP WITH A BUTYL RUBBER ADHESIVE, POLYETHYLENE BACKED TAPE.
2. INSTALL INSULATING WASHER ON UNPROTECTED SIDE OF FLANGE.

*CITY OF CASPER  
ENGINEERING DIVISION*

**INSULATING FLANGE DETAIL**

**503  
10**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06



## TYPICAL STREET CUT SECTION ASPHALT SURFACING

NOT TO SCALE

### NOTES:

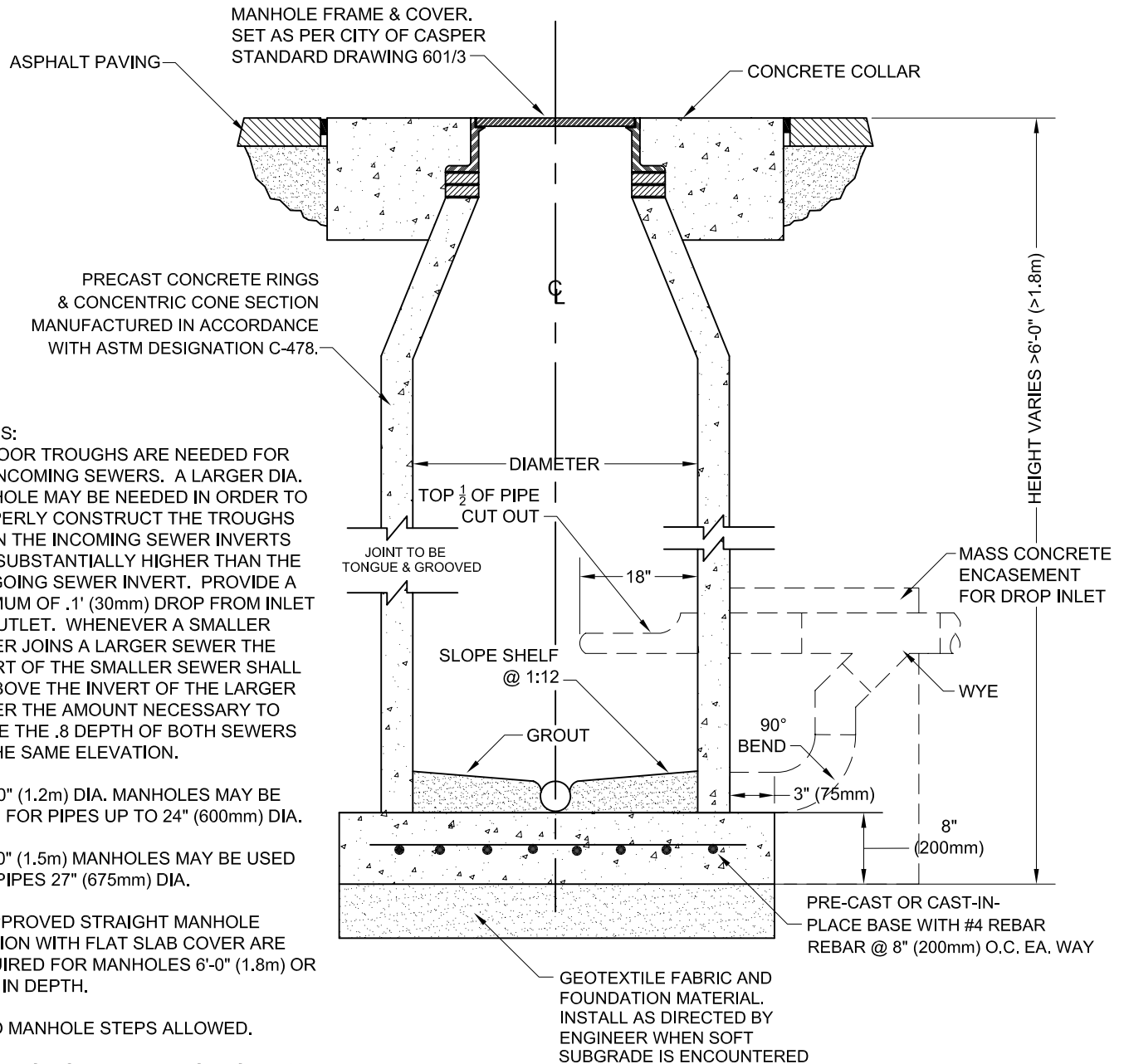
1. TACK COAT SHALL BE APPLIED ON ALL SAW CUT AND MILLED INTERFACES BETWEEN EXISTING AND NEW ASPHALT.
2. NEW PAVEMENT THICKNESS SHALL MATCH EXISTING.
3. DENSITY REQUIRED:
  - (A) =97% MARSHALL DENSITY
  - (B) =95% STANDARD PROCTOR
  - (C) =90% STANDARD PROCTOR
4. GRANULAR FOUNDATION MATERIAL IF USED SHALL BE PLACED BELOW AND TO THE MIDPOINT OF THE PIPE.

*CITY OF CASPER  
ENGINEERING DIVISION*

### TYPICAL STREET CUT SECTION ASPHALT SURFACING FOR SANITARY SEWER

**601**  
**1**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	6/1/01
2	DRAWING STANDARDS REVISIONS	JAN 06



#### NOTES:

1. FLOOR TROUGHS ARE NEEDED FOR ALL INCOMING SEWERS. A LARGER DIA. MANHOLE MAY BE NEEDED IN ORDER TO PROPERLY CONSTRUCT THE TROUGHS WHEN THE INCOMING SEWER INVERTS ARE SUBSTANTIALLY HIGHER THAN THE OUTGOING SEWER INVERT. PROVIDE A MINIMUM OF .1' (30mm) DROP FROM INLET TO OUTLET. WHENEVER A SMALLER SEWER JOINS A LARGER SEWER THE INVERT OF THE SMALLER SEWER SHALL BE ABOVE THE INVERT OF THE LARGER SEWER THE AMOUNT NECESSARY TO PLACE THE .8 DEPTH OF BOTH SEWERS AT THE SAME ELEVATION.

2. 4'-0" (1.2m) DIA. MANHOLES MAY BE USED FOR PIPES UP TO 24" (600mm) DIA.

3. 5'-0" (1.5m) MANHOLES MAY BE USED FOR PIPES 27" (675mm) DIA.

4. APPROVED STRAIGHT MANHOLE SECTION WITH FLAT SLAB COVER ARE REQUIRED FOR MANHOLES 6'-0" (1.8m) OR LESS IN DEPTH.

5. NO MANHOLE STEPS ALLOWED.

6. MANHOLES WITH THE BASE POURED MONOLITHICALLY WITH THE BOTTOM BARREL ARE ALSO ACCEPTABLE.

7. SEAL JOINTS WATER TIGHT WITH APPROVED MATERIAL. GROUT HOISTING HOLES WATER TIGHT WITH NONMETALLIC, NON-SHRINK GROUT.

8. INVERTS SHALL BE U-SHAPED TO THE I.D. PIPE DIA. POINT (PIPE CROWN).

9. THE ENGINEER SHALL DETERMINE THE MANHOLE SIZE BASED ON THE ANGLE, NUMBER AND SIZE OF PIPE PENETRATIONS. THE MINIMUM DISTANCE BETWEEN KNOCKOUTS IS 12" (300mm).

10. THE UPPER PIPE AT DROP INLETS SHALL EXTEND INTO THE MANHOLE 12" (300mm) WITH THE TOP HALF CUT OUT.

## STANDARD SANITARY SEWER MANHOLE DETAIL

(FOR MANHOLE DEPTH ≥6' BASE TO LID)  
NOT TO SCALE

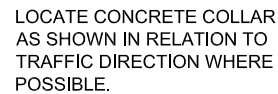
*CITY OF CASPER  
ENGINEERING DIVISION*

### STANDARD SANITARY SEWER MANHOLE DETAIL

FOR MANHOLE DEPTH ≥6'  
BASE TO LID

**601  
2**

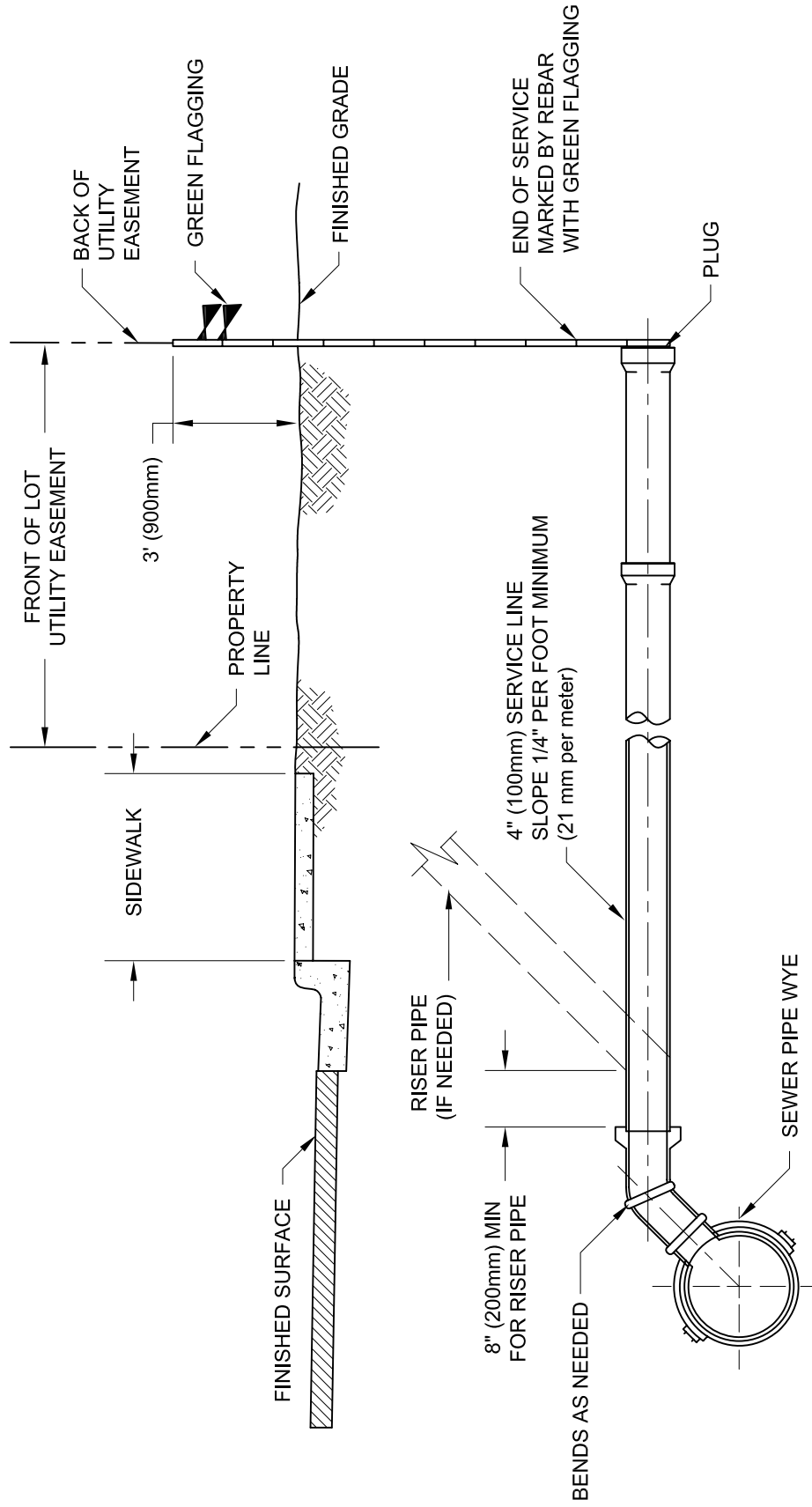
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	6/8/01
2	MODIFY NOTE 1 & ADD NOTE 10	1/17/05
3	DRAWING STANDARDS REVISIONS	JAN 06



- ## SECTION A-A

NOT TO SCALE

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	6/10/01
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTES:

1. THE ENDS OF SERVICE LINES SHALL END ABOVE THE GROUNDWATER TABLE.
2. SEWER SERVICE TO BE LOCATED AT 10 FEET (3m) FROM WATER SERVICE ON THE DOWNHILL FLOW SIDE OF SEWER MAIN.
3. A GROUNDWATER BARRIER SHALL BE INSTALLED IN THE SERVICE LINE TRENCH ON THE PROPERTY LINE.
4. SEWER SERVICE LINES WITH RISER PIPES SHALL MEET THE REQUIREMENTS OF SECTION 601.07.C.

**SEWER SERVICE  
LINE DETAIL**  
NOT TO SCALE

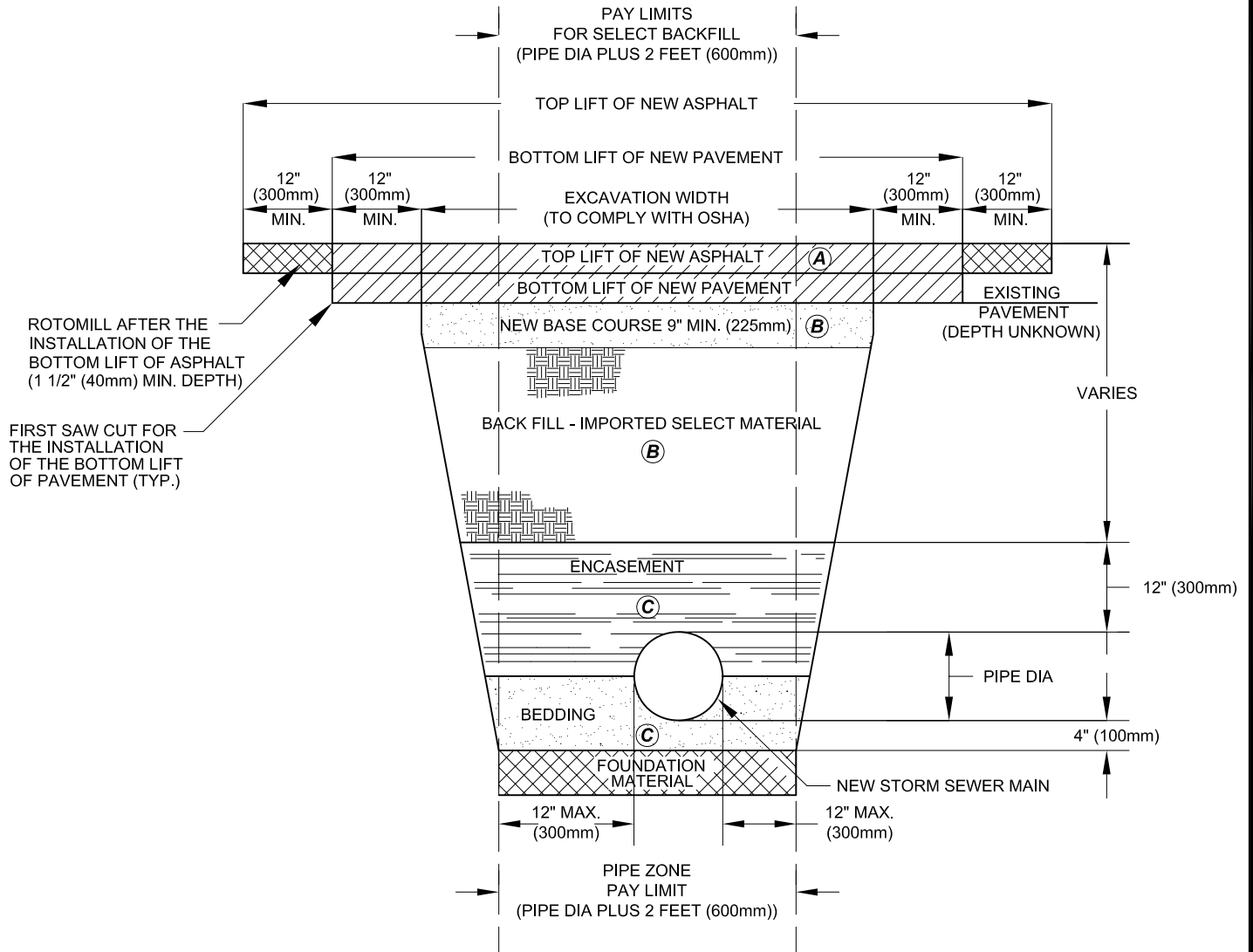
*CITY OF CASPER  
ENGINEERING DIVISION*

**SEWER SERVICE  
LINE DETAIL**

**601 4**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	6/14/01
2	ADD RISER PIPE & 2ND 45° BEND	1/24/05
3	DRAWING STANDARDS REVISIONS	JAN 06





## TYPICAL STREET CUT SECTION ASPHALT SURFACING

NOT TO SCALE

### NOTES:

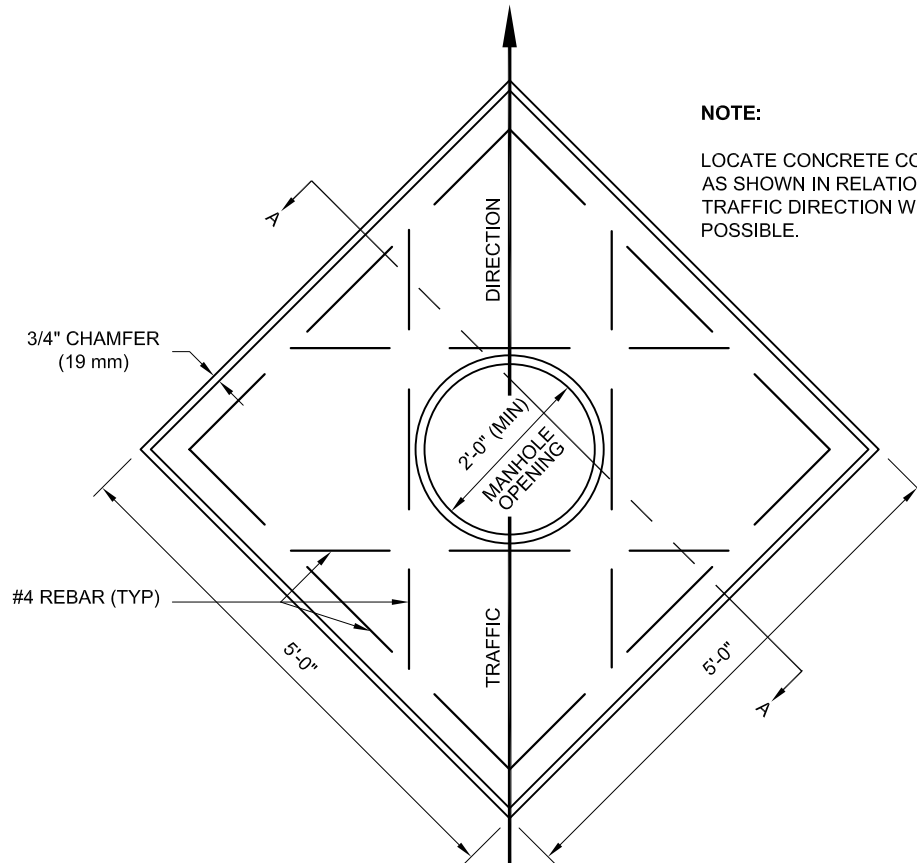
- TACK COAT SHALL BE APPLIED ON ALL SAW CUT AND MILLED INTERFACES BETWEEN EXISTING AND NEW ASPHALT.
- NEW PAVEMENT THICKNESS SHALL MATCH EXISTING.
- DENSITY REQUIRED:
  - (A) = 97% MARSHALL DENSITY
  - (B) = 95% STANDARD PROCTOR
  - (C) = 90% STANDARD PROCTOR

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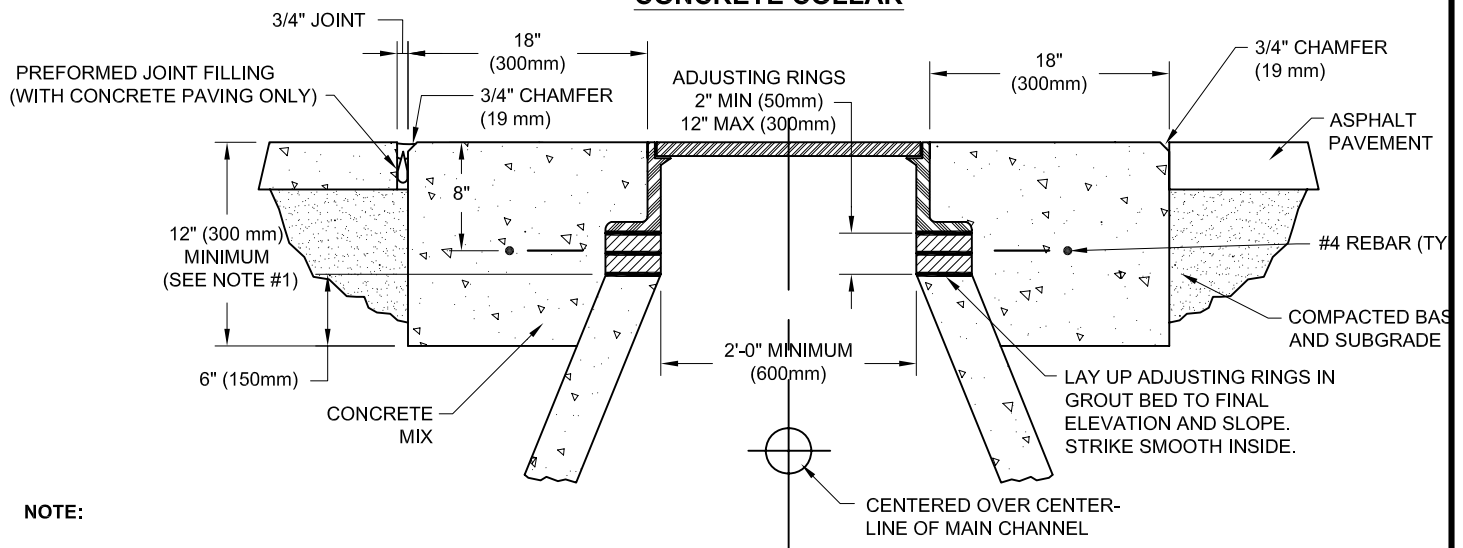
### TYPICAL STREET CUT SECTION ASPHALT SURFACING FOR STORM SEWER

**602**  
**1**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DRAWING STANDARDS REVISIONS	JAN 06



### CONCRETE COLLAR



### SECTION A-A

## MANHOLE FRAME & COVER AND GRADE ADJUSTMENT DETAIL

NOT TO SCALE

### NOTE:

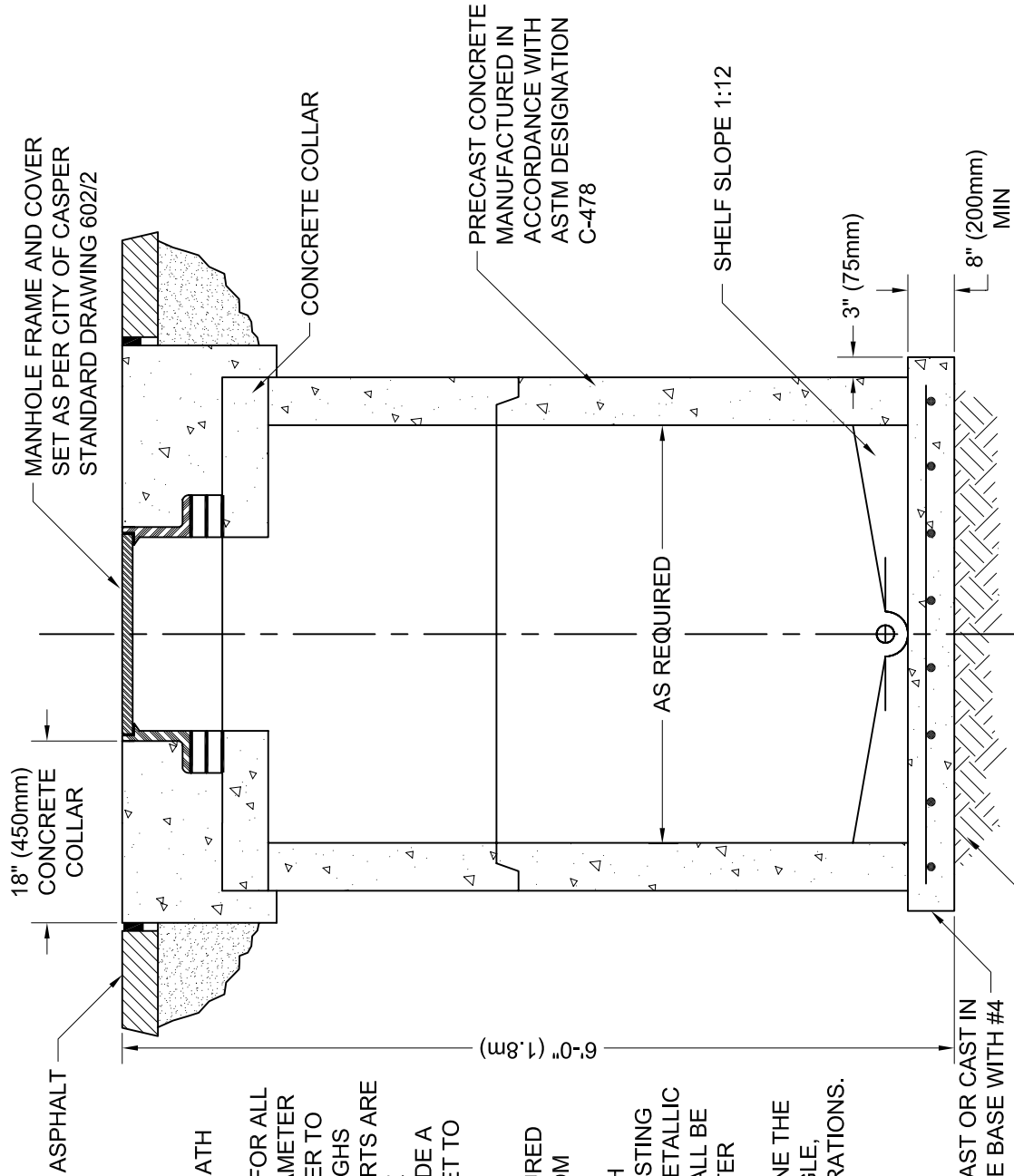
1. MINIMUM OF 12" (300mm) DEPTH CONCRETE ENCASEMENT AROUND MANHOLE CASTINGS OR 6" (150mm) BELOW BOTTOM OF ADJUSTING RING, WHICHEVER IS GREATER.
2. ADJUST MANHOLE UPWARD WITH ADJUSTING RINGS UNDER FRAME. ADJUST MANHOLE DOWNWARD BY REMOVING A PORTION OF THE MANHOLE RISER AND REBUILDING TO PROPER DIAMETER.
3. SLOPE MANHOLE RING AS REQUIRED TO MATCH LONGITUDINAL AND TRANSVERSE GRADE ON STREET.
4. FINAL MANHOLE ADJUSTMENT WILL BE MADE AFTER PAVING AND BEFORE SEAL COATING.
5. NO PAYMENT SHALL BE MADE FOR ADJUSTMENT OF NEW MANHOLES TO FINAL GRADE.
6. FRAME AND COVER TO BE D & L SUPPLY A-1040, DETTER FOUNDRY 1257, NEENAH 1726-A OR APPROVED EQUAL.

*CITY OF CASPER  
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**MANHOLE FRAME & COVER AND  
GRADE ADJUSTMENT DETAIL**

**602  
2**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	3/19/01
2	DRAWING STANDARDS REVISIONS	JAN 06



#### NOTES:

1. MANHOLES SHALL BE PLUMB.
2. SEAL ALL JOINTS AND UNDERNEATH RING AND ALL RISERS.
3. FLOOR TROUGHS ARE NEEDED FOR ALL INCOMING SEWERS. A LARGER DIAMETER MANHOLE MAY BE NEEDED IN ORDER TO PROPERLY CONSTRUCT THE TROUGHS WHEN THE INCOMING SEWER INVERTS ARE SUBSTANTIALLY HIGHER THAN THE OUTGOING SEWER INVERT. PROVIDE A MINIMUM OF .1 FT DROP FROM INLET TO OUTLET.
4. NO MANHOLE STEPS ALLOWED.
5. MANHOLES WITH THE BASE POURED MONOLITHICALLY WITH THE BOTTOM BARREL ARE ALSO ACCEPTABLE.
6. SEAL JOINTS WATER TIGHT WITH APPROVED MATERIAL. GROUT HOISTING HOLES WATER TIGHT WITH NON- METALLIC NON-SHRINK GROUT. INVERTS SHALL BE U-SHAPED TO THE I.D. PIPE DIAMETER POINT (PIPE CROWN).
7. THE ENGINEER SHALL DETERMINE THE MANHOLE SIZE BASED ON THE ANGLE, NUMBER AND SIZE OF PIPE PENETRATIONS. THE MINIMUM DISTANCE BETWEEN KNOCKOUTS IS 12" (300mm).

PRECAST OR CAST IN PLACE BASE WITH #4 REBAR @ 8" (200mm) ON CENTER EACH WAY

INSTALL 6" (150mm) OF FOUNDATION MATERIAL OR GEOTEXTILE FABRIC WHEN SOFT SUBGRADE IS ENCOUNTERED

CONCRETE TO BE PLACED ON UNDISTURBED SOIL

#### STANDARD STRAIGHT MANHOLE FOR DEPTHS OF 6'-0" OR LESS

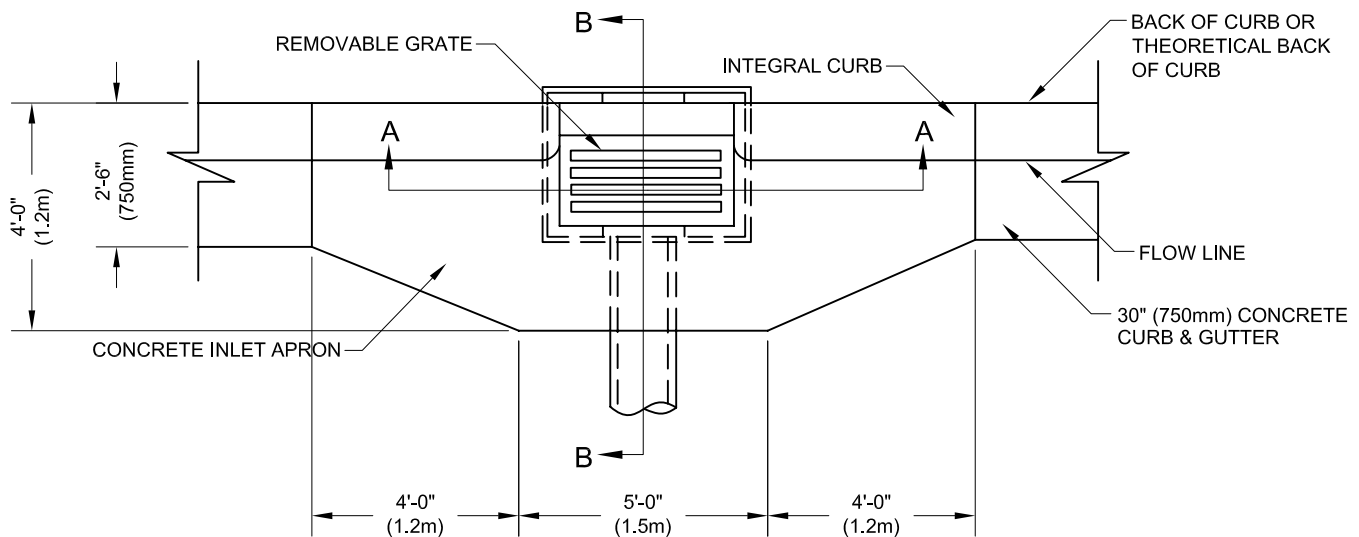
NOT TO SCALE

**CITY OF CASPER  
ENGINEERING DIVISION**

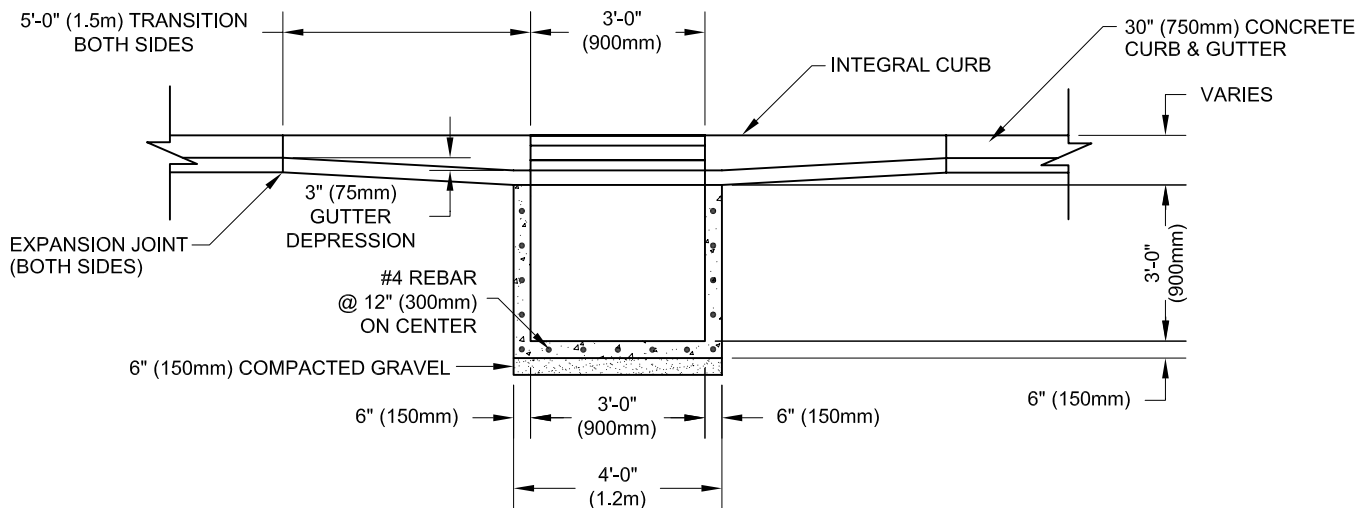
**STANDARD STRAIGHT MANHOLE  
FOR DEPTHS OF 6'-0" OR LESS**

**602.3**

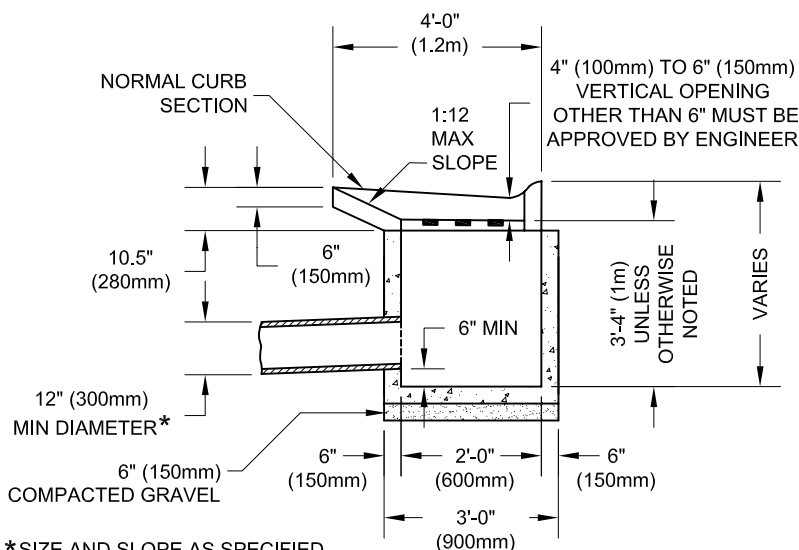
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER - Z.T.L.	4/11/01
2	FRAME & COVER CHANGES - Z.T.L.	2/25/03
3	DRAWING STANDARDS REVISIONS	JAN 06



**PLAN VIEW**



**SECTION A-A**



\*SIZE AND SLOPE AS SPECIFIED  
ON CONSTRUCTION DRAWINGS

**SECTION B-B**

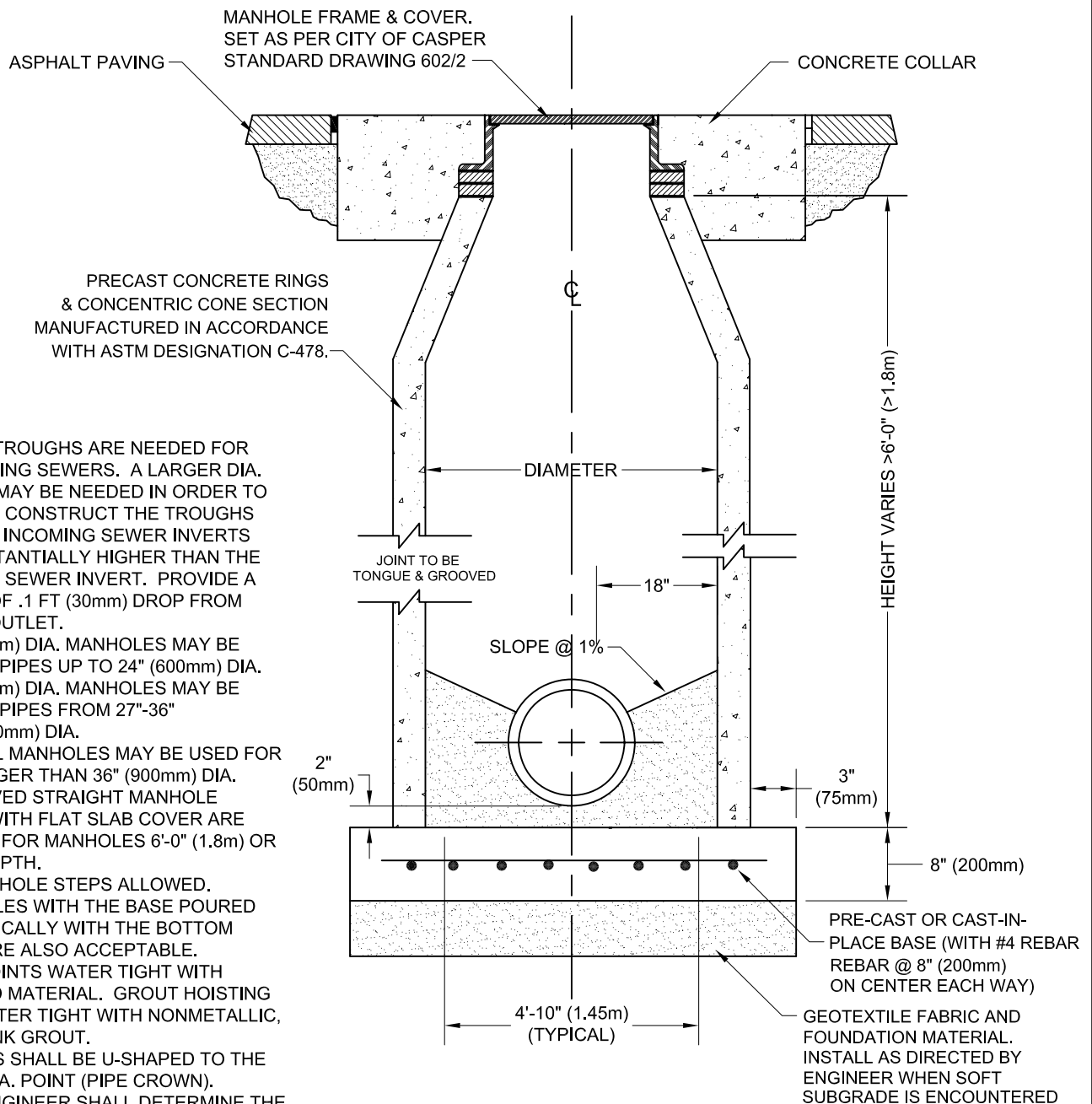
**STANDARD CATCH  
BASIN DETAIL**  
NOT TO SCALE

**CITY OF CASPER  
ENGINEERING DIVISION**

**STANDARD CATCH  
BASIN DETAILS**

**602  
4**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	3/21/01
2	DRAWING STANDARDS REVISIONS	JAN 06



#### NOTES:

1. FLOOR TROUGHS ARE NEEDED FOR ALL INCOMING SEWERS. A LARGER DIA. MANHOLE MAY BE NEEDED IN ORDER TO PROPERLY CONSTRUCT THE TROUGHS WHEN THE INCOMING SEWER INVERTS ARE SUBSTANTIALLY HIGHER THAN THE OUTGOING SEWER INVERT. PROVIDE A MINIMUM OF .1 FT (30mm) DROP FROM INLET TO OUTLET.
2. 4'-0" (1.2m) DIA. MANHOLES MAY BE USED FOR PIPES UP TO 24" (600mm) DIA.
3. 5'-0" (1.5m) DIA. MANHOLES MAY BE USED FOR PIPES FROM 27"-36" (675mm-900mm) DIA.
4. SPECIAL MANHOLES MAY BE USED FOR PIPES LARGER THAN 36" (900mm) DIA.
5. APPROVED STRAIGHT MANHOLE SECTION WITH FLAT SLAB COVER ARE REQUIRED FOR MANHOLES 6'-0" (1.8m) OR LESS IN DEPTH.
6. NO MANHOLE STEPS ALLOWED.
7. MANHOLES WITH THE BASE POURED MONOLITHICALLY WITH THE BOTTOM BARREL ARE ALSO ACCEPTABLE.
8. SEAL JOINTS WATER TIGHT WITH APPROVED MATERIAL. GROUT HOISTING HOLES WATER TIGHT WITH NONMETALLIC, NON-SHRINK GROUT.
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### STANDARD STORM SEWER MANHOLE DETAIL

(FOR MANHOLE DEPTH  $\geq$  6' BASE TO LID)  
NOT TO SCALE

*CITY OF CASPER  
ENGINEERING DIVISION*

#### STANDARD STORM SEWER MANHOLE DETAIL

FOR MANHOLE DEPTH  $\geq$  6'  
BASE TO LID

**602/5**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	3/23/01
2	DRAWING STANDARDS REVISIONS	JAN 06