

**ENGINEERING  
STANDARD DRAWINGS**

# CITY OF WHITEFISH ENGINEERING STANDARDS DRAWINGS

## GENERAL AND STREET DETAILS

APPROVAL BLOCK	SD-1a
RECORD DRAWING CERTIFICATE	SD-1b
SURVEY MONUMENT-PLACED IN ASPHALT	SD-2a
SURVEY MONUMENT-PLACED IN TURF	SD-2b
LOCAL STREET WITH PARKING (BOTH SIDES)	SD-3
LOCAL STREET WITH PARKING (ONE SIDE)	SD-4
LOCAL STREET WITHOUT PARKING	SD-5
LOCAL STREET WITH BIKE LANES (NO PARKING)	SD-6
LOW IMPACT DESIGN (LID) RURAL STREET (NO PARKING)	SD-7
COLLECTOR STREET (NO PARKING)	SD-8
COLLECTOR STREET WITH PARKING (ONE SIDE)	SD-9
ARTERIAL STREET (NO PARKING)	SD-10
STANDARD CURB AND GUTTER	SD-11
STRAIGHT CURB (NOT ALLOWED IN STREETS)	SD-12
STANDARD SIDEWALK	SD-13
PEDESTRIAN RAMPS	SD-14
DRIVEWAY APPROACH	SD-15
TYPICAL SIGN PLACEMENT	SD-16
TYPICAL SIGN MOUNTING	SD-17
ANTI-SPIN BASE DETAIL	SD-18
PVC TRENCH BEDDING & BACKFILL (PAVED SURFACE)	SD-19a
PVC TRENCH BEDDING & BACKFILL (GRAVELED SURFACE)	SD-19b
PVC TRENCH BEDDING & BACKFILL (UNIMPROVED SURFACE)	SD-19c
PVC TRENCH BEDDING & BACKFILL NOTES	SD-19d
TRENCH PLUG	SD-20

## WATER SYSTEM DETAILS

WATER SERVICE – COPPER TUBING	SD-21
WATER SERVICE – PE PIPE	SD-22
FIRE HYDRANT	SD-23
VALVE SETTING	SD-24
VALVE BOX ADJUSTMENT	SD-25
RESIDENTIAL SERVICE WITH FIRE SPRINKLER SYSTEM	SD-26
MULTIFAMILY RESIDENTIAL SERVICES>25 FIXTURE UNITS	SD-27
MULTIFAMILY RESIDENTIAL SERVICES<25 FIXTURE UNITS	SD-28
AIR RELEASE AND BLOWOFF (FIRE HYDRANT)	SD-29
FIRE HYDRANT AND END OF MAIN JOINT RESTRAINTS	SD-30

## **SANITARY SEWER SYSTEM DETAILS**

SANITARY SEWER SERVICE	SD-31
SANITARY SEWER MANHOLE	SD-32a
SANITARY SEWER WITH DROP INLET	SD-32b
SANITARY SEWER NOTES	SD-32c
MANHOLE ADJUSTMENT	SD-33
PRESSURIZED SEWER SERVICE ASSEMBLY	SD-34
INSIDE GRINDER PUMP	SD-35
OUTSIDE GRINDER PUMP	SD-36

## **STORM DRAINAGE SYSTEM DETAILS**

STORM DRAIN SERVICE CONNECTIONS	SD-37
CONCRETE VALLEY GUTTER	SD-38
PLAN VIEW CONC. VALLEY GUTTER WITH APRON	SD-39a
CONCRETE VALLEY GUTTER WITH APRON	SD-39b
STORM DRAIN INLET DETAIL	SD-40
STORM DRAIN MANHOLE	SD-41
AREA DRAIN AND CATCH BASIN	SD-42
INLET APRON	SD-43
BIOSWALE DETAIL	SD-44
DRYWELL DETAIL TYPE 'A'	SD-45a
DRYWELL DETAIL TYPE 'B'	SD-45b
DRYWELL DETAIL NOTES	SD-45c
OUTLET STRUCTURE	SD-46a
OUTLET STRUCTURE	SD-46b

## **STREET LIGHTING DETAILS**

LUMINAIRE AND POLE DETAIL	SD-47a
TYPE 1 PULL BOX	SD-47b
TYPICAL STREET LIGHTING CONDUIT	SD-47c
CONCRETE PAD FOR SERVICE ASSEMBLY	SD-47d
BASE PLATE AND PVC RISER DETAILS	SD-47e
LIGHT POLE BASE DETAIL	SD-47f
SERVICE WIRING DIAGRAM	SD-47g
LIGHTING NOTES	SD-47h

## **BIKE PATH DETAIL**

BIKE PATH	SD-48
-----------	-------

## **EROSION AND SEDIMENTATION CONTROL DETAILS**

PRESERVATION OF EXISTING VEGETATION	SD-49
-------------------------------------	-------

**EROSION AND SEDIMENTATION CONTROL DETAILS (CONTINUED)**

SEDIMENT/DESILTING BASIN	SD-50
TEMPORARY SEEDING	SD-51
STRAW MULCH	SD-52
HYDRAULIC MULCH	SD-53
POST-PAVING GRAVEL CURB INLET FILTER	SD-54
STRAW BALE SEDIMENT CONTROL	SD-55
FIBER ROLLS	SD-56
EROSION CONTROL DETAILS (FIBER ROLLS)	SD-57
EROSION CONTROL DETAILS (FIBER ROLLS)	SD-58
EROSION CONTROL DETAILS (FIBER ROLLS)	SD-59
TYPICAL SLOPE SOIL STABILIZATION	SD-60
TYPICAL INSTALLATION DETAILS	SD-61
STRAW BALE CHECK DAMS	SD-62
TEMPORARY CHECK DAM (TYPE 1)	SD-63
TEMPORARY CHECK DAM (TYPE 2)	SD-64
TEMPORARY CHECK DAM DETAILS (TYPE 1 & 2)	SD-65
VEHICLE TRACKING PAD	SD-66
SILT FENCE	SD-67

APPROVED FOR CONSTRUCTION

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
CITY ENGINEER

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
FIRE MARSHAL

The following note must be placed on the title sheet (first sheet) of all improvement plans submitted to the City of Whitefish Public Works Department. Prior to improvement plans being accepted as complete, the signed **RECORD DRAWINGS CERTIFICATE** will be required.

**RECORD DRAWINGS CERTIFICATE**

ALL INFORMATION SHOWN ON THESE PLANS HAS BEEN PREPARED BY OR UNDER DIRECTION OF, THE UNDERSIGNED ENGINEER. ADJUSTMENTS MADE IN THE FIELD DURING CONSTRUCTION ARE INCLUDED HEREIN AND ARE BASED UPON FIELD OBSERVATIONS MADE UNDER THE DIRECTION OF OR BY THE UNDERSIGNED **AND** CITY OF WHITEFISH WHEN THE ENGINEER IS ADVISED IN WRITING OF SUCH CHANGE. THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR CHANGES TO THESE PLANS NOT AUTHORIZED BY THE ENGINEER.

\_\_\_\_\_  
DATE

\_\_\_\_\_  
ENGINEER SIGNATURE  
(STAMP OR SEAL)

\_\_\_\_\_  
DATE

\_\_\_\_\_  
CONTRACTOR SIGNATURE

The following must be included in the lower right hand corner of all remaining sheets of a plan set. The date and initials of the responsible engineer shall be completed, as part of the "RECORD DRAWINGS" required as noted below.

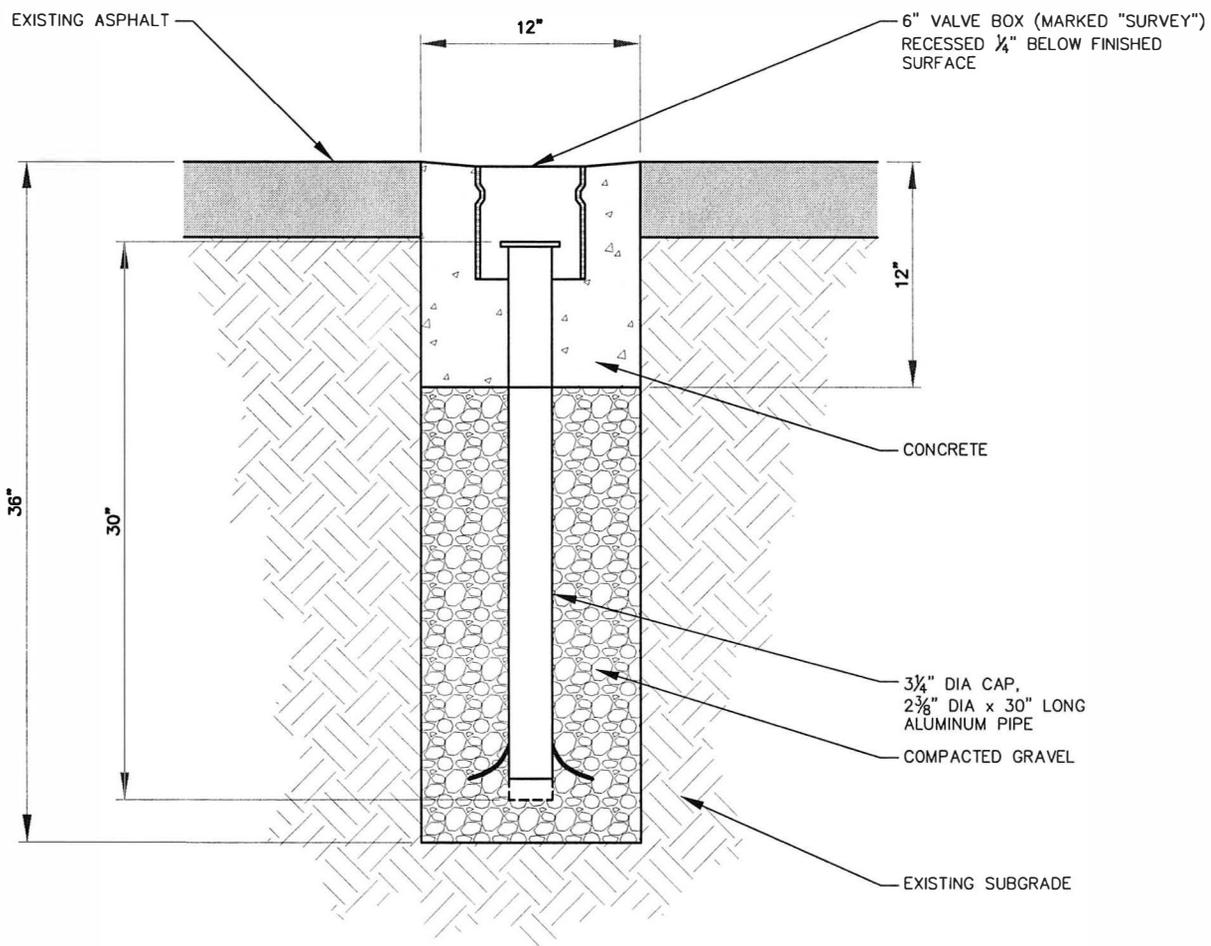
RECORD DRAWINGS

\_\_\_\_\_  
DATE

\_\_\_\_\_  
ENGINEER INITIAL

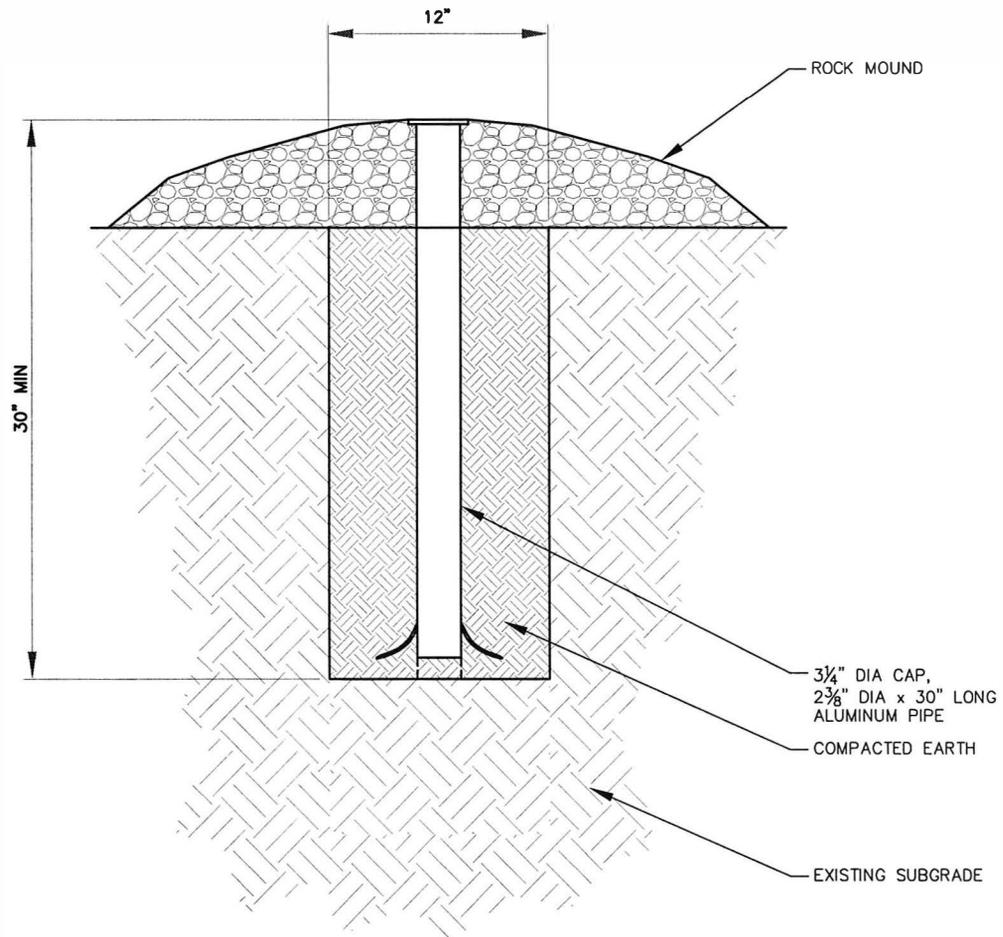
\_\_\_\_\_  
DATE

\_\_\_\_\_  
CONTRACTOR INITIAL

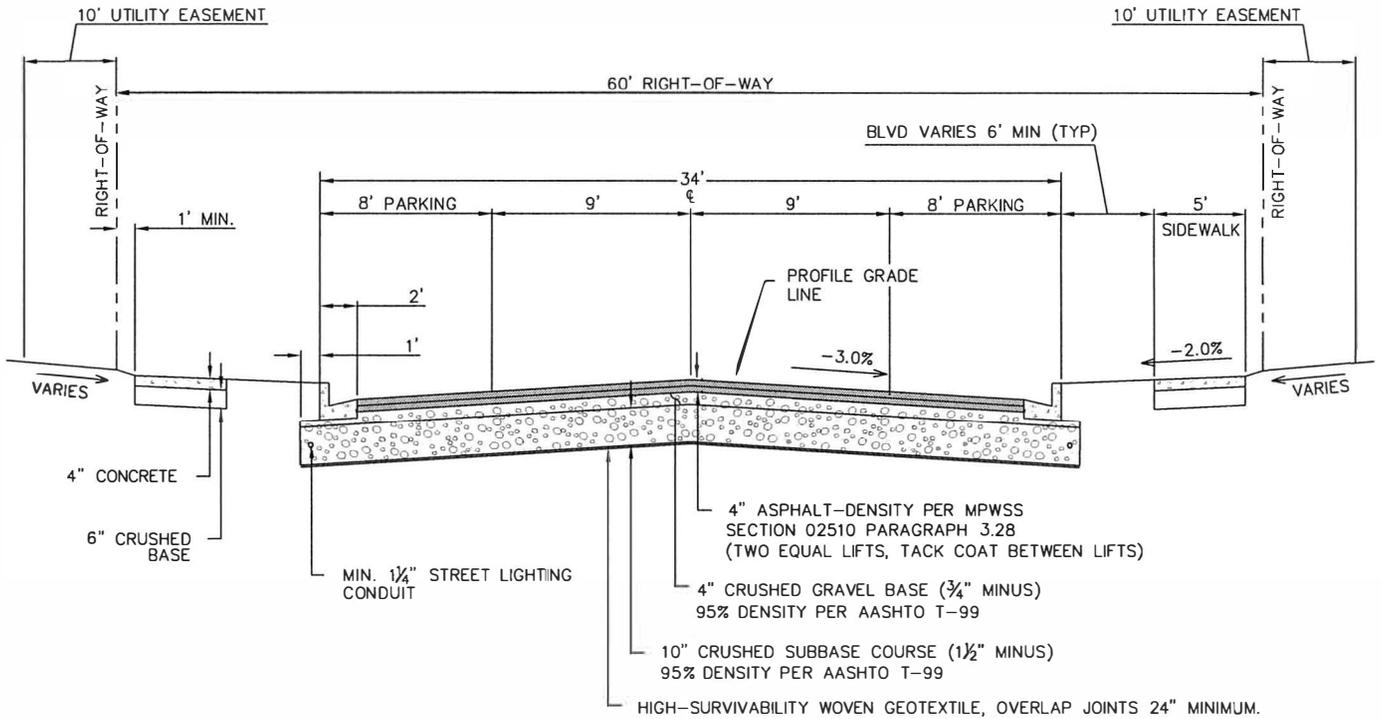


**SURVEY MONUMENT - PLACED IN ASPHALT**

SCALE: NONE



**SURVEY MONUMENT - PLACED IN TURF**  
SCALE: NONE



**34 FT. TYPICAL ROADWAY SECTION**

SCALE: NONE

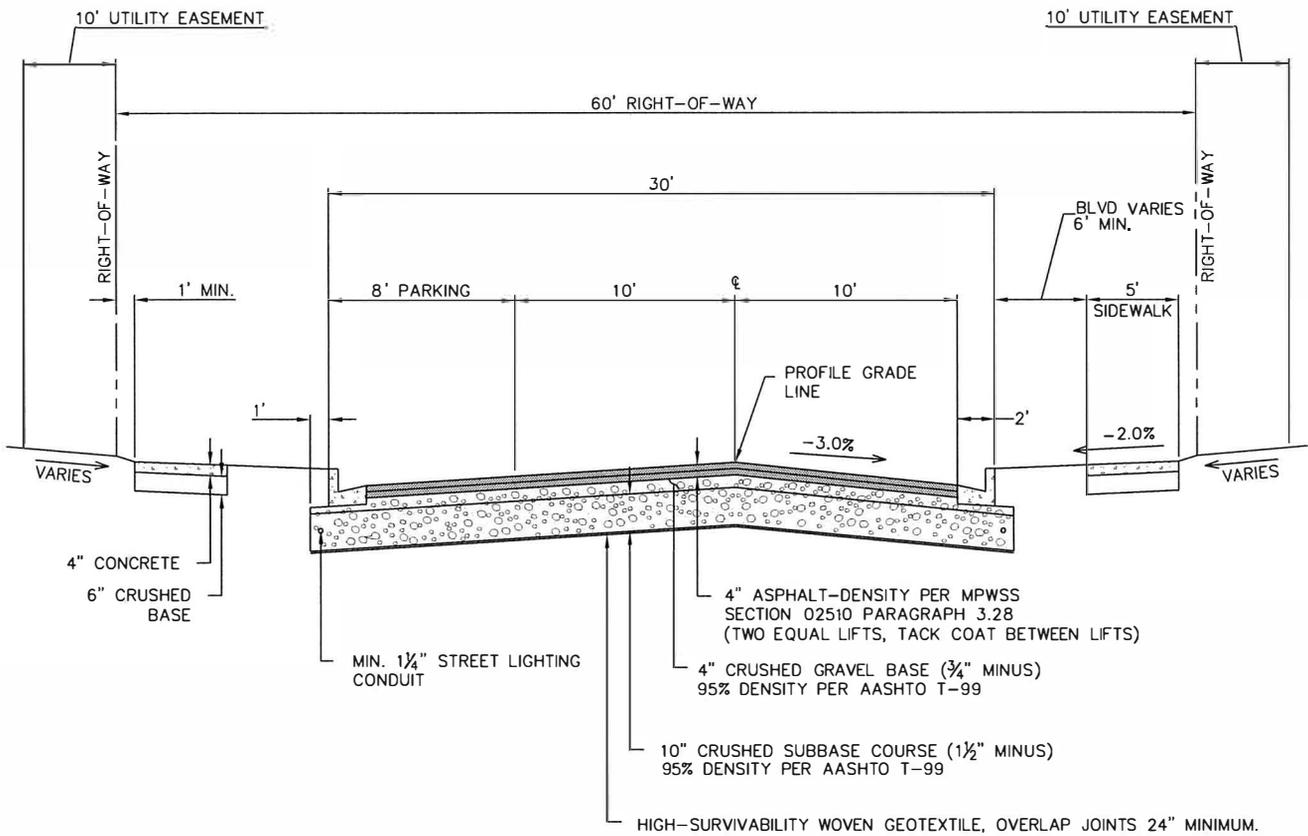
**NOTES:**

1. THE WIDTH OF THE RIGHT OF WAY MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR OTHER REQUIREMENTS.
2. ALL TOPSOILED AREAS TO BE SEEDED OR SODDED.
3. THE MAXIMUM GRADE SHALL BE 9%.
4. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.

GEOTEXTILE INSTALLATION:

- A. COMPACT SUBGRADE TO 95% PROCTOR.
- B. REMOVE ALL WRINKLES.
- C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.

5. UTILITY NOTE: NO UNDERGROUND UTILITIES SHALL BE PLACED IN THE BOULEVARD BETWEEN THE BACK OF CURB AND SIDEWALK, UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, STORM SEWER, AND STREET LIGHTING) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.

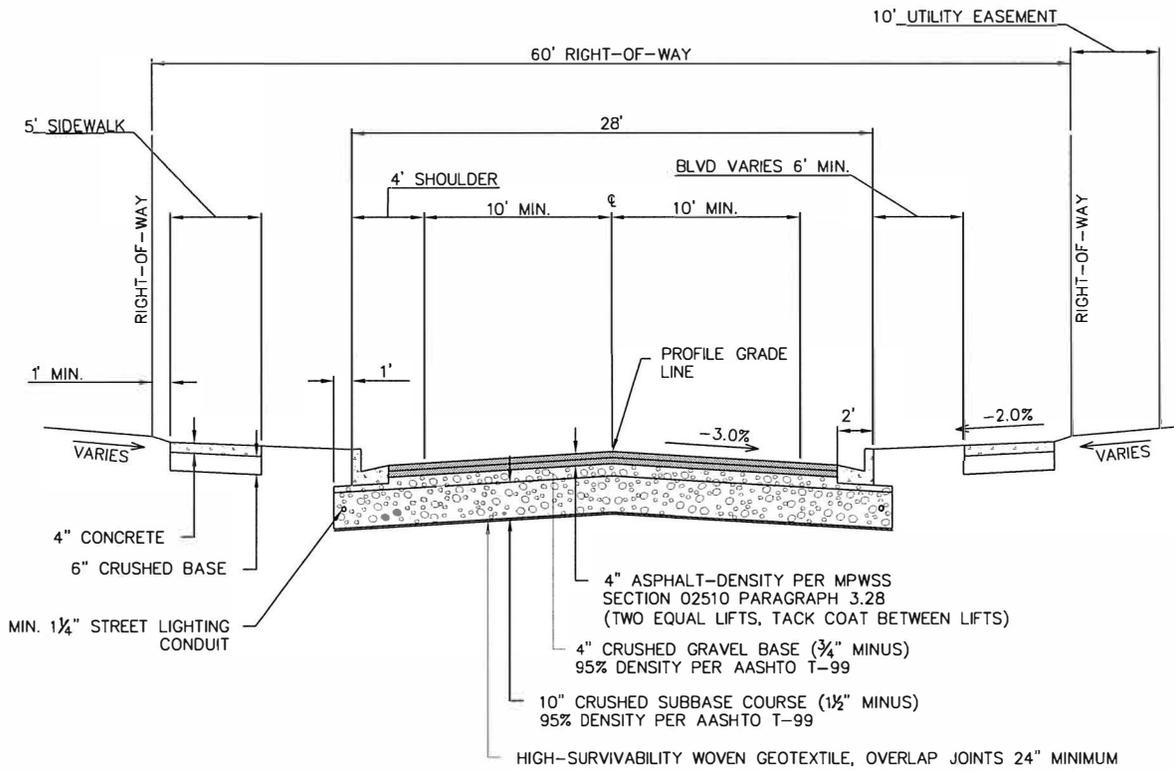


**30 FT. TYPICAL ROADWAY SECTION**

SCALE: NONE

**NOTES:**

1. THE WIDTH OF THE RIGHT OF WAY MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR OTHER REQUIREMENTS.
2. ALL TOPSOILED AREAS TO BE SEEDDED OR SODDED.
3. THE MAXIMUM GRADE SHALL BE 9%.
4. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.  
 GEOTEXTILE INSTALLATION:  
 A. COMPACT SUBGRADE TO 95% PROCTOR.  
 B. REMOVE ALL WRINKLES.  
 C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.
5. UTILITY NOTE: NO UNDERGROUND UTILITIES SHALL BE PLACED IN THE BOULEVARD BETWEEN THE BACK OF CURB AND SIDEWALK, UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, STORM SEWER, AND STREET LIGHTING) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.



**28 FT. TYPICAL ROADWAY SECTION**

SCALE: NONE

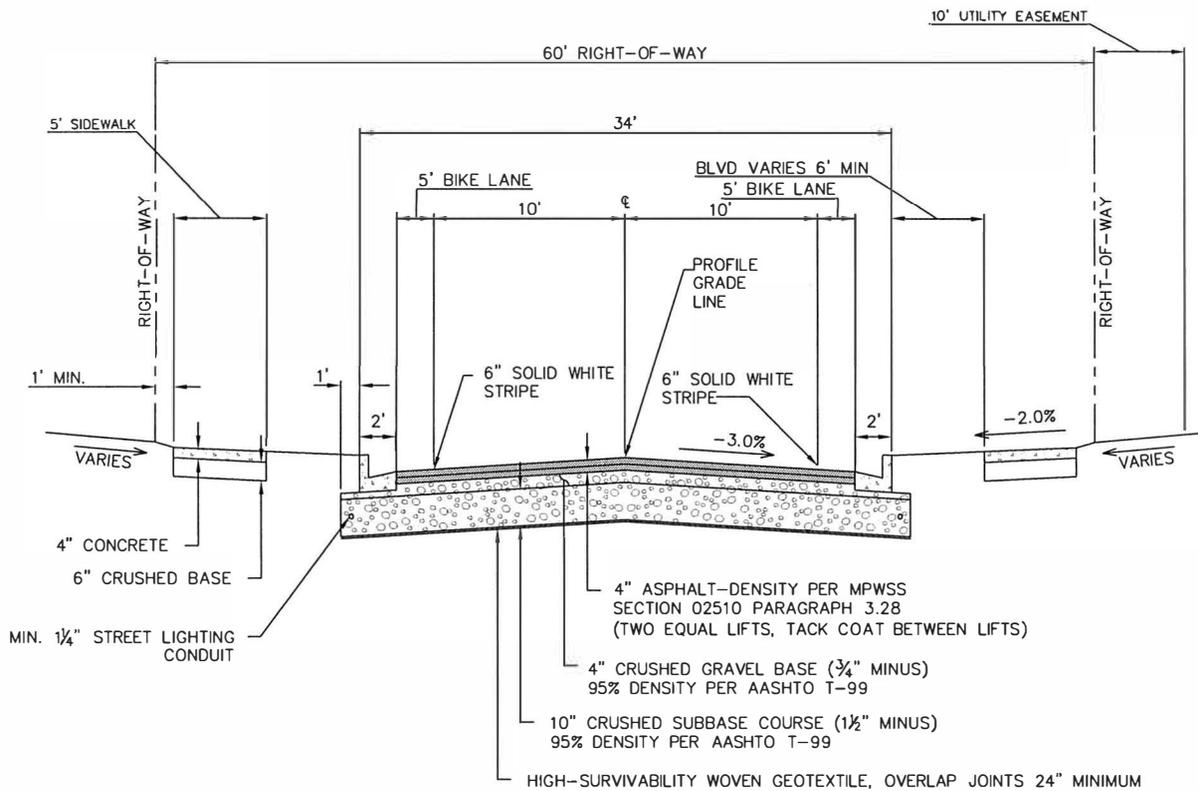
**NOTES:**

1. THE WIDTH OF PAVEMENT WILL DEPEND ON LOCAL CONDITIONS SUCH AS WIDTH OF EXISTING STREETS IN THE AREA, ANTICIPATED TRAFFIC VOLUME, PARKING REQUIREMENTS, FUTURE EXTENSIONS, ETC.
2. THE WIDTH OF THE R/W MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR OTHER REQUIREMENTS.
3. ALL TOPSOILED AREAS TO BE SEEDED OR SODDED.
4. THE MAXIMUM GRADE SHALL BE 9%.
5. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.

GEOTEXTILE INSTALLATION:

- A. COMPACT SUBGRADE TO 95% PROCTOR.
- B. REMOVE ALL WRINKLES.
- C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.

6. UTILITY NOTE: NO UNDERGROUND UTILITIES SHALL BE PLACED IN THE BOULEVARD BETWEEN THE BACK OF CURB AND SIDEWALK, UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, STORM SEWER, AND STREET LIGHTING) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.



### 34 FT. TYPICAL ROADWAY SECTION

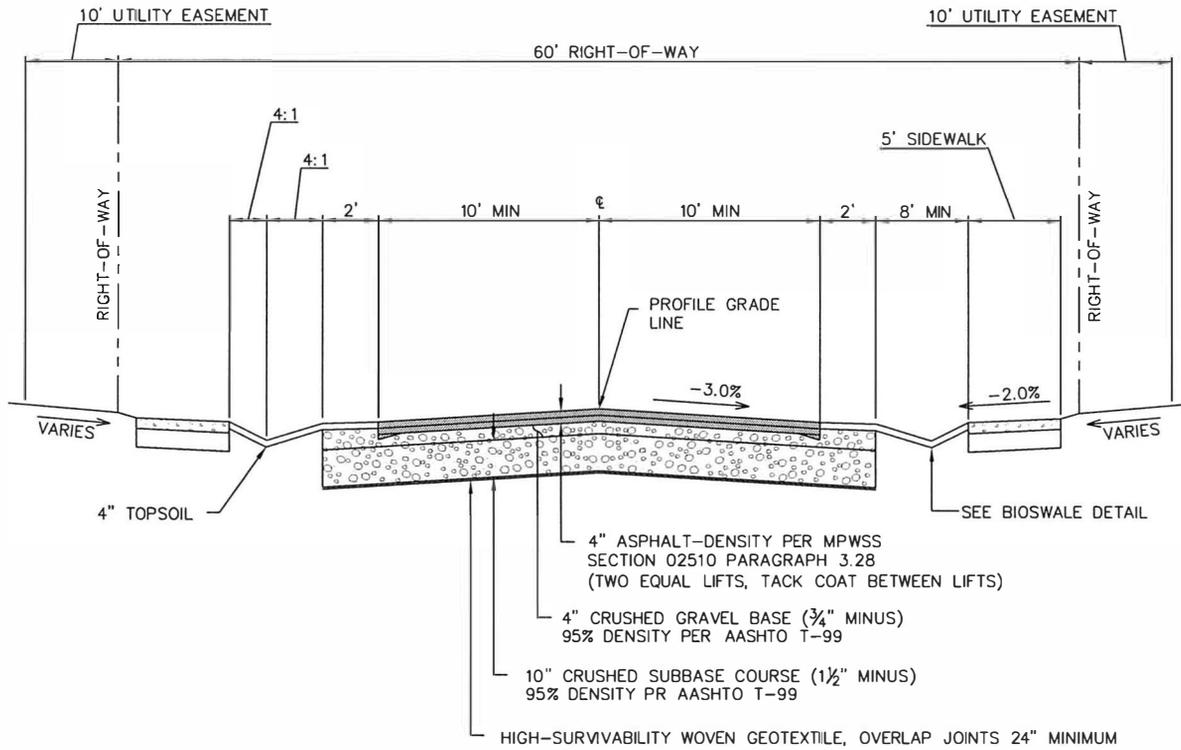
SCALE: NONE

#### NOTES:

1. THE WIDTH OF PAVEMENT WILL DEPEND ON LOCAL CONDITIONS SUCH AS WIDTH OF EXISTING STREETS IN THE AREA, ANTICIPATED TRAFFIC VOLUME, PARKING REQUIREMENTS, FUTURE EXTENSIONS, ETC.
2. THE WIDTH OF THE RIGHT OF WAY MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR R OTHER REQUIREMENTS.
3. ALL TOPSOILED AREAS TO BE SEEDED OR SODDED.
4. THE MAXIMUM GRADE SHALL BE 9%.
5. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.
 

GEOTEXTILE REPLACEMENT:

  - A. COMPACT SUBGRADE TO 95% PROCTOR.
  - B. REMOVE ALL WRINKLES.
  - C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.
6. UTILITY NOTE: NO UNDERGROUND UTILITIES SHALL BE PLACED IN THE BOULEVARD BETWEEN THE BACK OF CURB AND SIDEWALK, UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, STORM SEWER, AND STREET LIGHTING) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.



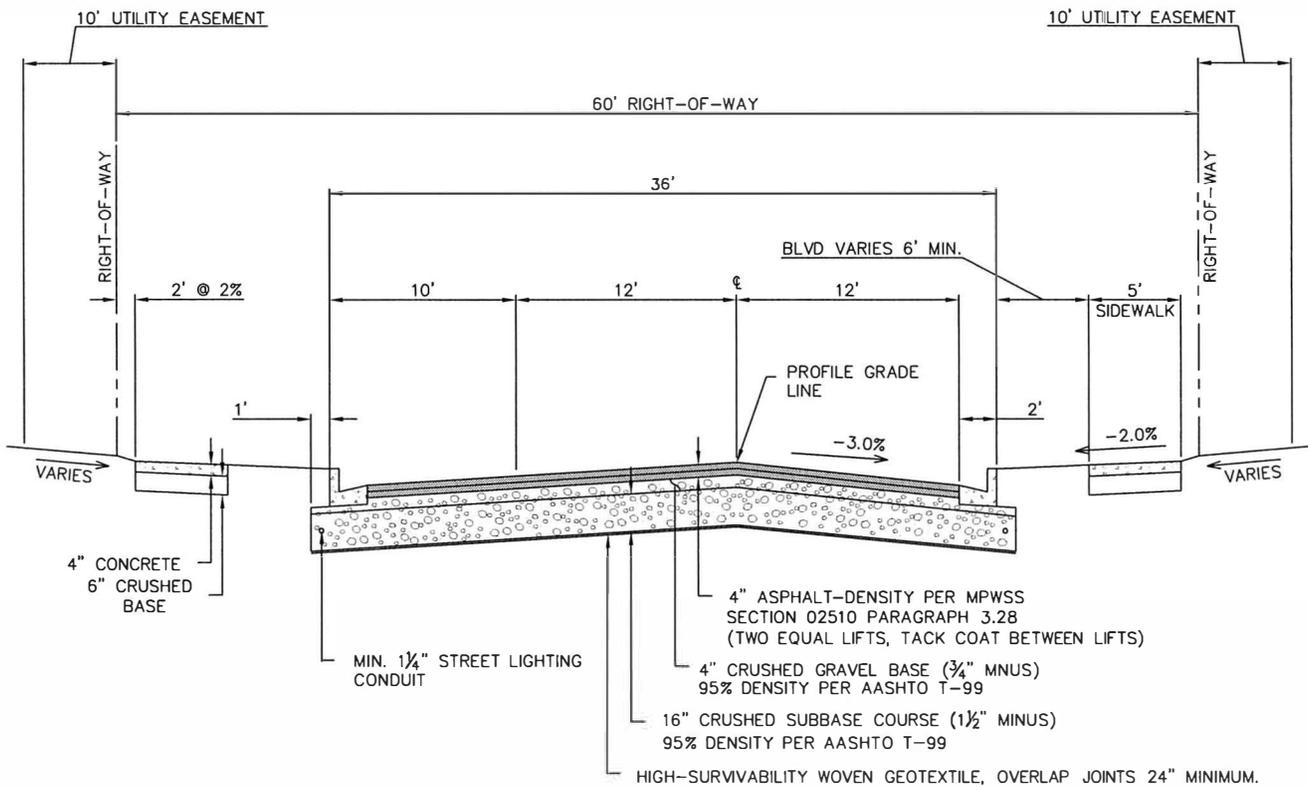
**24' RURAL ROADWAY SECTION (20' ASPHALT)**

SCALE: NONE

**NOTES:**

1. THIS CROSS-SECTION MAY BE USED ONLY WHEN THE AREA ADJACENT TO THE PROPOSED DEVELOPMENT DOES NOT HAVE CURBING OR ESTABLISHED STORM DRAINAGE SYSTEMS. THE CROSS-SECTION MUST BE APPROVED BY THE PUBLIC WORKS DIRECTOR PRIOR TO INCORPORATING INTO THE DRAWINGS.
2. THE ASPHALT EDGE MUST BE THICKENED TO PREVENT CRACKING.
3. THE WIDTH OF THE RIGHT OF WAY MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR OTHER REQUIREMENTS.
4. ALL TOPSOILED AREAS TO BE SEEDED OR SODDED.
5. THE MAXIMUM GRADE SHALL BE 9%.
6. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.  
 GEOTEXTILE INSTALLATION:  
 A. COMPACT SUBGRADE TO 95% PROCTOR.  
 B. REMOVE ALL WRINKLES.  
 C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.
7. UTILITY NOTE: UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, AND STORM SEWER) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.





### 36 FT. TYPICAL ROADWAY SECTION

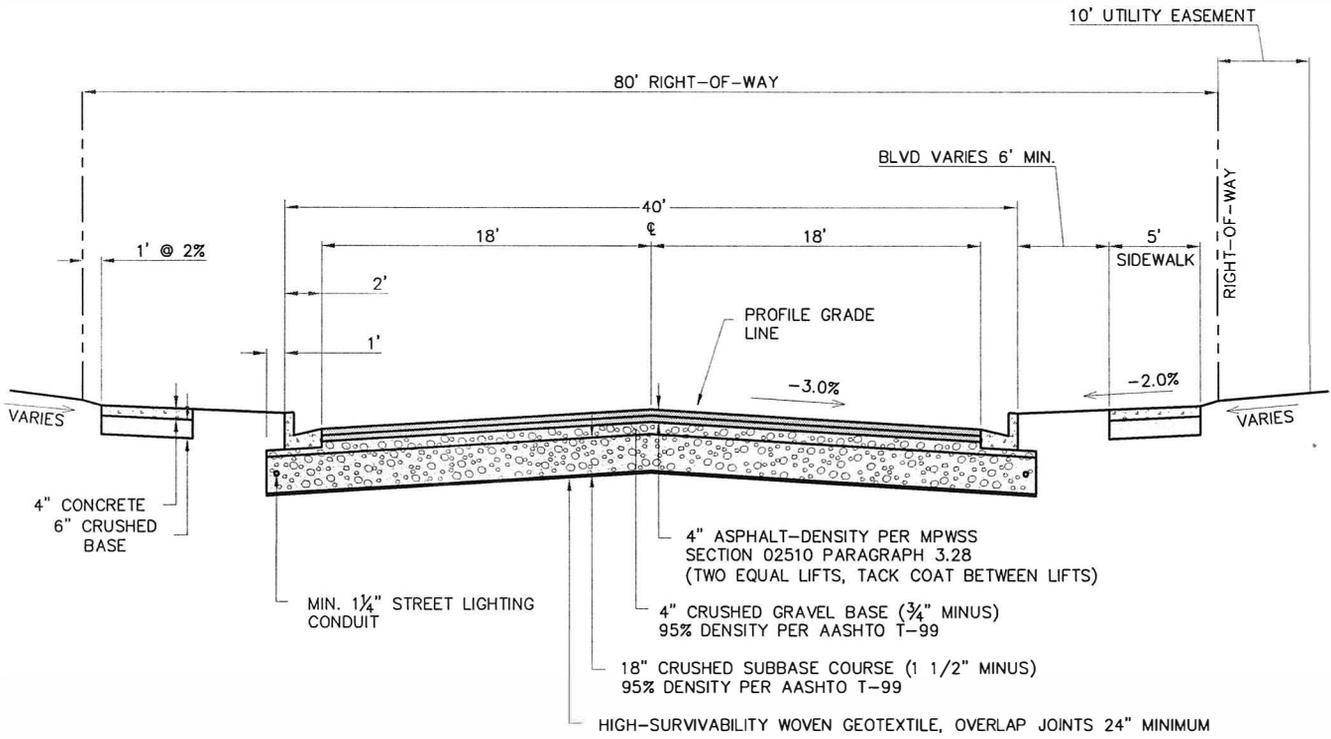
SCALE: NONE

#### NOTES:

1. THE WIDTH OF THE R/W MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR OTHER REQUIREMENTS.
2. ALL TOPSOILED AREAS TO BE SEEDED OR SODDED.
3. THE MAXIMUM GRADE SHALL BE 8%.
4. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.

#### GEOTEXTILE INSTALLATION:

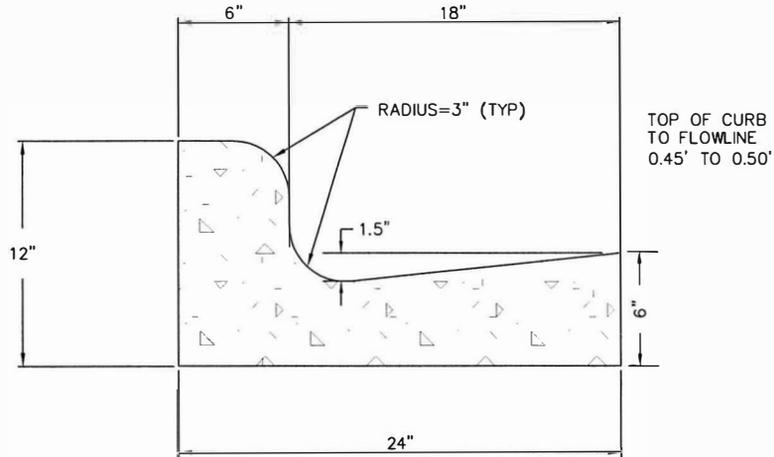
- A. COMPACT SUBGRADE TO 95% PROCTOR.
  - B. REMOVE ALL WRINKLES.
  - C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.
5. UTILITY NOTE: NO UNDERGROUND UTILITIES SHALL BE PLACED IN THE BOULEVARD BETWEEN THE BACK OF CURB AND SIDEWALK, UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, STORM SEWER, AND STREET LIGHTING) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.



**40' ARTERIAL TYPICAL ROADWAY SECTION**  
SCALE: NONE

**NOTES:**

1. THE WIDTH OF THE RIGHT OF WAY MAY HAVE TO BE INCREASED DUE TO ROAD SLOPES, UTILITIES, TRAFFIC VOLUME OR OTHER REQUIREMENTS.
2. ALL TOPSOILED AREAS TO BE SEEDED OR SODDED.
3. THE MAXIMUM GRADE SHALL BE 6%.
4. THE CITY ENGINEER MAY REQUIRE THAT TRAFFIC LOAD AND SOIL ANALYSIS BE DONE AS PART OF STREET DESIGN PREPARED BY A PROFESSIONAL ENGINEER.
5. GEOTEXTILE SHALL BE MIRAFI 500x OR APPROVED EQUAL.  
 GEOTEXTILE INSTALLATION:
  - A. COMPACT SUBGRADE TO 95% PROCTOR.
  - B. REMOVE ALL WRINKLES.
  - C. DO NOT DRIVE OR OPERATE EQUIPMENT ON FABRIC.
6. UTILITY NOTE: NO UNDERGROUND UTILITIES SHALL BE PLACED IN THE BOULEVARD BETWEEN THE BACK OF CURB AND SIDEWALK, UNDERGROUND UTILITIES (OTHER THAN SEWER, WATER, STORM SEWER, AND STREET LIGHTING) SHALL BE LOCATED BETWEEN BACK OF SIDEWALK AND THE EASEMENT LINE.

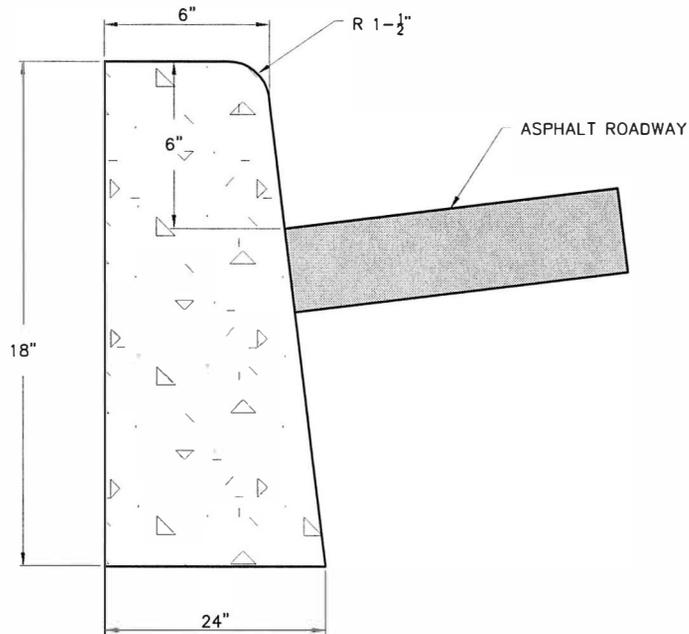


### **STANDARD CURB AND GUTTER**

SCALE: NONE

#### **NOTES:**

1.  $\frac{1}{2}$ " EXPANSION JOINT MATERIAL SHALL BE PLACED AT THE P.C.
2. CONTRACTION JOINT SHALL BE PLACED AT EVERY 15' OF CURB LENGTH AND SHALL HAVE A MINIMUM DEPTH OF  $\frac{3}{4}$ " AND MINIMUM WIDTH OF  $\frac{1}{8}$ ". CONTRACTION JOINTS SHALL BE CONSTRUCTED BY SAWING OR SCORING. A TOOL SHALL BE USED WHICH WILL LEAVE CORNERS ROUNDED AND DESTROY AGGREGATE INTERLOCK FOR THE SPECIFIED MINIMUM DEPTH.
3. GRADE, ALIGNMENT AND FORMS SHALL BE INSPECTED BY THE CITY PRIOR TO POURING.
4. CONCRETE SHALL BE M-4000 WITH  $\frac{3}{4}$ " MAXIMUM AGGREGATE AND A 28-DAY STRENGTH OF 4000 PSI, 5% TO 8% AIR CONTENT WITH A MAXIMUM SLUMP OF FOUR (4) INCHES.
5. INDIVIDUAL CONTRACTORS FORMS MAY VARY SLIGHTLY FROM THIS PATTERN. PATTERNS WHICH ACHIEVE ESSENTIALLY THE SAME RESULT AS THE ABOVE PATTERN MAY BE APPROVED BY THE CITY.
6. FOUR INCHES OF BASE MATERIAL IS REQUIRED. BASE MATERIAL SHALL BE  $\frac{3}{4}$ " CRUSHED BASE COURSE COMPACTED TO 95% PER AASHTO T-99.

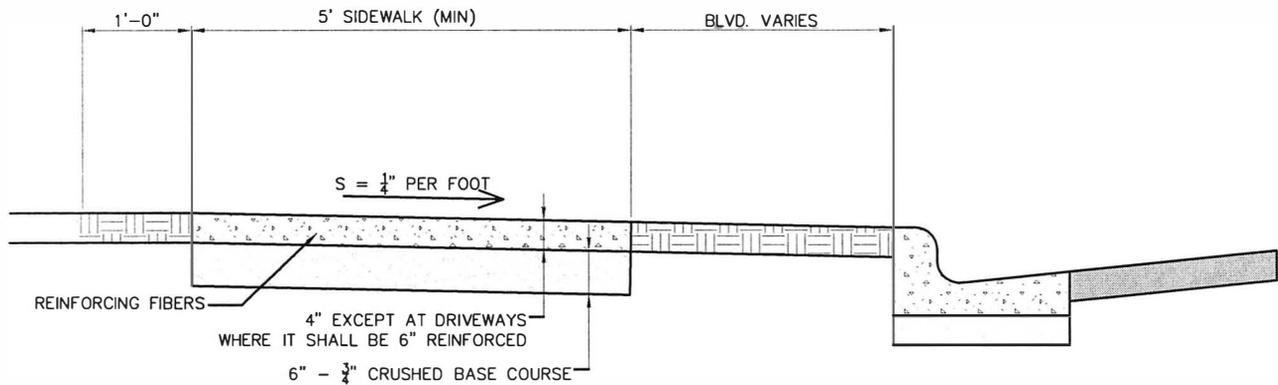


**STRAIGHT CURB**

SCALE: NONE

**NOTES:**

1.  $\frac{1}{2}$ " EXPANSION JOINT MATERIAL SHALL BE PLACED AT THE P.C.
2. CONTRACTION JOINT SHALL BE PLACED AT EVERY 15' OF CURB LENGTH AND SHALL HAVE A MINIMUM DEPTH OF  $\frac{3}{4}$ " AND MINIMUM WIDTH OF  $\frac{1}{8}$ ". CONTRACTION JOINTS SHALL BE CONSTRUCTED BY SAWING OR SCORING. A TOOL SHALL BE USED WHICH WILL LEAVE CORNERS ROUNDED AND DESTROY AGGREGATE INTERLOCK FOR THE SPECIFIED MINIMUM DEPTH.
3. GRADE, ALIGNMENT AND FORMS SHALL BE INSPECTED BY THE CITY PRIOR TO POURING.
4. CONCRETE SHALL BE M-4000 WITH  $\frac{3}{4}$ " MAXIMUM AGGREGATE AND A 28-DAY STRENGTH OF 4000 PSI, 5% TO 8% AIR CONTENT WITH A MAXIMUM SLUMP OF FOUR (4) INCHES.
5. INDIVIDUAL CONTRACTORS FORMS MAY VARY SLIGHTLY FROM THIS PATTERN. PATTERNS WHICH ACHIEVE ESSENTIALLY THE SAME RESULT AS THE ABOVE PATTERN MAY BE APPROVED BY THE CITY.
6. FOUR INCHES OF CRUSHED BASE COURSE MATERIAL IS REQUIRED. CRUSHED BASE COURSE MATERIAL SHALL BE  $\frac{3}{4}$ " CRUSHED GRAVEL COMPACTED TO 95% PER AASHTO T-99.
7. USE OF STRAIGHT CURB IS RESTRICTED TO SPECIFIC APPLICATION AND SHALL REQUIRE PRIOR APPROVAL FROM THE CITY ENGINEER.

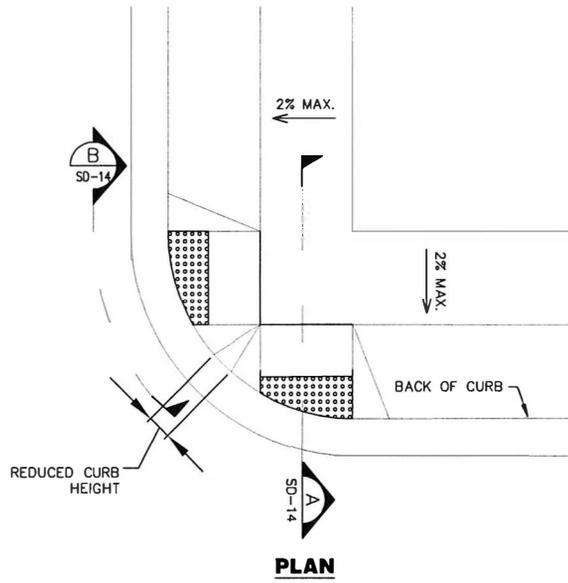


### STANDARD SIDEWALK

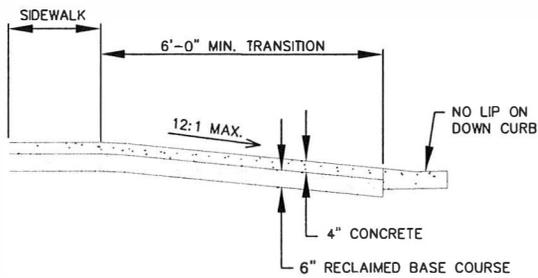
SCALE: NONE

#### NOTES:

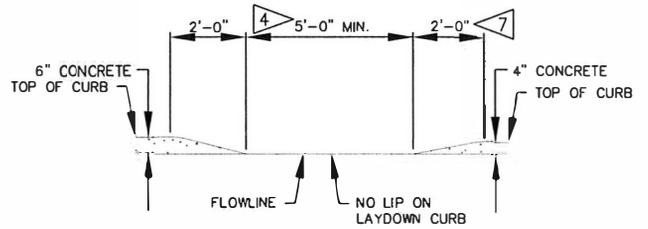
1. CONCRETE SHALL BE M-4000 WITH  $\frac{3}{4}$ " MAXIMUM AGGREGATE AND A 28-DAY STRENGTH OF 4000 PSI, 5% TO 8% AIR CONTENT WITH A MAXIMUM SLUMP OF FOUR (4) INCHES. CONCRETE SHALL INCLUDE 0.75 POUNDS OF REINFORCING FIBERS PER CUBIC YARD.
2. CONTRACTION JOINTS SHALL BE SPACED THE SAME DIMENSION AS THE WIDTH BUT NOT EXCEED 6 FEET EACH WAY. CONTRACTION JOINTS SHALL BE CONSTRUCTED BY SAWING OR SCORING. A TOOL SHALL BE USED WHICH WILL LEAVE CORNERS ROUNDED AND DESTROY AGGREGATE INTERLOCK FOR THE SPECIFIED MINIMUM DEPTH. CONTRACTION JOINTS SHALL BE A MINIMUM OF  $\frac{1}{4}$  OF THE TOTAL DEPTH OF THE CONCRETE.
3. ALL SIDEWALKS GREATER THAN SIX FEET IN WIDTH SHALL BE SAWCUT LENGTHWISE DOWN THE CENTER A MINIMUM OF  $\frac{1}{4}$  THE TOTAL DEPTH OF THE CONCRETE.
4. EXPANSION JOINTS, USING  $\frac{1}{2}$ " MATERIAL SHALL BE SPACED AT INTERVALS OF 45' MAXIMUM.
5. ALL EDGES AND JOINTS SHALL BE ROUNDED WITH AN EDGING TOOL OF A MINIMUM  $\frac{1}{4}$ " RADIUS.
6. SIX INCHES OF BASE MATERIAL IS REQUIRED. BASE MATERIAL SHALL BE  $\frac{3}{4}$ " CRUSHED BASE COURSE COMPACTED TO 95% PER AASHTO, T-99, OR SAND THOROUGHLY COMPACTED IN PLACE.
7. GRADE, ALIGNMENT AND FORMS SHALL BE INSPECTED BY THE CITY OR THEIR DESIGNATED INSPECTOR PRIOR TO POURING.
8. ALL CONCRETE DRIVEWAY SECTIONS SHALL BE 6" THICK WITH REINFORCEMENT. (SEE DRIVEWAY APPROACH DETAIL SD-15)
9. ALL COLD JOINTS SHALL HAVE SMOOTH DOWEL BARS PLACED IN BOTTOM  $\frac{1}{3}$  OF CONCRETE AT 18" O.C. EACH WAY & 6" FROM EDGES, OR KEY WAYS INSTALLED TO PREVENT VERTICAL SEPARATION.



**PEDESTRIAN RAMP**  
SCALE: NONE



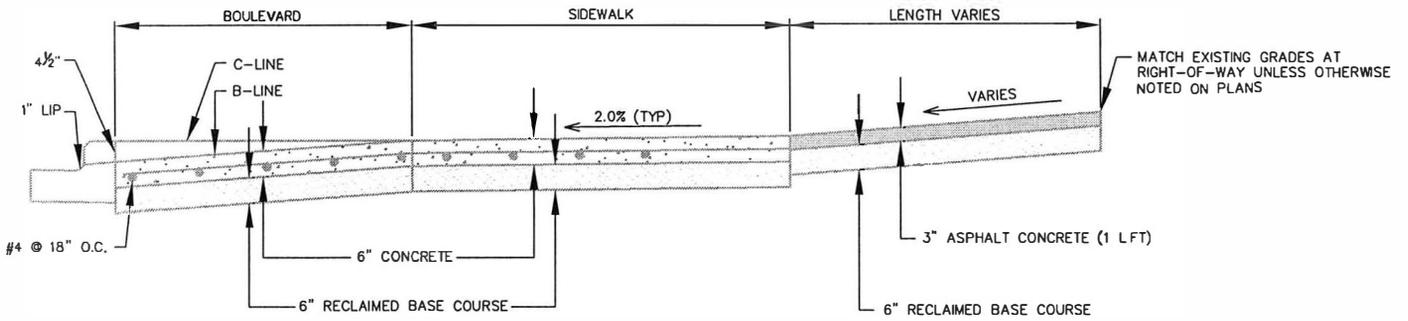
**SECTION A**  
SCALE: NONE SD-14



**SECTION B**  
SCALE: NONE SD-14

**NOTES:**

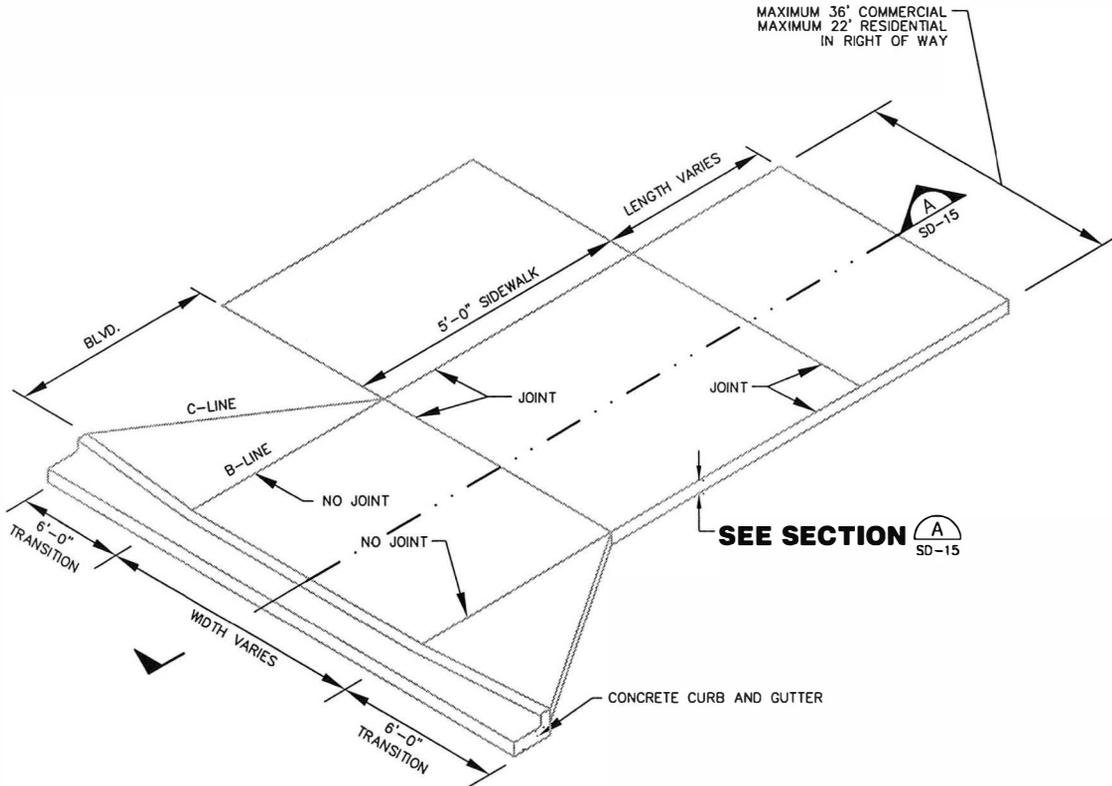
1. RAMP SLOPE SHALL NOT BE STEEPER THAN 12:1.
2. SIDEWALK CROSS-SLOPES SHALL NOT EXCEED 2%.
3. BEGIN RAMP SLOPE AT FLOWLINE OF GUTTER.
4. VARIES WITH CURB RETURN RADIUS.
5. CURB RAMPS MUST HAVE A DETECTABLE WARNING FEATURE EXTENDING THE FULL WIDTH OF THE RAMP. THE DETECTABLE SURFACE MUST CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 INCHES, A HEIGHT OF NOMINAL 0.2 INCHES AND A CENTER TO CENTER SPACING OF NOMINAL 2.35 INCHES AND BE A LEAST 3' IN WIDTH. THE TEXTURE AND COLOR OF THE DETECTABLE WARNING FEATURE MUST CONTRAST WITH SURROUNDING SURFACES.
6. SEE MPWSS 02529 FOR JOINT REQUIREMENTS.
7. TRANSITION TO 4" CURB BETWEEN PEDESTRIAN RAMPS.



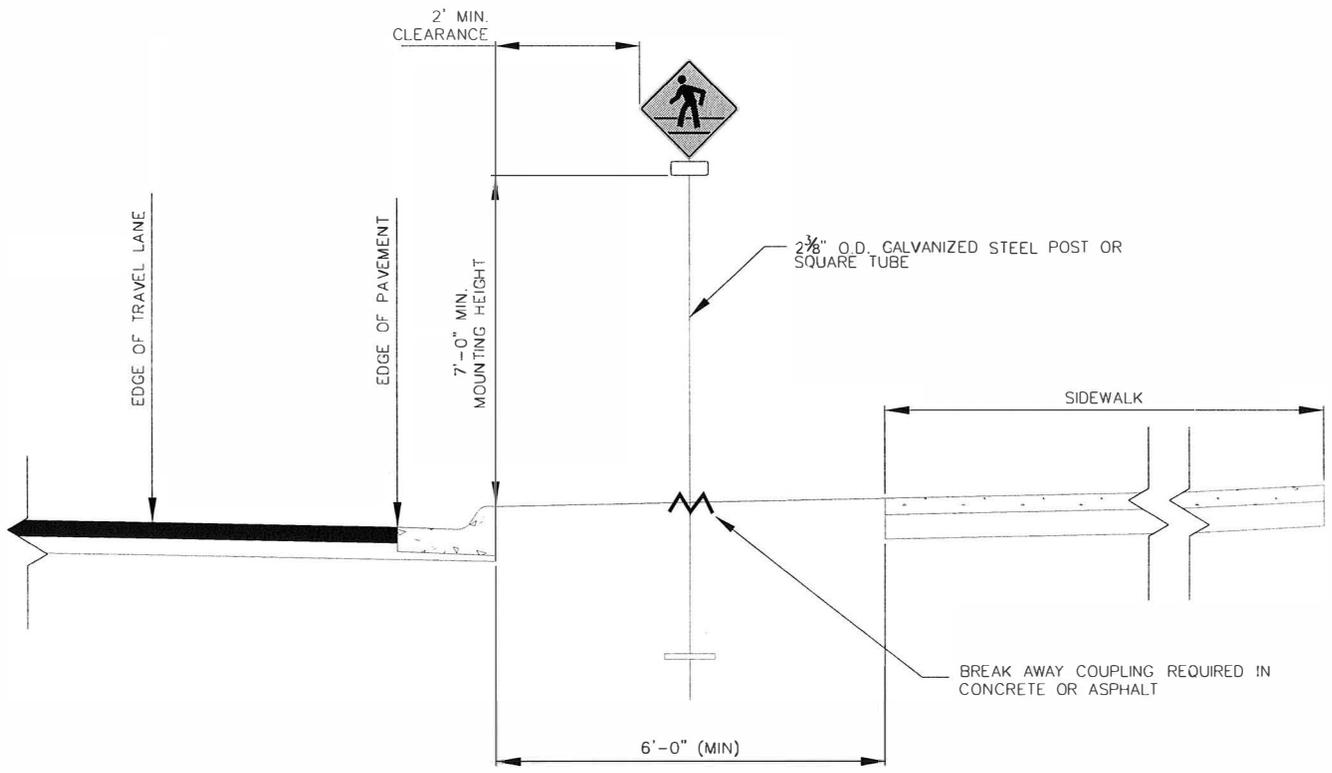
**SECTION A**  
SCALE: NONE SD-15

**NOTES:**

1. PLACE #4 REBAR @ 18" O.C. SUPPORTED BY 2" TALL CHAIRS IN ALL 6" CONCRETE.
2. SEE MPWSS 02529 FOR JOINT REQUIREMENTS.



**DRIVEWAY APPROACH 1**  
SCALE: NONE SD-15

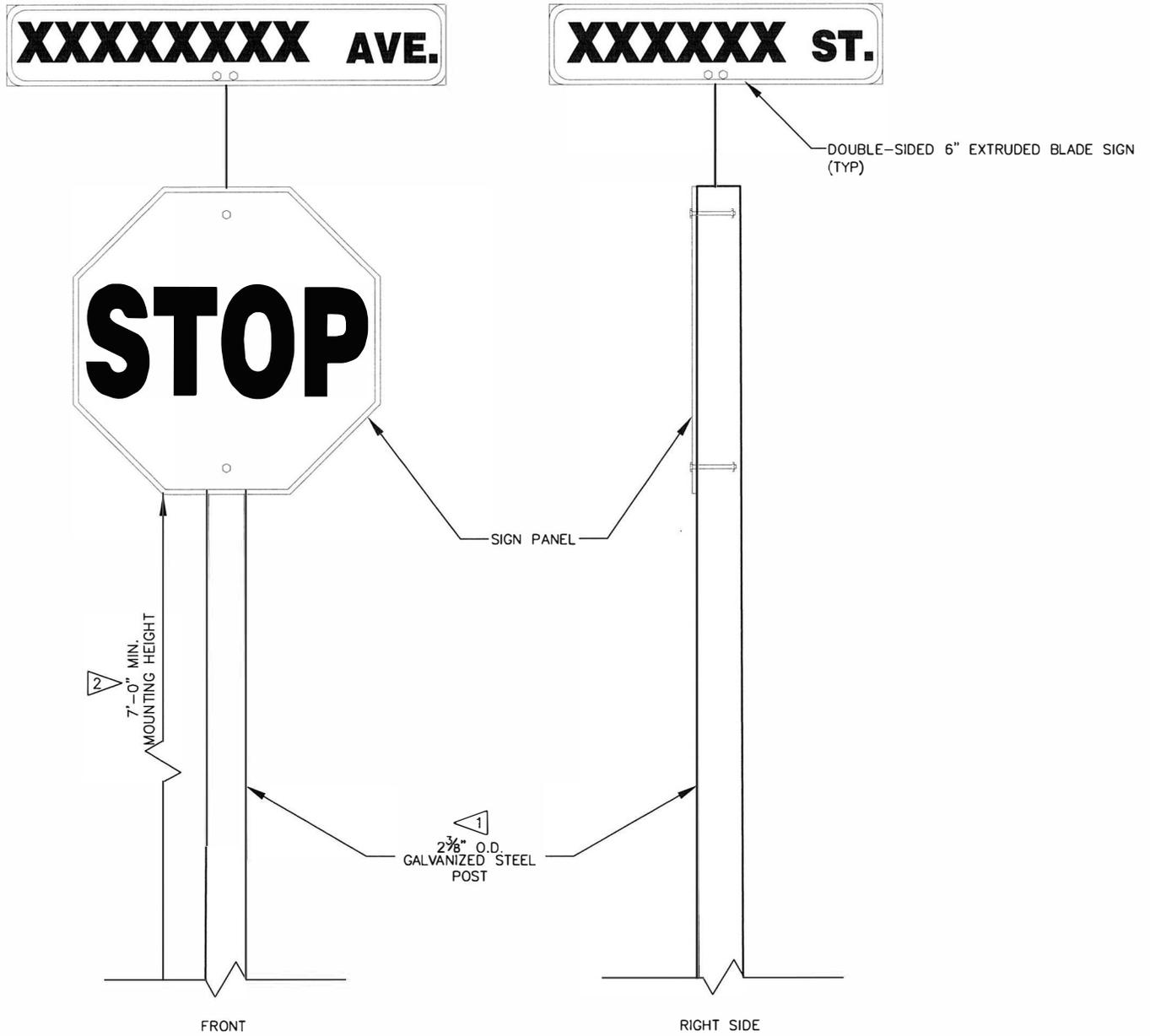


**NOTES:**

1. WELD TABS TO EACH SIDE OF STEEL TUBE TO ACHIEVE ANTI-SPIN BASE PLATE SIZE OR BOLT A 6" x 4" PLATE OF STEEL TO TUBE USING TWO 1/2" DIAMETER BOLTS. PLATE SHALL BE 4" FROM BOTTOM OF STEEL TUBE.
2. PLACE STOP SIGNS ADJACENT TO STOP BARS.
3. PLACE ALL SIGNS AT SPECIFIED CLEARANCES.

**TYPICAL SIGN PLACEMENT**

SCALE: NONE

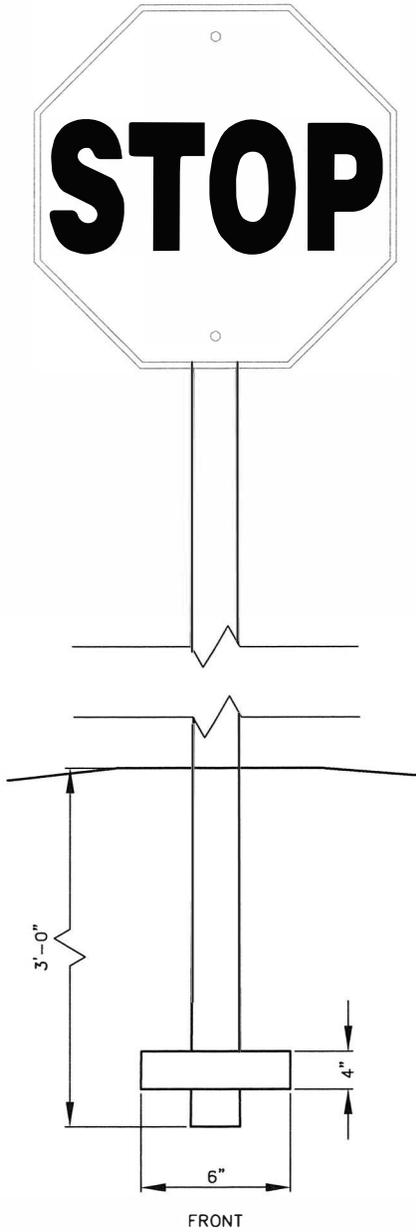


**TYPICAL D-3 SIGN MOUNTING**

SCALE: NONE

**SIGN SPECIFICATIONS:**

- 1 THESE POSTS SHALL INCLUDE 3/8" WIDE RED/FLORESCENT YELLOW-GREEN POST REFLECTORS AS REQUIRED.
- 2 BOTTOM OF SIGN PER MUTCD. (7'-0" MIN.)
- 3. STREET NAME SIGN BACKING SHALL BE 3M GREEN 3277 HIGH GRADE REFLECTIVE SHEETING OR APPROVED EQUAL.
- 4. STREET NAME SIGN LETTERING SHALL BE 3M WHITE 3290 HIGH GRADE REFLECTIVE SHEETING OR APPROVED EQUAL. LETTERING SHALL BE 6" HIGH IN CAPITAL LETTERS.
- 5. STREET NAME SIGNS SHALL BE ATTACHED TO THE TOP OF THE SIGN POST WITH A ROUND CAP SIGN HOLDER WITH A 6"-LONG MOUNTING BRACKET. A 6"-LONG 90 CROSSPIECE SHALL BE USED FOR DUAL SIGN APPLICATIONS.

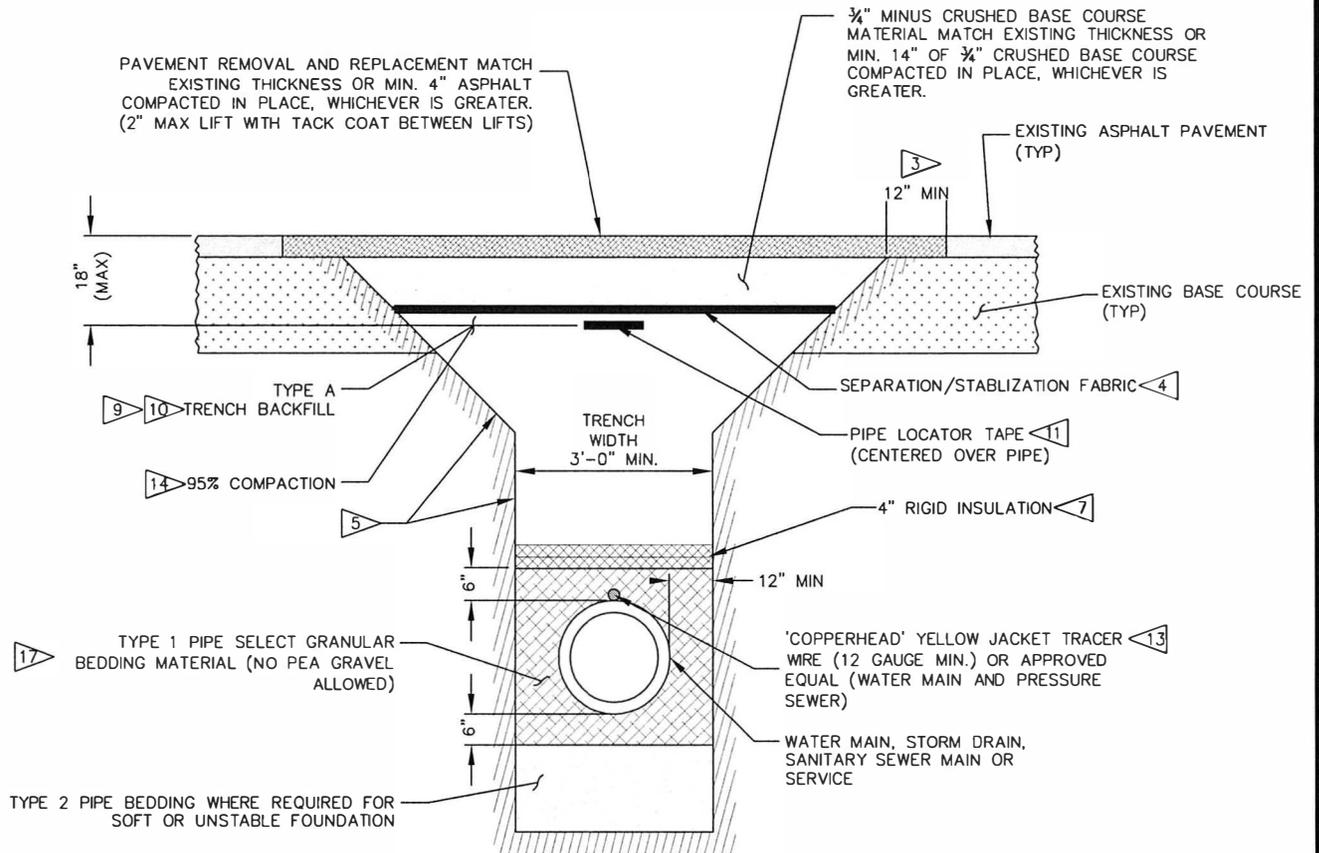


**ANTI-SPIN BASE DETAIL**

SCALE: NONE

**SIGN SPECIFICATIONS**

1. ALL SIGN BLANKS SHALL BE .080 GAUGE FLAT ALUMINUM STOCK.
2. STOP SIGN FACES SHALL BE 3M HIGH INTENSITY GRADE REFLECTIVE SHEETING OR APPROVED EQUAL.
3. ALL SIGN MATERIALS AND CONSTRUCTION PROCEDURES SHALL CONFORM TO THE 'STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION,' 1995 EDITION, DISTRIBUTED BY THE MONTANA DEPARTMENT OF TRANSPORTATION (MDT).
4. UNIFORM MANUAL NUMBERS ARE REFERENCED TO THE 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES' BY THE FEDERAL HIGHWAYS ADMINISTRATION.



**3 PAVED SURFACE**

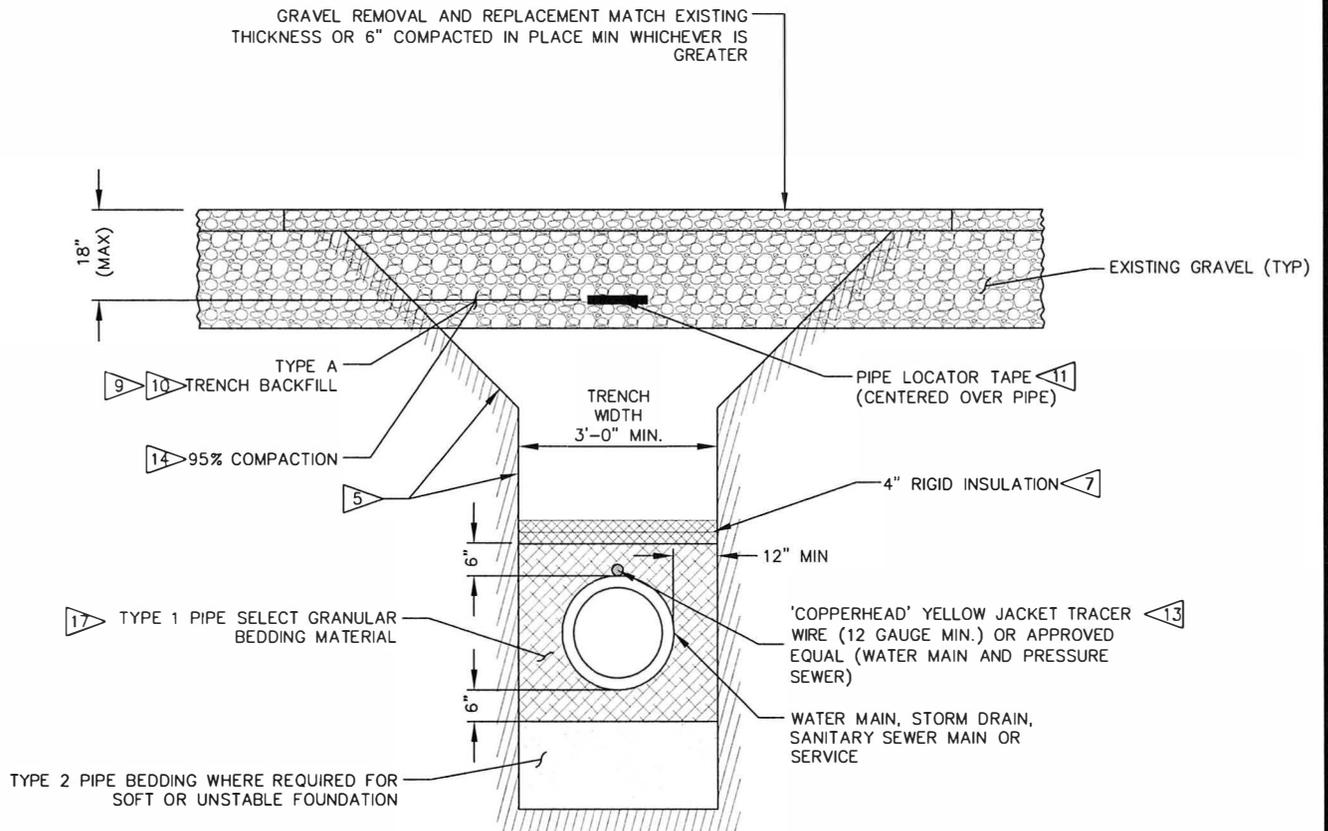
SCALE: NONE

**GEOTEXTILE REPLACEMENT:**

THE CONTRACTOR SHALL EXCAVATE TO STREET SUBGRADE AND EXPOSE THE GEOTEXTILE FABRIC WITHOUT DISTURBING IT. THE FABRIC SHALL BE CUT AND ROLLED BACK INTACT. A MINIMUM TWO FEET OF FABRIC SHALL BE EXPOSED ON EITHER SIDE OF THE CUT. THE FABRIC CUTS SHALL BE MADE WITH A SHARP KNIFE OR SCISSORS. RIPPING WITH A BACKHOE OR OTHER MACHINERY IS NOT ACCEPTABLE. AFTER PIPE BACKFILL, THE FABRIC SHALL BE PATCHED BY ONE OF THE FOLLOWING METHODS:

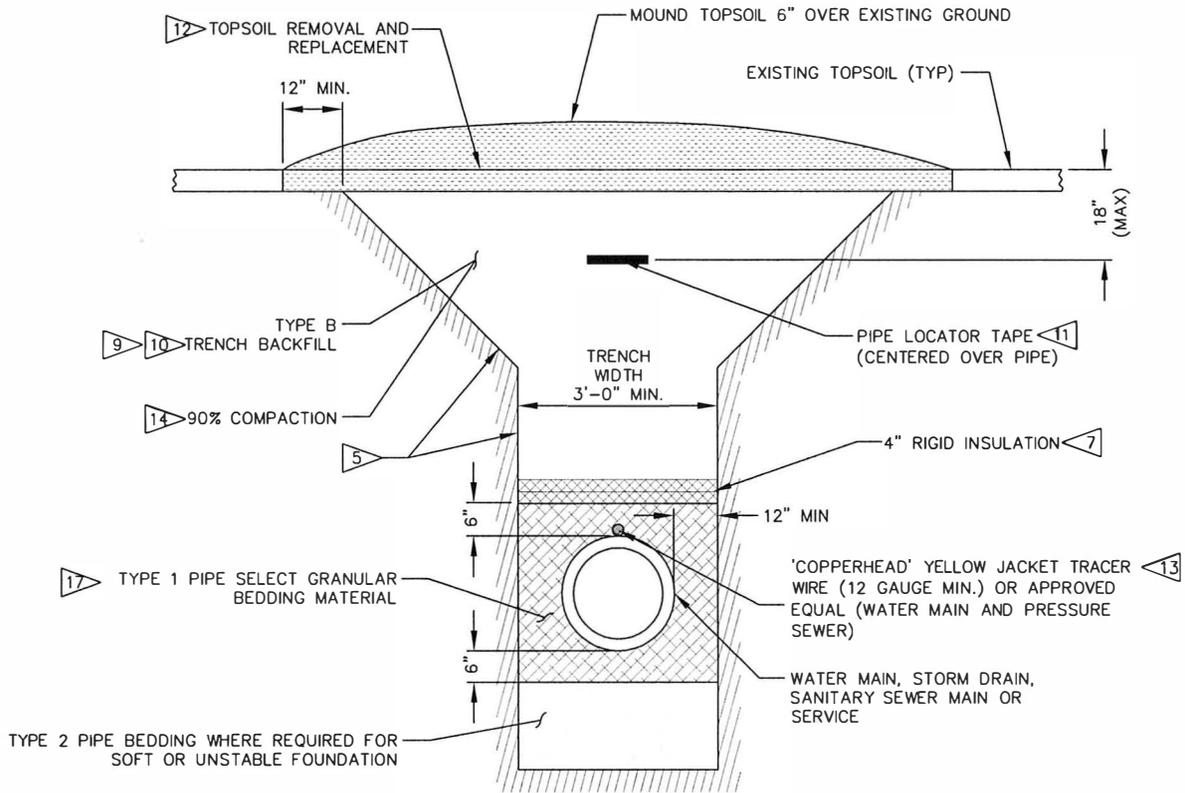
- A. CONTRACTOR SHALL INSTALL NEW FABRIC (AMOCO CEF 2006) WITH A MINIMUM OVERLAP OF 2' BEYOND ANY CUT MADE IN THE EXISTING FABRIC, OR
- B. THE CONTRACTOR SHALL INSTALL NEW FABRIC (AMOCO CEF 2006) BY SEWING THE NEW FABRIC TO THE EXISTING FABRIC USING STITCHING METHODS APPROVED BY THE FABRIC MANUFACTURER.

THE PATCHING OF THE GEOTEXTILE FABRIC MUST BE INSPECTED BY THE CITY OF WHITEFISH PRIOR TO BACKFILLING



**2 GRAVELED SURFACE**

SCALE: NONE



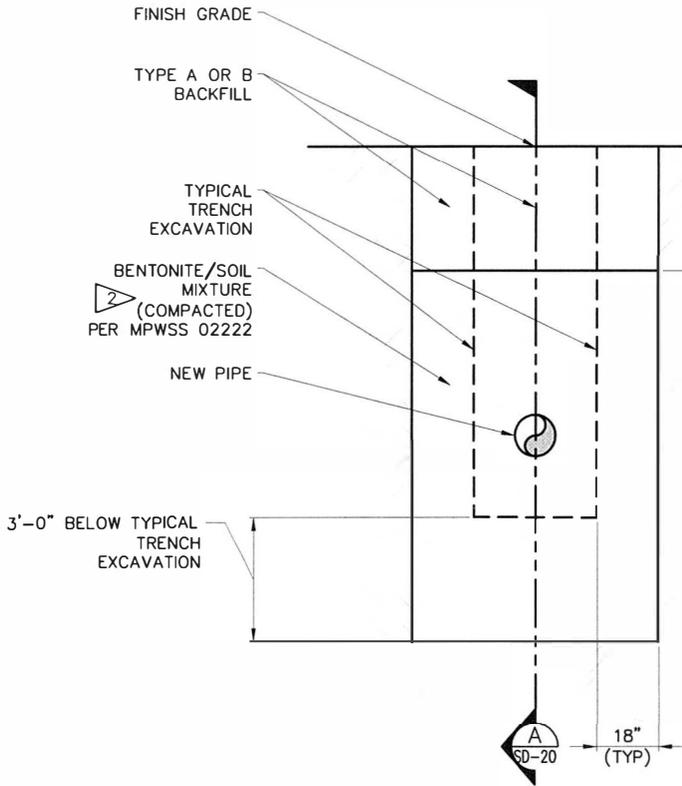
**1 UNIMPROVED SURFACE**

SCALE: NONE

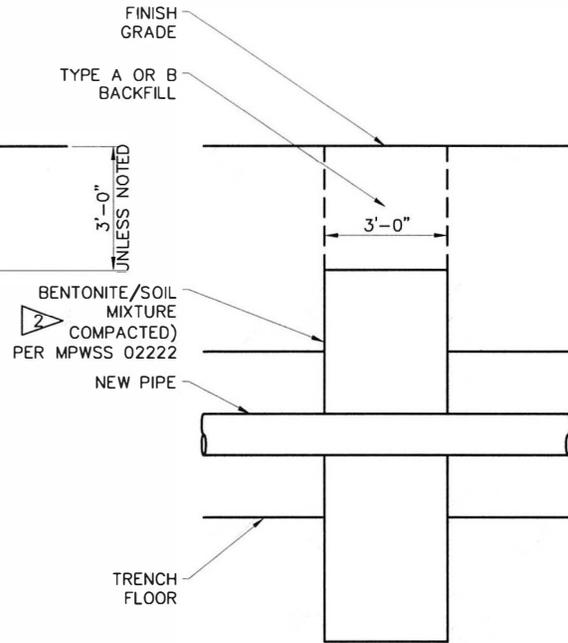
**CONSTRUCTION NOTES:**

- 1 WHERE TRENCH PASSES THROUGH EXISTING UNIMPROVED SOIL:  
THE TOPSOIL SHALL BE REMOVED AND REPLACED A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING.
- 2 WHERE TRENCH PASSES THROUGH EXISTING GRAVEL:  
THE GRAVEL SHALL BE REMOVED AND REPLACED A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING.
- 3 WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT:  
THE PAVEMENT SHALL BE CUT ALONG A NEAT VERTICAL LINE A MINIMUM OF 12" FROM THE EDGE OF THE TRENCH OPENING.
- 4 WHERE TRENCH PASSES THROUGH EXISTING PAVEMENT:  
SAWCUT THE ASPHALT ALONG A NEAT VERTICAL LINE PER LIMITS SHOWN ON THE PLANS. WHERE SUITABLE TRENCH BACKFILL IS NOT USED, SEPARATION/STABILIZATION FABRIC AMOCO 2006 OR CONTECH C-300 GEOTEXTILE FABRIC, OR APPROVED EQUAL WILL BE USED.
- 5 TRENCH SHALL BE CONSTRUCTED TO OSHA SPECIFICATIONS FOR EXCAVATION, SECTION 1926, SUBPART B. DRAWINGS DO NOT SHOW TRENCH DIMENSIONS OR BACKSLOPES THAT MAY BE REQUIRED.
- 6 ALL SPOILS SHALL BE REMOVED AND DISPOSED OF AT AN APPROVED LOCATION.
- 7 INSTALL 4" OF WATER RESISTANT RIGID INSULATION THE FULL WIDTH OF THE TRENCH WHEN BURY TO TOP OF PIPE IS LESS THAN 6'-0" FOR WATER, 4'-0" FOR SEWER. (SHALL BE APPROVED BY CITY ENGINEER)
- 8 ALL ROCKS GREATER THAN 12" IN ANY DIMENSION SHALL BE HAULED OFF SITE AND DISPOSED OF PROPERLY.
- 9 NO ROCKS OR LUMPS LARGER THAN 2" IN ANY DIMENSION SHALL BE ALLOWED WITHIN 6" OF THE PIPE.
- 10 USE SUITABLE NATIVE MATERIAL FOR BACKFILL: WITH PRIOR APPROVAL OF THE CITY AND THE ENGINEER, ON-SITE EXCAVATED SOIL MAY BE USED TO BACKFILL WATER MAINS, WATER SERVICES, FIRE HYDRANT LEADS, SEWER MAINS AND SEWER SERVICES. BLOCKY OR PLATY CLAY, AND SATURATED OR NEAR SATURATED SOILS, WILL NOT BE PERMITTED FOR USE AS BACKFILL MATERIAL. BACKFILL MATERIAL SHALL BE PLACED IN 12-INCH MAXIMUM LOOSE LIFTS AND SHALL BE COMPACTED TO AT LEAST 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY, AS DETERMINED BY AASHTO T-99 OR ASTM D698. NO ROCKS LARGER THAN 3", ANY DIMENSION, WILL BE PERMITTED IN FIRST LIFT OF BACKFILL. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A PROCTOR (MOISTURE-DENSITY RELATIONSHIP) FOR THE BACKFILL MATERIAL.
- 11 USE LABELED AND COLOR-CODED TAPE FOR THE APPROPRIATE UTILITY PIPE.
- 12 SEED, FERTILIZE, AND MULCH ALL DISTURBED AREAS WHICH ARE NOT PAVED, CONCRETED, GRAVELED, OR SODDED PER SPECIFICATIONS.
- 13 FOR WATER MAINS AND PRESSURE SEWERS; 'COPPERHEAD' YELLOW JACKET TRACER WIRE (12 GAUGE MIN.), OR APPROVED EQUAL, SHALL BE TAPED TO TOP OF ALL PLASTIC PIPE (PVC OR POLYETHYLENE) AND BROUGHT UP IN CONDUIT BEHIND FIRE HYDRANT AND COILED AT END OF SERVICE.
- 14 COMPACTION REFERS TO PERCENT OF MAXIMUM DENSITY DETERMINED BY A STANDARD PROCTOR. AASHTO T-99 OR AASHTO T-99.
- 15 FINISHED GRADE MUST MATCH THE ORIGINAL EXISTING GRADE WHERE PIPE IS INSTALLED UNLESS OTHERWISE NOTED.
- 16 VERIFY THAT COMPACTION METHODS ARE COMPATIBLE WITH PIPE MANUFACTURER'S RECOMMENDATIONS. ANY DAMAGE TO THE PIPE WILL BE THE CONTRACTOR'S RESPONSIBILITY.
- 17. SELECT TYPE 1 BEDDING--IN ADDITION TO THE SPECIFICATIONS IN MPWSS, PIPE BEDDING MATERIAL SHALL BE UNIFORMLY GRADED AS FOLLOWS:

<u>SIEVE NO. OR SIZE</u>	<u>PERCENT PASSING (BY WEIGHT)</u>
3/8"	100
#4	95-100
#8	80-100
#16	50-85
#30	25-60
#50	10-30
#100	2-10
#200	0-5



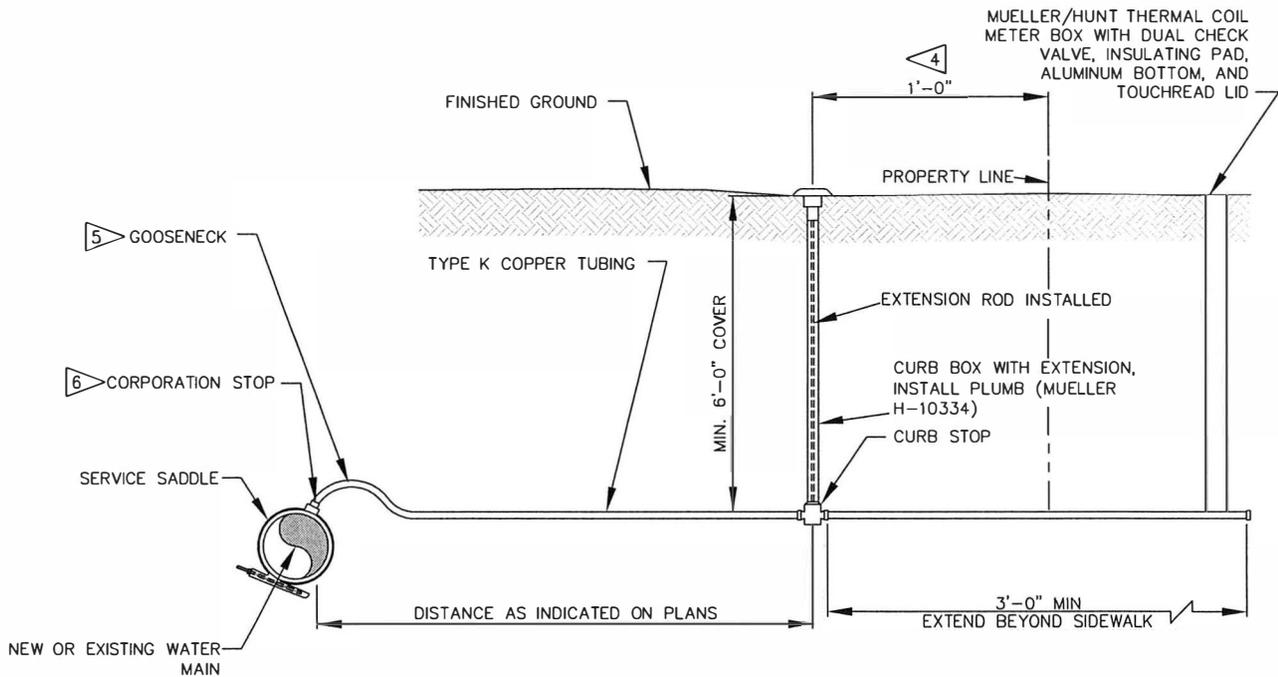
**TRENCH PLUG**  
SCALE: NONE



**TRENCH SECTION A**  
SCALE: NONE

**TRENCH PLUG NOTES:**

1. THE PURPOSE OF THE TRENCH WATER STOP IS TO PREVENT TYPE 1 & TYPE 2 BEDDING FROM BECOMING A CONDUIT FOR GROUNDWATER.
2. THE CONTRACTOR SHALL PROVIDE THE MIXTURE PROPORTIONING OF THE BENTONITE MATERIAL WITH ON-SITE LEAN CLAYS. ALL TRENCH WATER STOPS SHALL BE CONSTRUCTED TO HAVE AN IN-PLACE PERMEABILITY RATE OF  $1 \times 10^{-7}$  CM/SECOND OR LESS. THE CONTRACTOR SHALL SUBMIT A MIX PROPORTION DESIGN & CERTIFIED TESTING RESULTS FROM A PROFESSIONAL LAB INDICATING THE CONFORMANCE WITH THIS PERMEABILITY RATE.
3. TRENCH WATER STOPS SHALL BE INSTALLED AT A MINIMUM OF 100'-0" APART, OR CROSSING OF STREAMS, DITCHES, OR OTHER SOURCES OF GROUNDWATER. TRENCH PLUGS SHALL BE INSTALLED WITHIN 10'-0" UPSTREAM OF ALL SANITARY SEWER MANHOLES. WHEN DIRECTED BY THE ENGINEER, TRENCH WATER STOPS SHALL ALSO BE INSTALLED ALONG SERVICE UTILITY TRENCHES.
4. TRENCH PLUGS ARE REQUIRED ON ALL SANITARY SEWER MAINS.

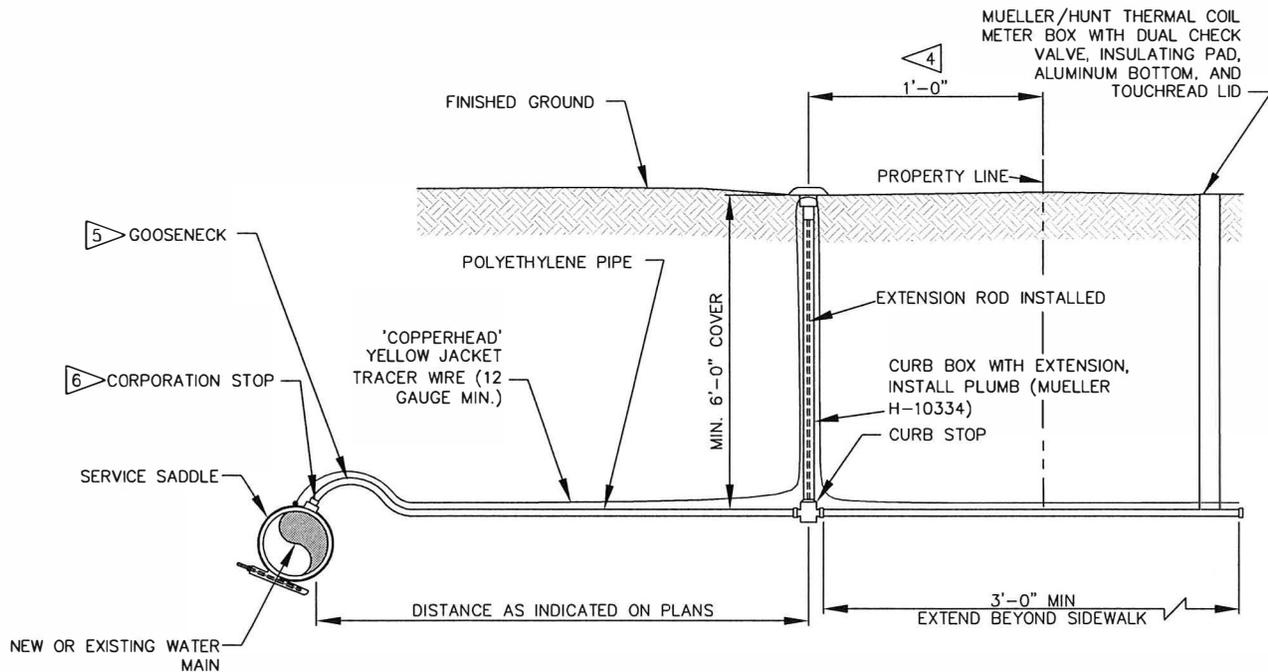


**WATER SERVICE**

SCALE: NONE

**NOTES:**

1. THIS DETAIL APPLIES TO SERVICES THAT ARE 2" IN DIAMETER OR SMALLER. SERVICE LINES OVER 2" ARE INSTALLED SIMILAR TO WATER MAINS.
2. WATER SERVICE LINES SHALL BE CONNECTED/INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
3. BEDDING MATERIAL WITHIN 6-INCHES OF THE SERVICE LINE SHALL BE TYPE 1 PIPE BEDDING.
4. THE CURB BOX SHALL BE INSTALLED 1'-0" FROM THE PROPERTY LINE OR WHERE SHOWN ON THE DRAWINGS. WHERE A SIDEWALK IS ADJACENT TO THE PROPERTY LINE, INSTALL CURB BOX IN THE CENTER OF THE BOULEVARD.
5. THE GOOSENECK IN THE SERVICE LINE AT THE CONNECTION TO THE CORPORATION STOP SHALL BE MADE IN THE HORIZONTAL PLANE WHEN POSSIBLE.
6. THE CORPORATION SHALL BE TAPPED AT 45° VERTICAL ANGLE ON THE PIPE (MEASURED FROM THE HORIZONTAL).
7. CONCRETE AND/OR PAVEMENT REMOVAL AND REPLACEMENT SHALL BE PROVIDED AS NECESSARY.
8. MINIMUM 6'-0" COVER SHALL BE MAINTAINED ALONG THE ENTIRE SERVICE LINE.
9. WHEN A 'WATER SERVICE' IS CALLED OUT THE CONTRACTOR SHALL PLACE THE ENTIRE SERVICE, FROM THE MAIN TO THE PROPOSED CURB STOP LOCATION. THIS INSTALLATION INCLUDES NEW CORPORATION STOP, SERVICE SADDLE, TUBING, CURB STOP, CURB STOP BOX, AND EXTENSION ROD.



**WATER SERVICE**

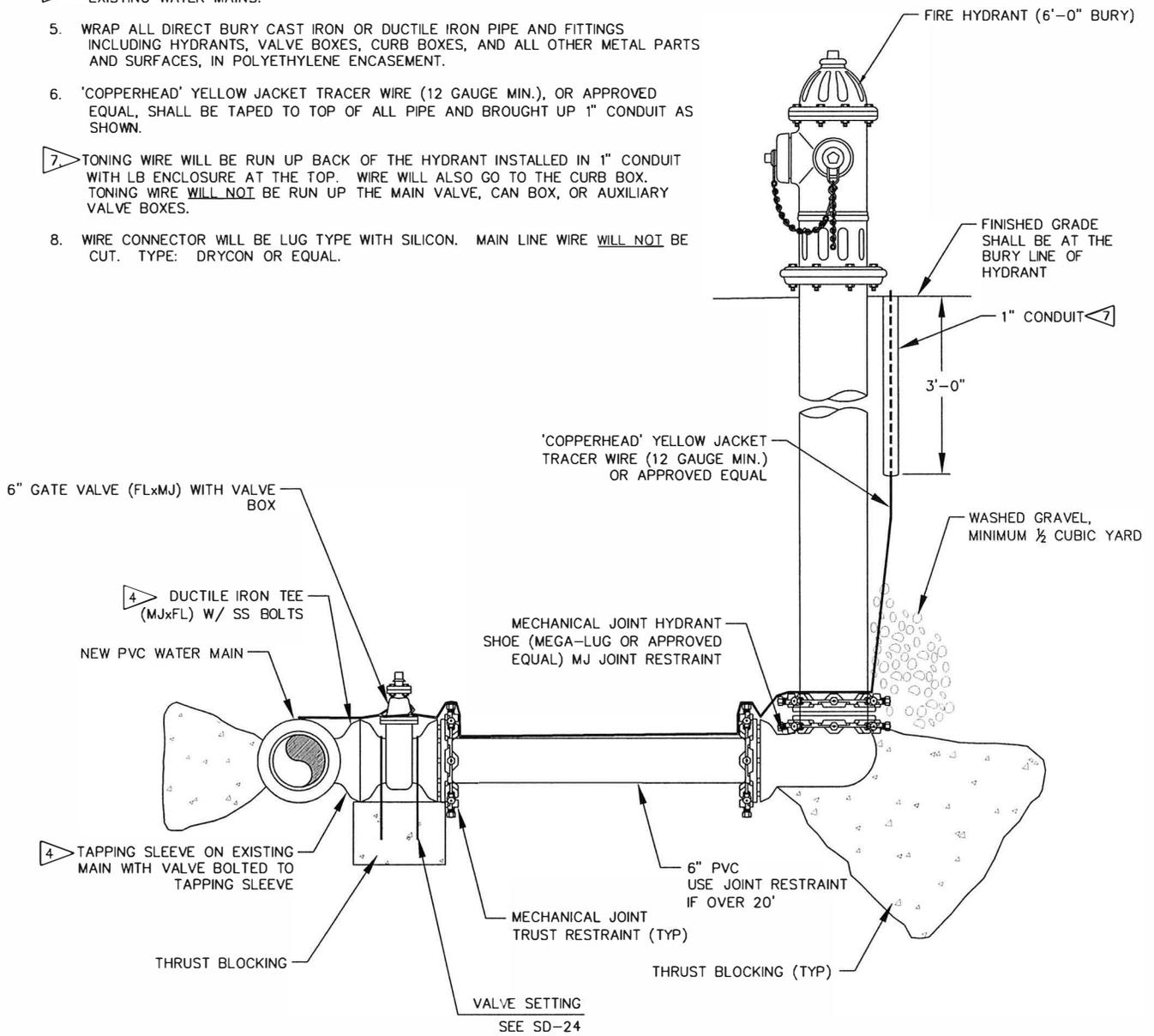
SCALE: NONE

**NOTES:**

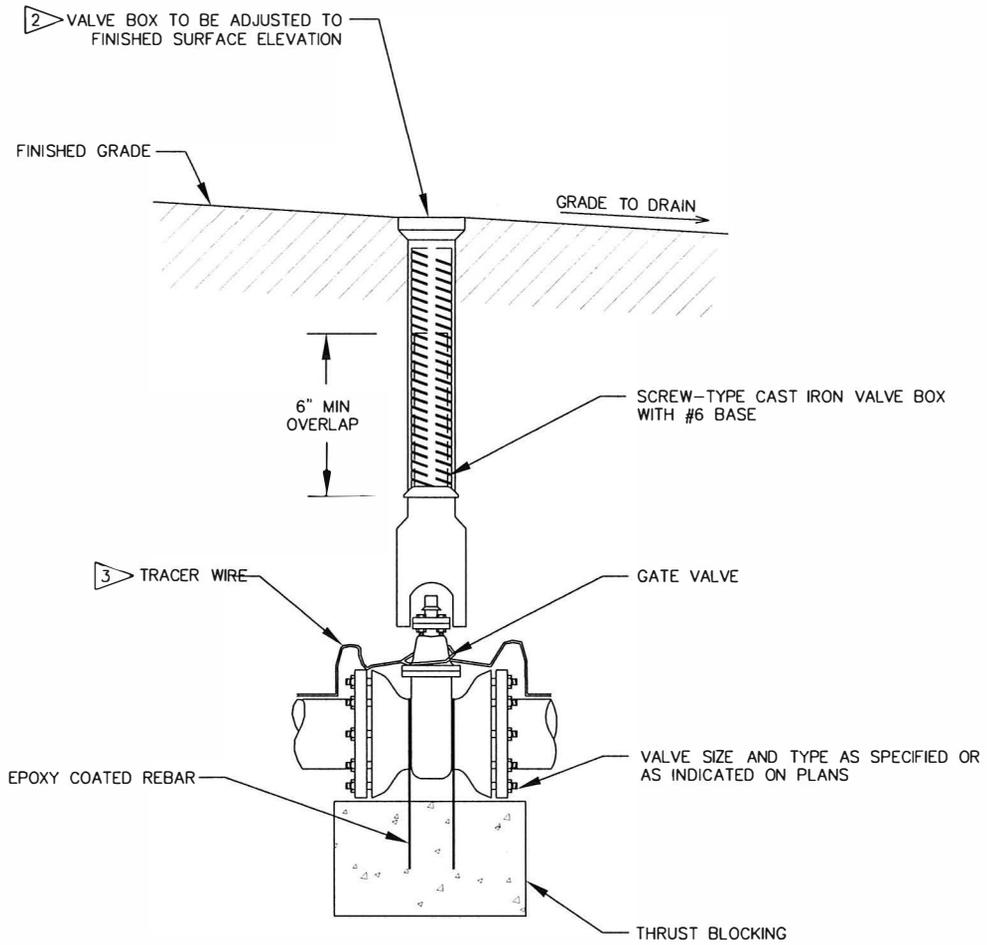
1. THIS DETAIL APPLIES TO SERVICES THAT ARE 2" IN DIAMETER OR SMALLER. SERVICE LINES OVER 2" ARE INSTALLED SIMILAR TO WATER MAINS.
2. WATER SERVICE LINES SHALL BE CONNECTED/INSTALLED WHERE SHOWN ON THE DRAWINGS OR AS SPECIFIED.
3. BEDDING MATERIAL WITHIN 6-INCHES OF THE SERVICE LINE SHALL BE TYPE 1 PIPE BEDDING.
4. THE CURB BOX SHALL BE INSTALLED 1'-0" FROM THE PROPERTY LINE OR WHERE SHOWN ON THE DRAWINGS. WHERE A SIDEWALK IS ADJACENT TO THE PROPERTY LINE, INSTALL CURB BOX IN THE CENTER OF THE BOULEVARD.
5. THE GOOSENECK IN THE SERVICE LINE AT THE CONNECTION TO THE CORPORATION STOP SHALL BE MADE IN THE HORIZONTAL PLANE WHEN POSSIBLE.
6. THE CORPORATION SHALL BE TAPPED AT 45° VERTICAL ANGLE ON THE PIPE (MEASURED FROM THE HORIZONTAL).
7. CONCRETE AND/OR PAVEMENT REMOVAL AND REPLACEMENT SHALL BE PROVIDED AS NECESSARY.
8. MINIMUM 6'-0" COVER SHALL BE MAINTAINED ALONG THE ENTIRE SERVICE LINE.
9. WHEN A 'WATER SERVICE' IS CALLED OUT THE CONTRACTOR SHALL PLACE THE ENTIRE SERVICE, FROM THE MAIN TO THE PROPOSED CURB STOP LOCATION. THIS INSTALLATION INCLUDES NEW CORPORATION STOP, SERVICE SADDLE, TUBING, CURB STOP, CURB STOP BOX, AND EXTENSION ROD.
10. PLUMBER NEEDS TO CONTINUE TRACER WIRE TO HOUSE AND TERMINATE AT HOUSE FOOTING WITH LB ENCLOSURE.

**NOTES:**

1. INSTALL HYDRANT WITH PUMPER NOZZLE FACING STREET UNLESS OTHERWISE DIRECTED BY FIELD ENGINEER.
2. HYDRANTS SHALL BE PLACED IN THE CENTER OF BOULEVARDS, WHERE APPLICABLE OR A MINIMUM OF 5' FROM EDGE OF PAVEMENT WHERE THERE IS NO CURB AND GUTTER.
3. PROVIDE BOTH MECHANICAL JOINT THRUST RESTRAINT AND CONCRETE THRUST BLOCKING ON THE TEE, VALVE, AND HYDRANT.
4. TAP EXISTING WATER MAIN WITH 6" TAPPING SLEEVE FOR NEW HYDRANTS ON EXISTING WATER MAINS.
5. WRAP ALL DIRECT BURY CAST IRON OR DUCTILE IRON PIPE AND FITTINGS INCLUDING HYDRANTS, VALVE BOXES, CURB BOXES, AND ALL OTHER METAL PARTS AND SURFACES, IN POLYETHYLENE ENCASEMENT.
6. 'COPPERHEAD' YELLOW JACKET TRACER WIRE (12 GAUGE MIN.), OR APPROVED EQUAL, SHALL BE TAPED TO TOP OF ALL PIPE AND BROUGHT UP 1" CONDUIT AS SHOWN.
7. TONING WIRE WILL BE RUN UP BACK OF THE HYDRANT INSTALLED IN 1" CONDUIT WITH LB ENCLOSURE AT THE TOP. WIRE WILL ALSO GO TO THE CURB BOX. TONING WIRE WILL NOT BE RUN UP THE MAIN VALVE, CAN BOX, OR AUXILIARY VALVE BOXES.
8. WIRE CONNECTOR WILL BE LUG TYPE WITH SILICON. MAIN LINE WIRE WILL NOT BE CUT. TYPE: DRYCON OR EQUAL.



**FIRE HYDRANT**  
SCALE: NONE

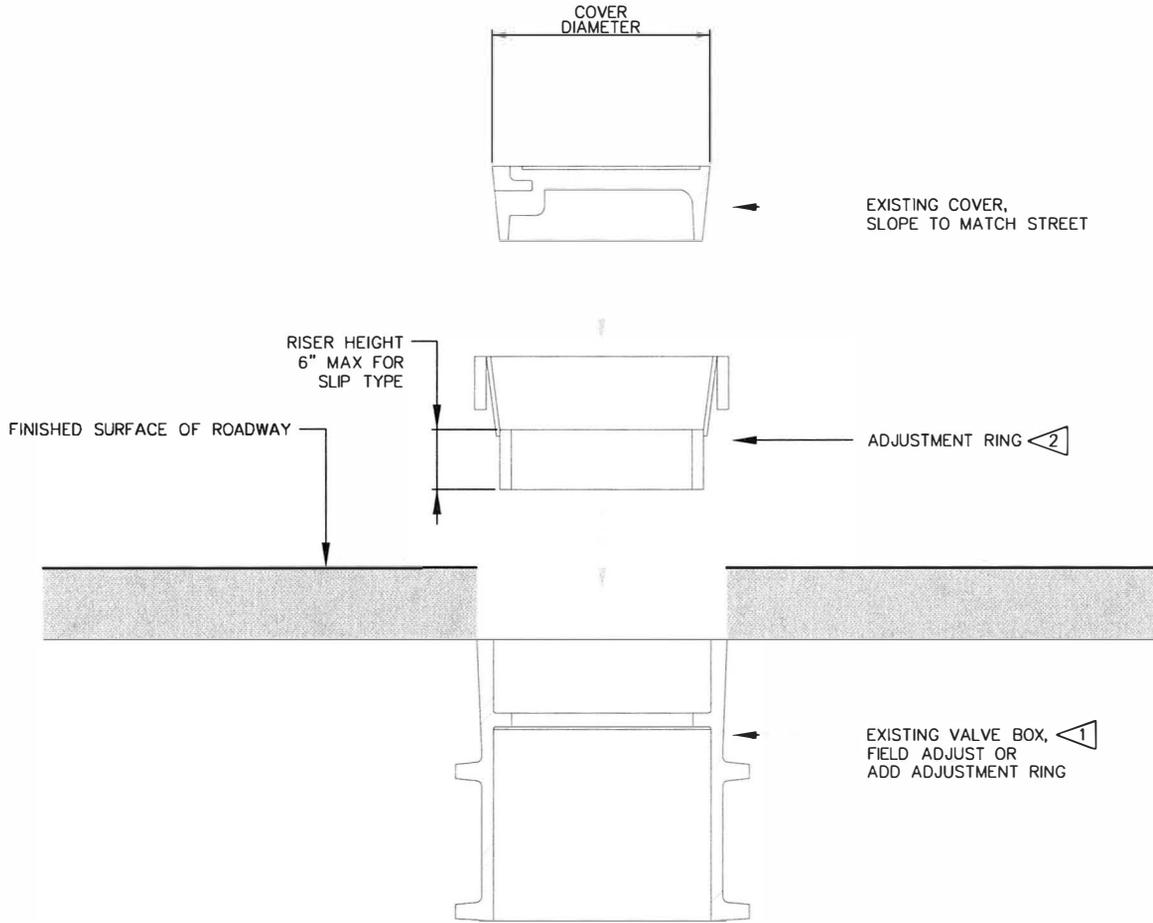


**NOTES:**

1. THIS DETAIL APPLIES TO ALL BURIED VALVES.
2. ADJUST VALVE BOX TO BE  $\frac{1}{4}$ "  $\pm$   $\frac{1}{8}$ " BELOW FINISHED PAVEMENT/CONCRETE SURFACE. MAKE FINAL ADJUSTMENTS PRIOR TO PAVING.
3. 'COPPERHEAD' YELLOW JACKET TRACER WIRE (12 GAUGE MIN.) OR APPROVED EQUAL.

**VALVE SETTING**

SCALE: NONE



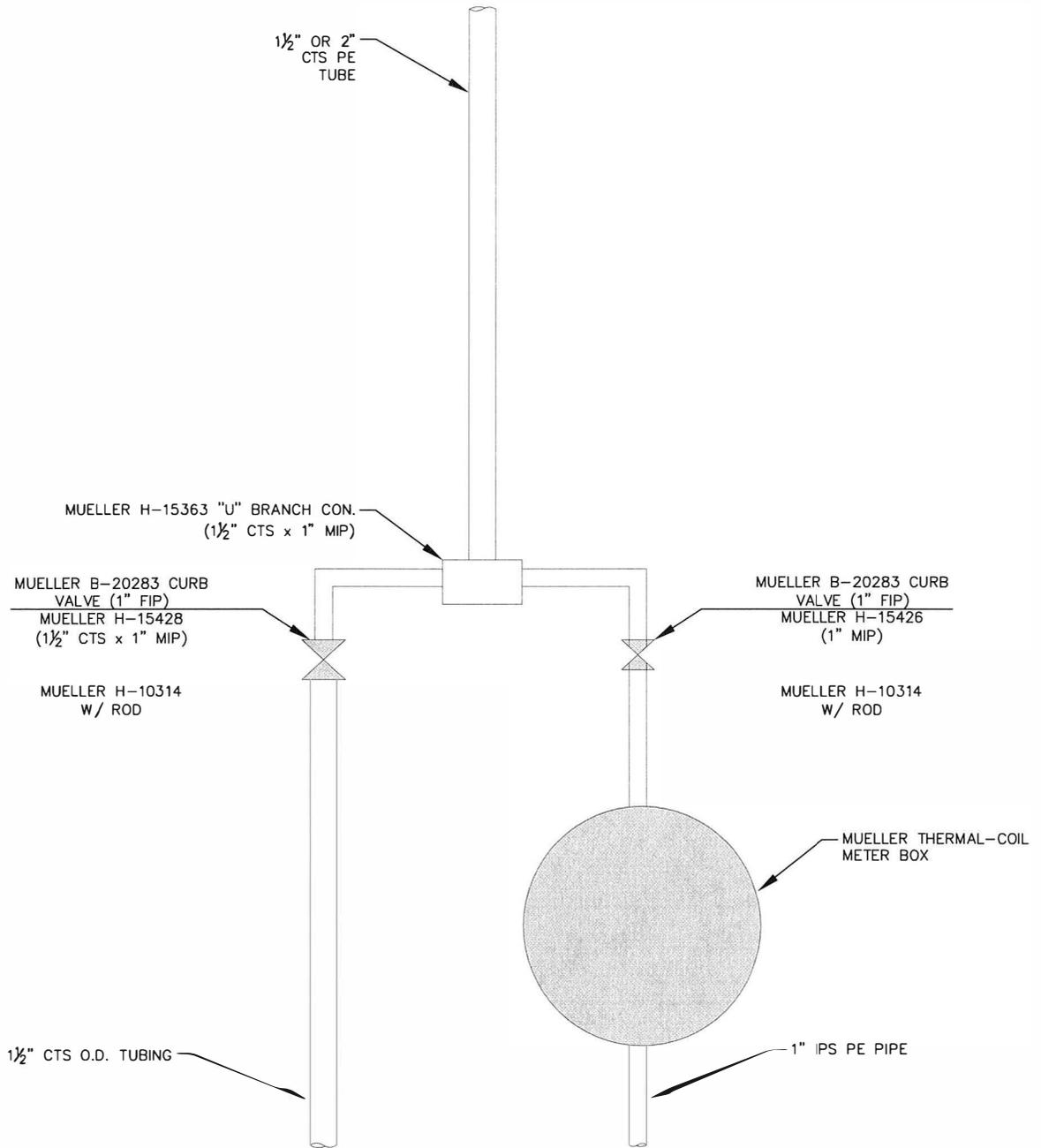
**NOTES:**

- 1 THE PREFERRED METHOD FOR FIELD ADJUSTMENT IS BY 'SCREWING' VALVE BOX. IF CONTRACTOR IS UNABLE TO ADJUST BY 'SCREWING' VALVE BOX, AN ADJUSTMENT RING WILL BE REQUIRED.
- 2 ADJUSTMENT RING SIZE/THICKNESS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING.
3. FINISHED VALVE BOX COVER SHALL BE  $\frac{1}{8}$ " TO  $\frac{1}{4}$ " (MAXIMUM) LOWER THAN FINISHED SURFACE.

**VALVE BOX ADJUSTMENT**

SCALE: NONE

SERVICE FROM MAIN

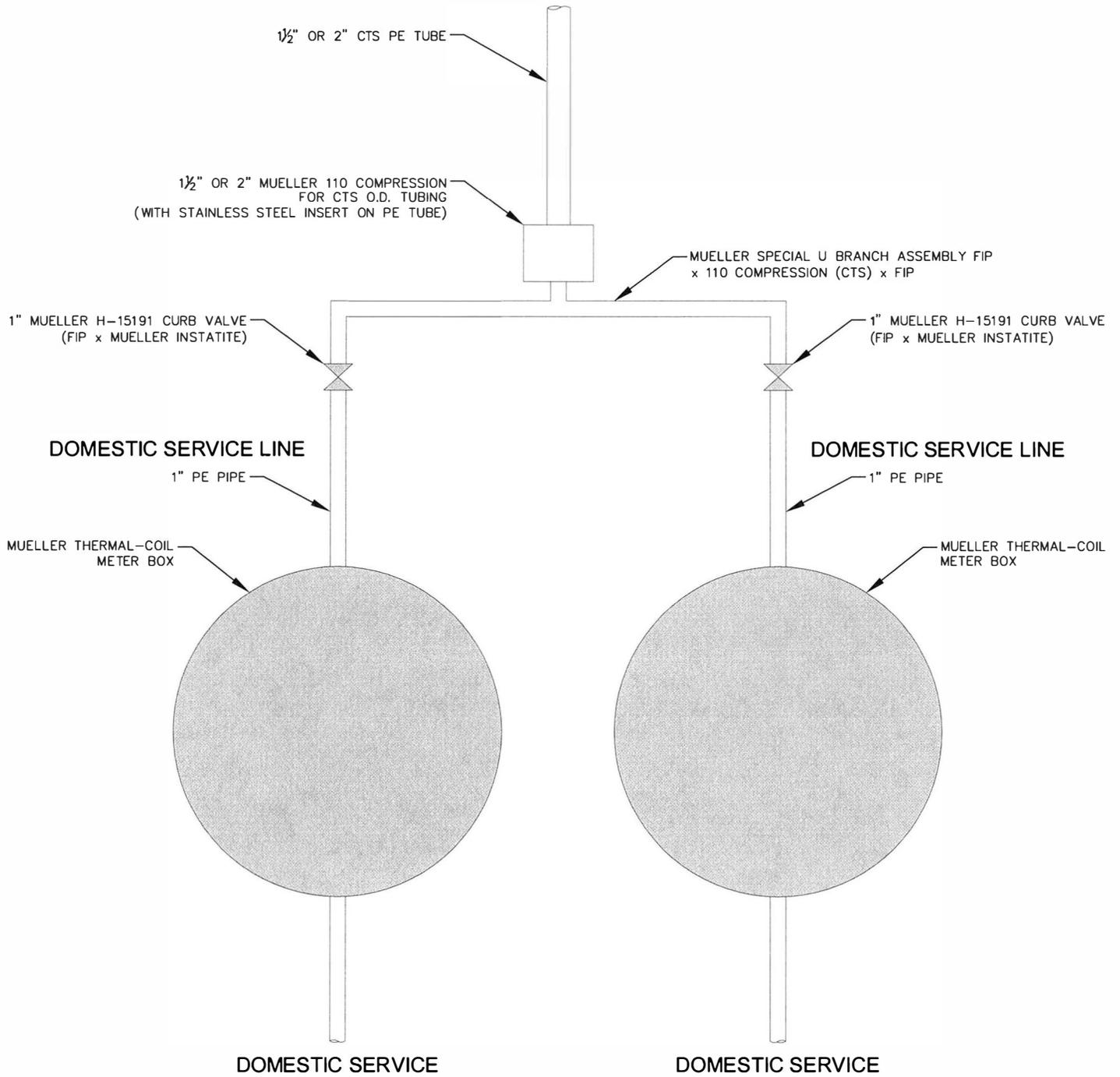


FIRE SERVICE

DOMESTIC SERVICE

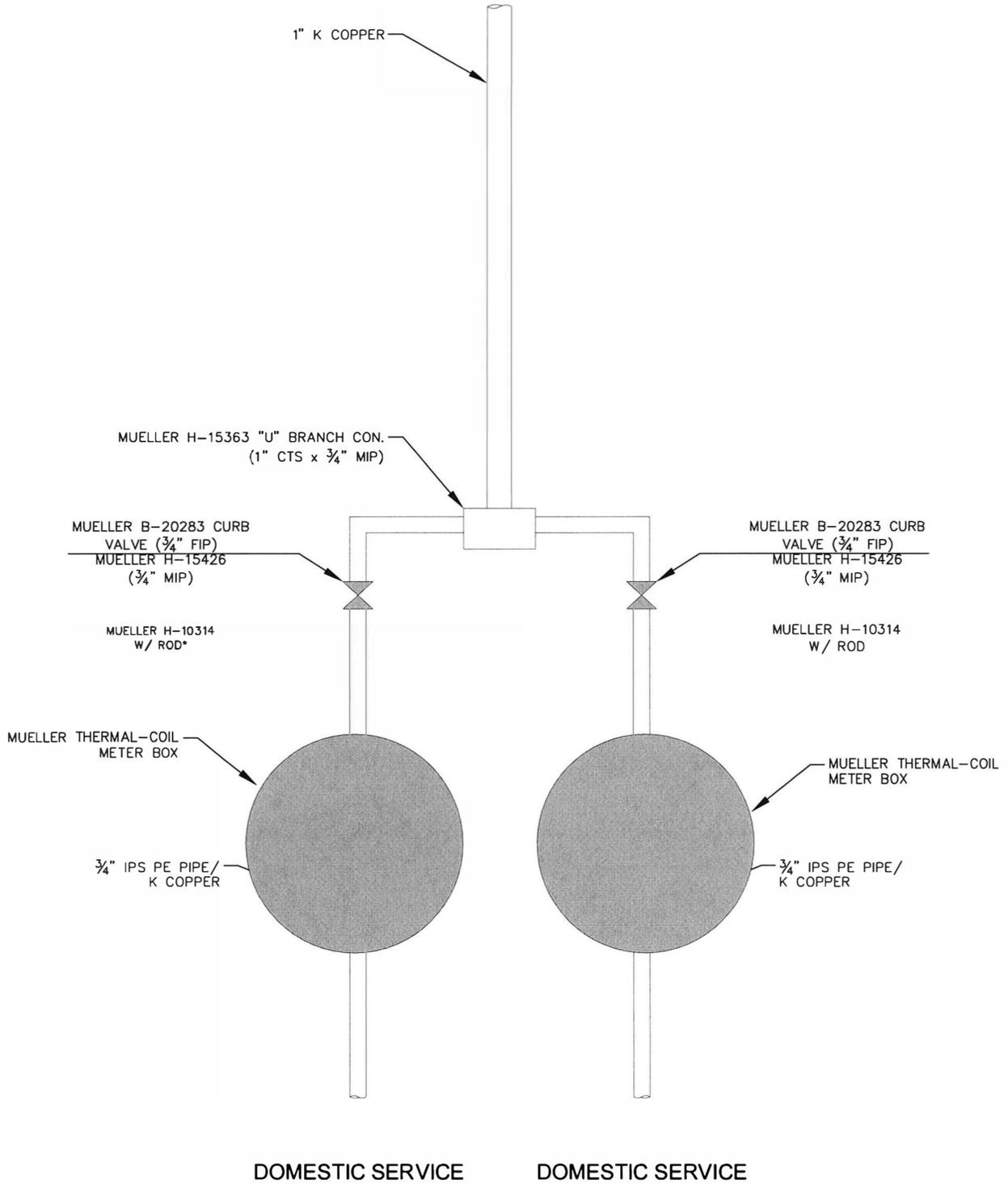
TYPICAL METER BOX SPECIFICATION: LOCKWING FULL PORT ANGLE BALL VALVE INLET  
 A.S.S.E. DUAL CHECK VALVE OUTLET  
 ATTACHED ALUMINUM BASE  
 SIDE LOCKING LID  
 72" DEPTH  
 INSULATING PAD

SERVICE FROM MAIN



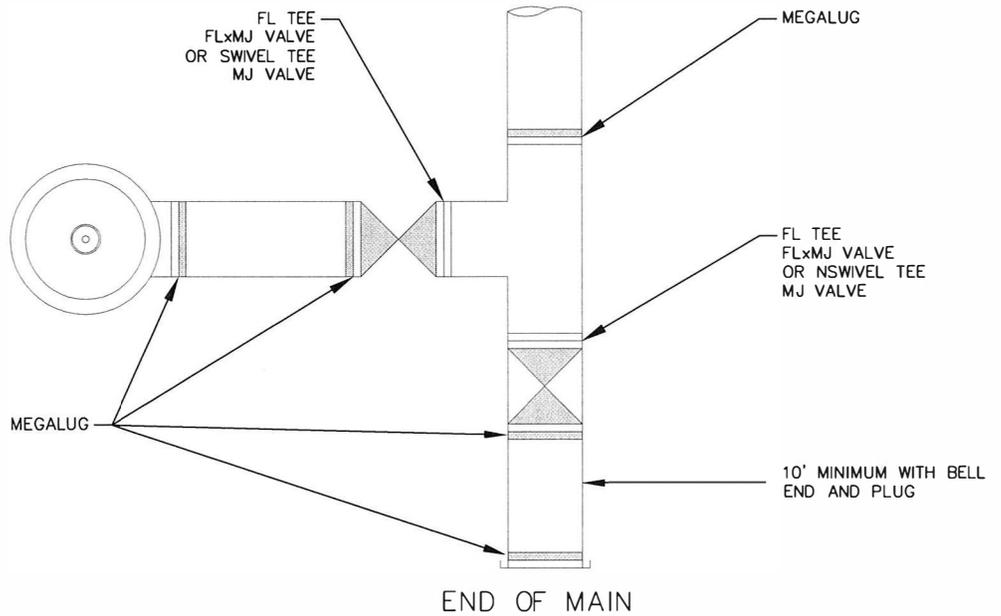
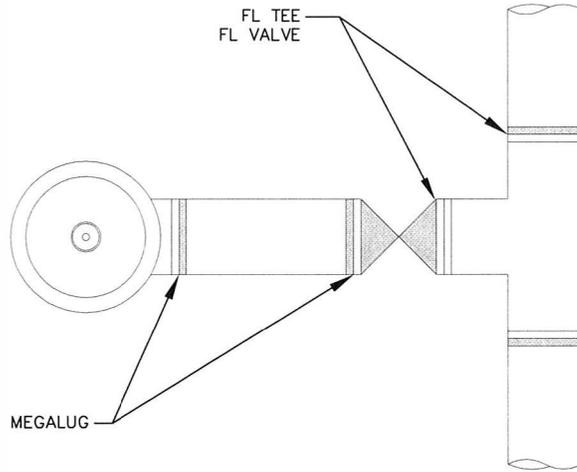
TYPICAL METER BOX SPECIFICATION: LOCKWING FULL PORT ANGLE BALL VALVE INLET  
 A.S.S.E. DUAL CHECK VALVE OUTLET  
 ATTACHED ALUMINUM BASE  
 SIDE LOCKING LID  
 72" DEPTH  
 INSULATING PAD

SERVICE FROM MAIN



\*USE MUELLER H-10334 FOR PLACEMENT IN CONCRETE FOR DRIVEWAYS.



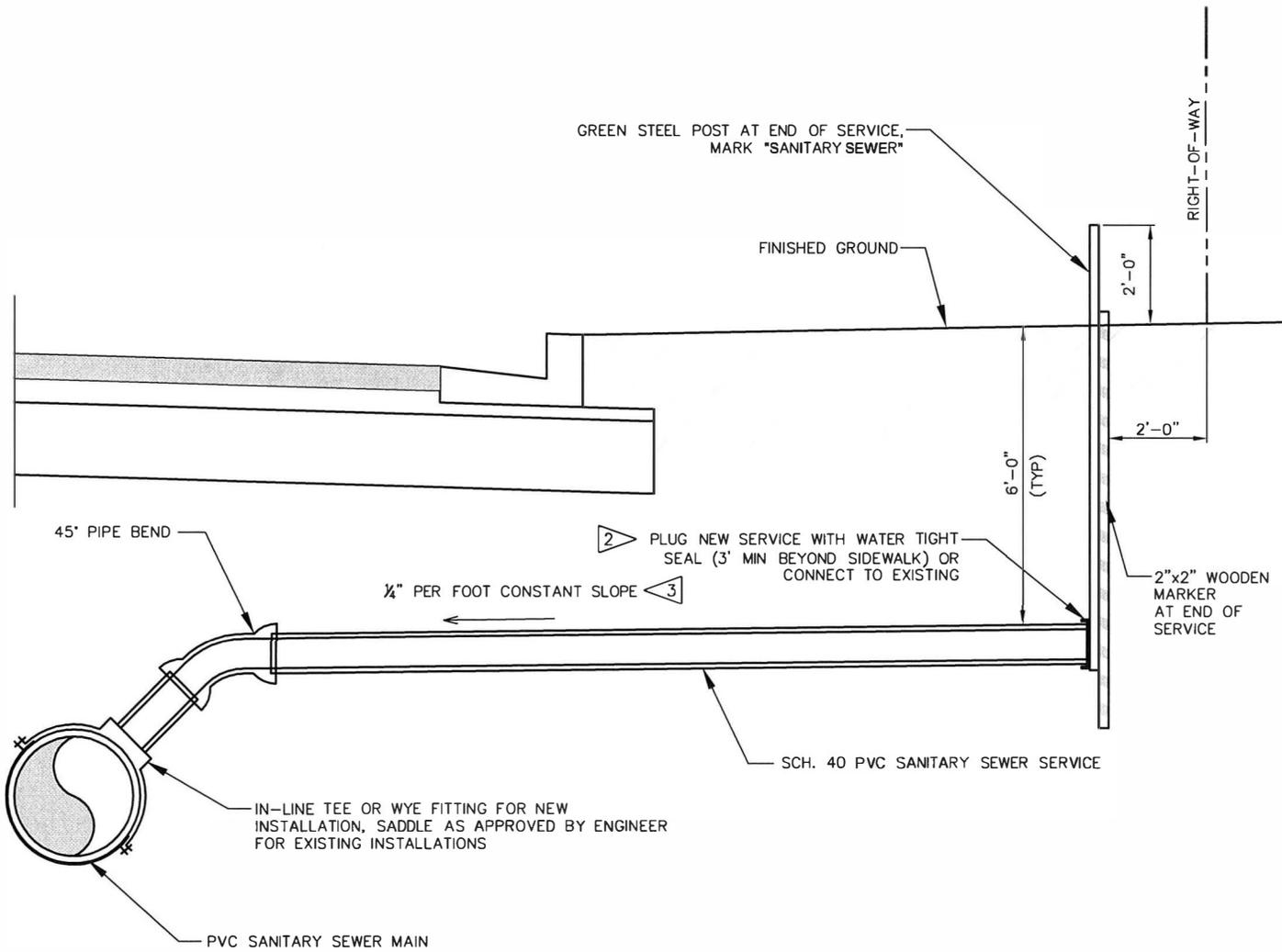


**JOINT RESTRAINTS**

SCALE: NONE

**NOTE:**

THRUST BLOCKS ARE REQUIRED FOR JOINT RESTRAINTS. IN ADDITION MEGALUGS ARE REQUIRED AS SHOWN ABOVE. MEGALUGS CAN BE USED TO REPLACE THE FLANGE TEE AND FLANGE VALVE SHOWN IN BOTH EXAMPLES.

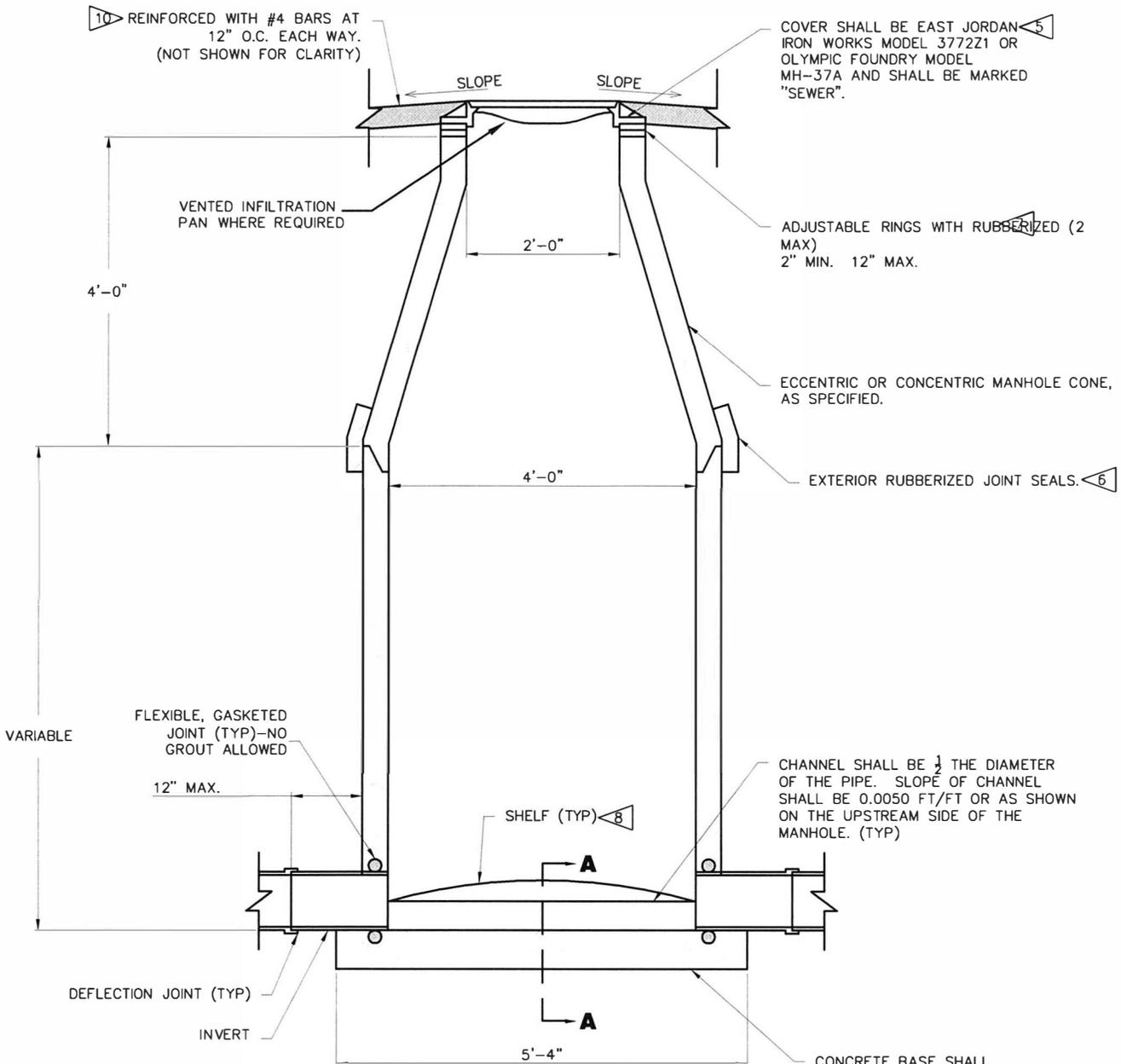


**CONSTRUCTION NOTES:**

1. ACTUAL DEPTH OF BURY FOR EACH SERVICE VARIES.
2. CONTRACTOR SHALL PROVIDE ALL FITTINGS AND PIPING AS NECESSARY TO CONNECT TO THE EXISTING SANITARY SEWER LATERALS.
3. MATCH EXISTING SANITARY SEWER SERVICE SLOPE FOR ALL SERVICE CONNECTIONS.
4. ALL BACKFILL SHALL BE TYPE A UNLESS OTHERWISE NOTED.
5. SERVICE CONNECTION SHALL MEET ALL REQUIREMENTS OF THE INTERNATIONAL PLUMBING CODE, INCLUDING REQUIRED CLEANOUTS.

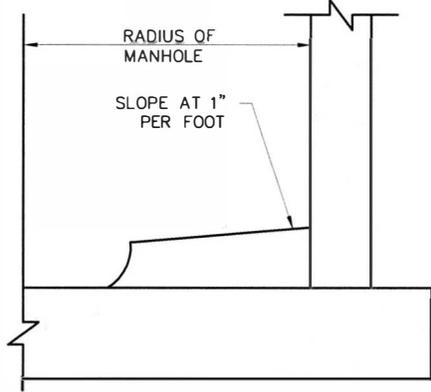
**SANITARY SEWER SERVICE**

SCALE: NONE



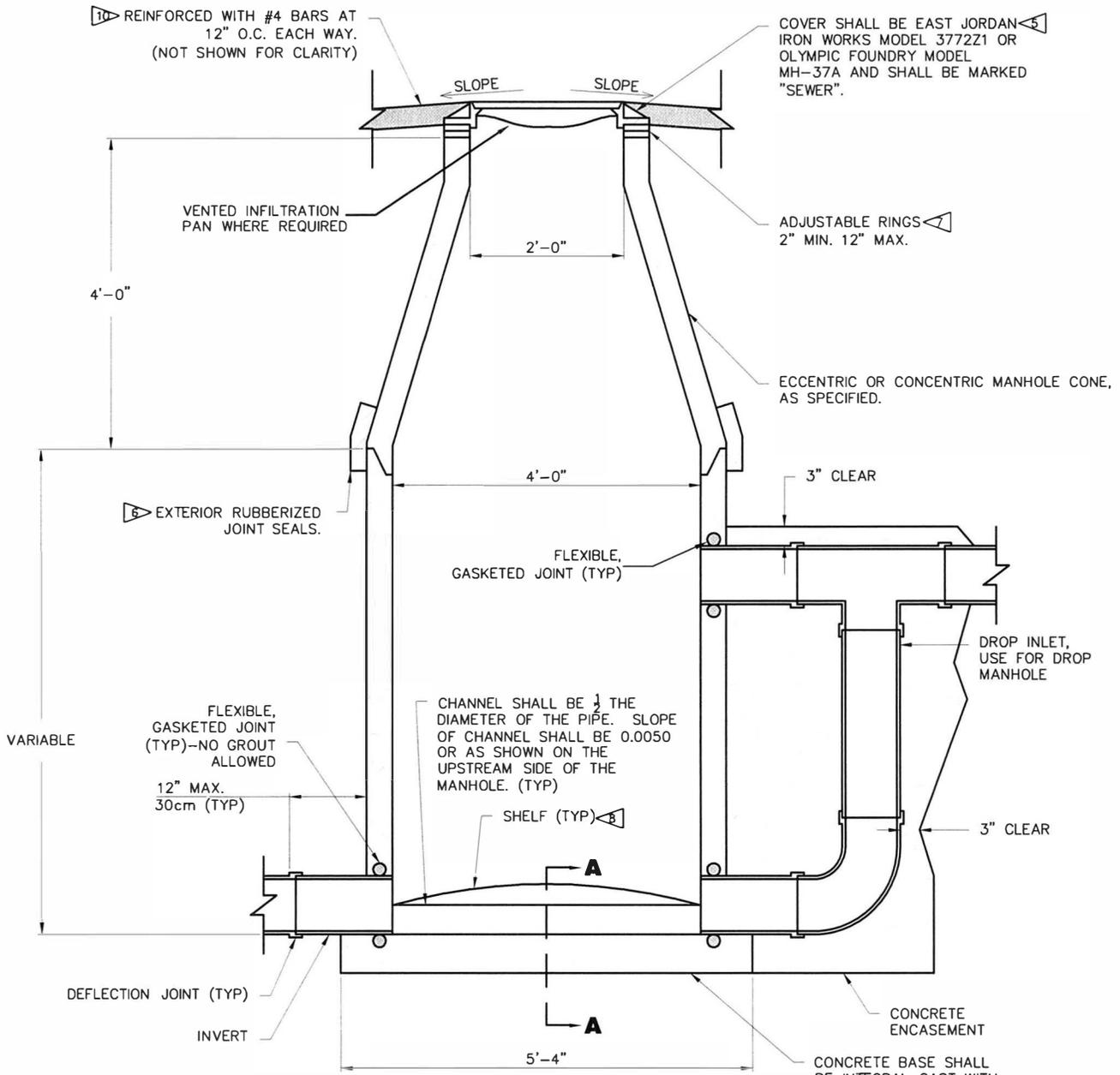
**SANITARY SEWER**

SCALE: NONE

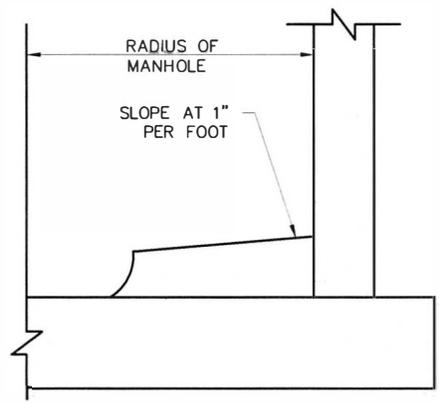


**SECTION "A-A"**

SCALE: NONE



**SANITARY SEWER**  
SCALE: NONE

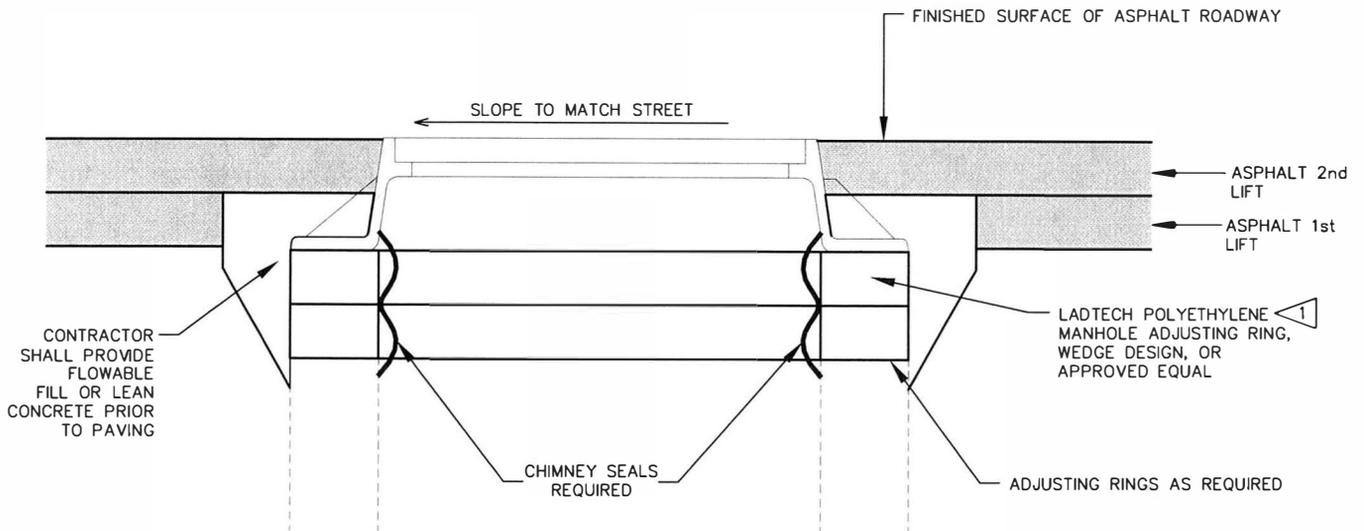


**SECTION "A-A"**  
SCALE: NONE

**MANHOLE NOTES:**

1. ALL MANHOLES NOT MANUFACTURED IN ACCORDANCE WITH ASTM C-478M-93 MUST HAVE BITUMINOUS OR COAL TAR EPOXY COAT ON EXTERIOR.
2. PRECAST REINFORCED CONCRETE MANHOLE RISER AND ECCENTRIC CONE TOP PER ASTM C-478.
3. ECCENTRIC MANHOLES REQUIRED ON ALL 4' DIAMETER MANHOLES GREATER THAN 5'-0" IN OVERALL HEIGHT UNLESS SPECIFIED OTHERWISE.
4. ALL JOINTS BETWEEN MANHOLES SECTIONS, ADJUSTING RINGS, MANHOLE RING & TOP SECTION, AND AROUND SEWER PIPE INTO MANHOLE SHALL BE WATERTIGHT. JOINTING MATERIAL SHALL BE "RAM-NEK" OR EQUAL FOR ALL JOINTS EXCEPT BETWEEN SEWER PIPE AND MANHOLE WALL.

5. FIELD SET COVER TO GRADE WHEN MANHOLE IS LOCATED WITHIN A STREET OR ALLEY, AND INSTALL INFILTRATION PAN OTHERWISE SET COVER 6" ABOVE GRADE.
6. EXTERIOR RUBBERIZED JOINT SEALS, MEETING ASTM C-877. TYPE II WITH A MINIMUM WIDTH OF 9".
7. RUBBERIZED CHIMNEY SEALS ARE REQUIRED ON ALL MANHOLE COVER FRAMES AND ADJUSTING RING COMBINATIONS, MEETING ASTM C923 WITH A MINIMUM THICKNESS OF  $\frac{3}{16}$ ". 1" TO 6" (ONE GRADE RING MAX)/6" TO 12" (TWO GRADE RINGS MAX)
8. SHELVES SHALL SLOPE AT 1" PER FOOT TOWARD CHANNEL.
9. FINISHED MANHOLES SHALL BE IN COMPLIANCE WITH LATEST EDITION OF MPW STANDARD SPECIFICATIONS.
10. FOR MANHOLES NOT LOCATED IN STREETS, PROVIDE A 4'-0"x4'-0"x6" CONCRETE PAD. PROVIDE SLOPE THAT DROPS 0.50 FT FROM MANHOLE LID TO EDGE OF THE SLAB.

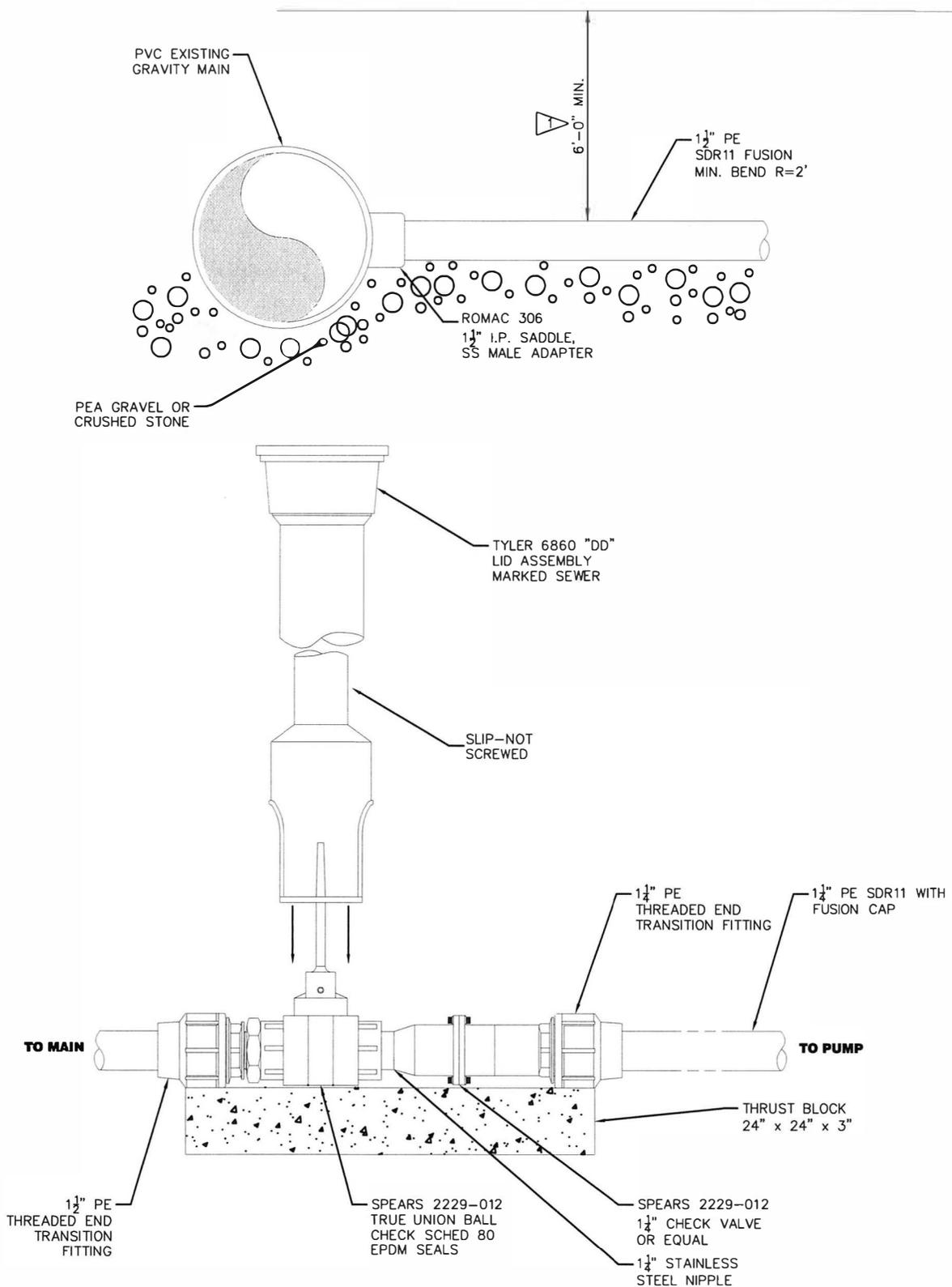


**NOTES:**

1. ADJUSTMENT RING SIZE/THICKNESS SHALL BE VERIFIED BY CONTRACTOR PRIOR TO ORDERING.
2. ADJUST MANHOLE UPWARD WITH ADJUSTMENT RINGS UNDER FRAME. (MAXIMUM 12" / MAXIMUM 2 RINGS)
3. ADJUST MANHOLE DOWNWARD BY REMOVING A PORTION OF THE MANHOLE RISER AND REBUILDING TO PROPER DIAMETER. SLOPE MANHOLE RING AS REQUIRED TO MATCH LONGITUDINAL AND TRANSVERSE GRADE ON STREET FINAL MANHOLE ADJUSTMENT WILL BE MADE AFTER PAVING.
4. SLOPE MANHOLE FRAME AS REQUIRED TO MATCH SLOPE OF STREET.
5. FINISHED MANHOLE COVER SHALL BE  $\frac{1}{8}$ " TO  $\frac{1}{4}$ " (MAXIMUM) LOWER THAN FINISHED SURFACE.

**MANHOLE ADJUSTMENT**

SCALE: NONE



**PRESSURIZED SEWER SERVICE ASSEMBLY**

SCALE: NONE

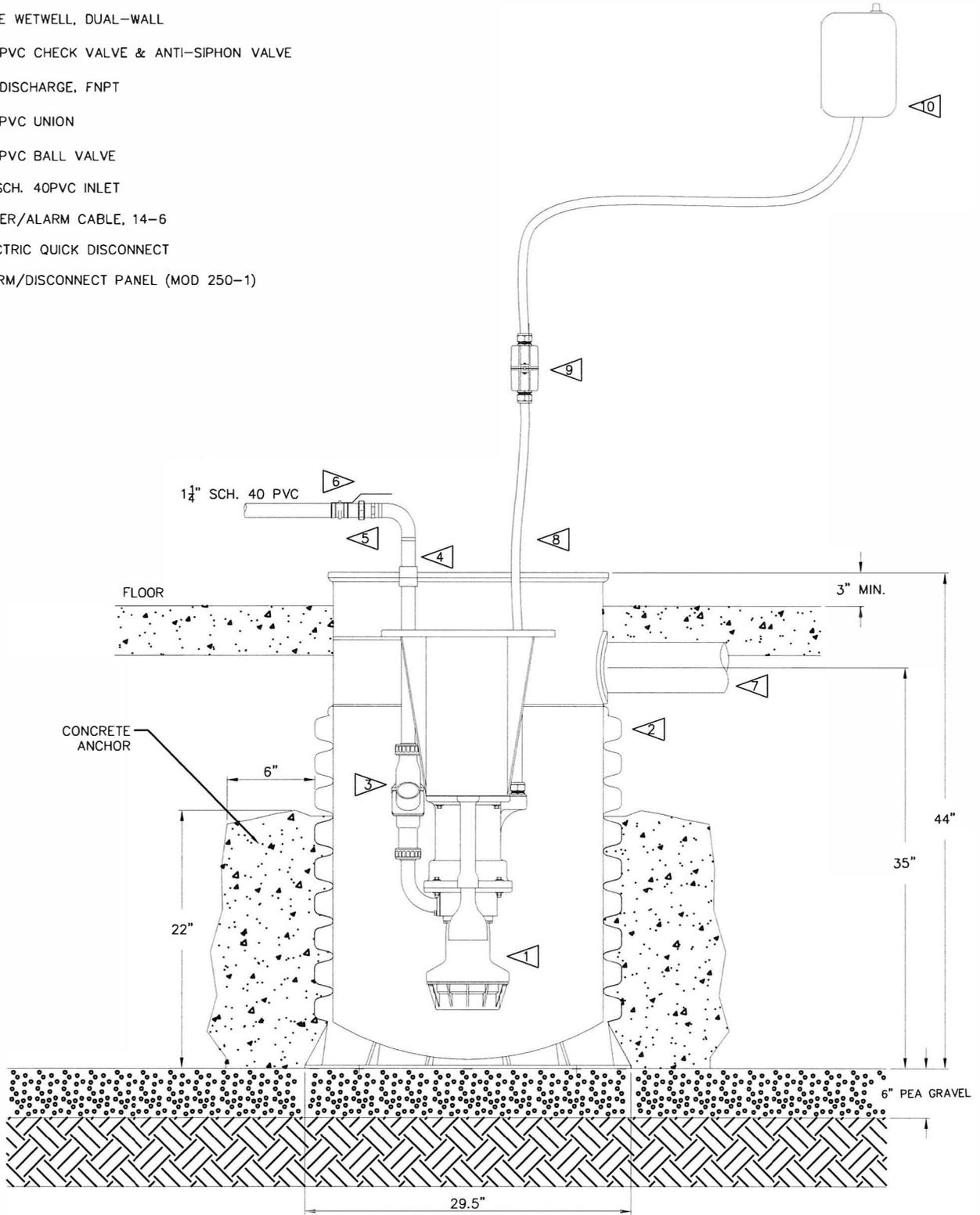
**DETAIL NOTES:**

NEED TO INSULATE WHERE PIPE IS LESS THAN 6 FEET DEEP. MUST HAVE APPROVAL OF THE PUBLIC WORKS DIRECTOR IF LESS THAN 6 FEET.

ASSEMBLY TO BE USED WITH 1 1/2" SDR 11 PIPE ONLY.  
PRESSURE RATING: 150 PSI

**DETAIL NOTES:**

- 1 SEMI-POSITIVE DISPLACEMENT PUMP GRINDER PUMP  
1Hp, 240V, 1725 RPM, 1 PHASE
- 2 HDPE WETWELL, DUAL-WALL
- 3 1½" PVC CHECK VALVE & ANTI-SIPHON VALVE
- 4 1½" DISCHARGE, FNPT
- 5 1½" PVC UNION
- 6 1½" PVC BALL VALVE
- 7 4" SCH. 40PVC INLET
- 8 POWER/ALARM CABLE, 14-6
- 9 ELECTRIC QUICK DISCONNECT
- 10 ALARM/DISCONNECT PANEL (MOD 250-1)



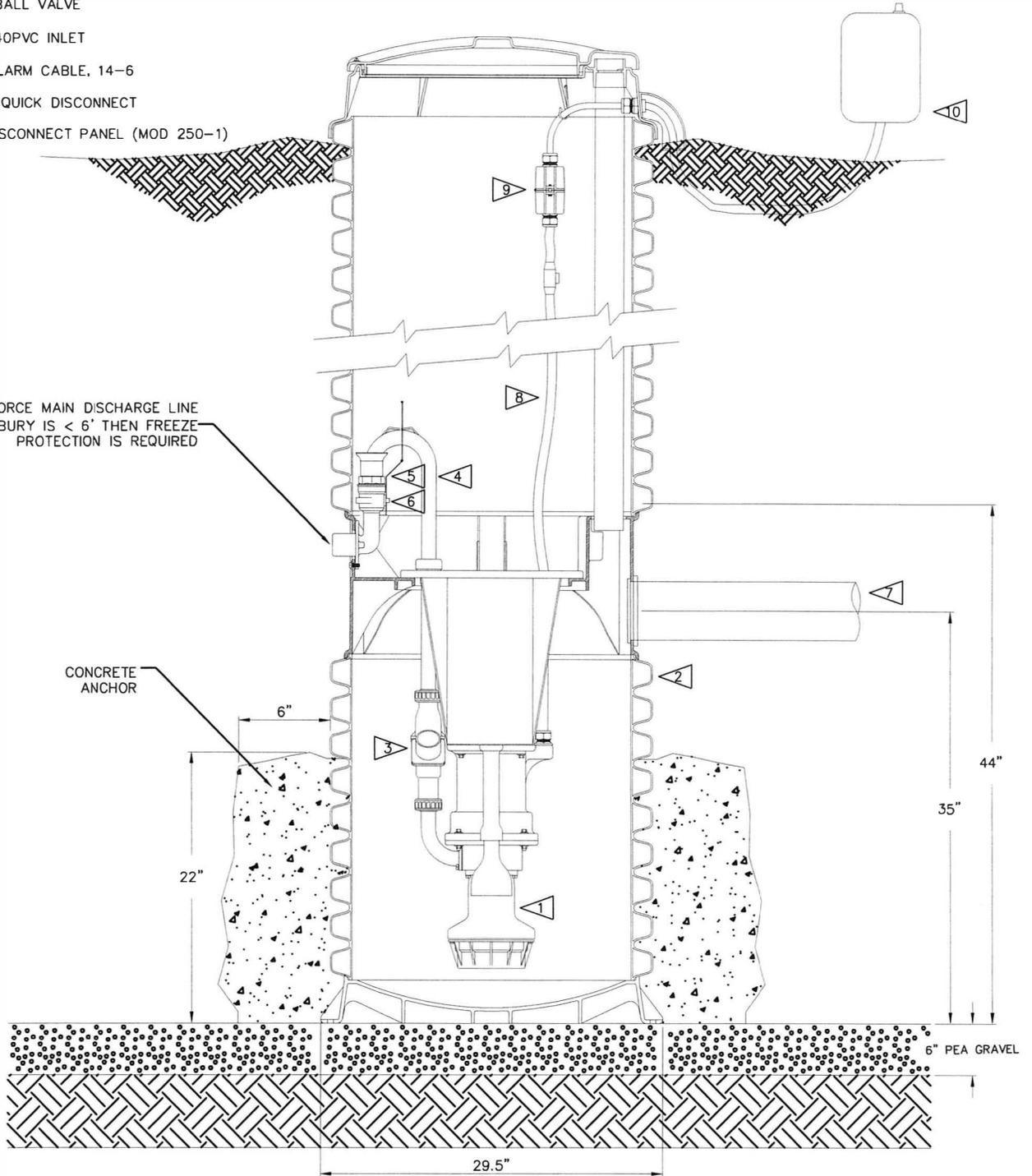
**INSIDE GRINDER PUMP**

SCALE: NONE

**DETAIL NOTES:**

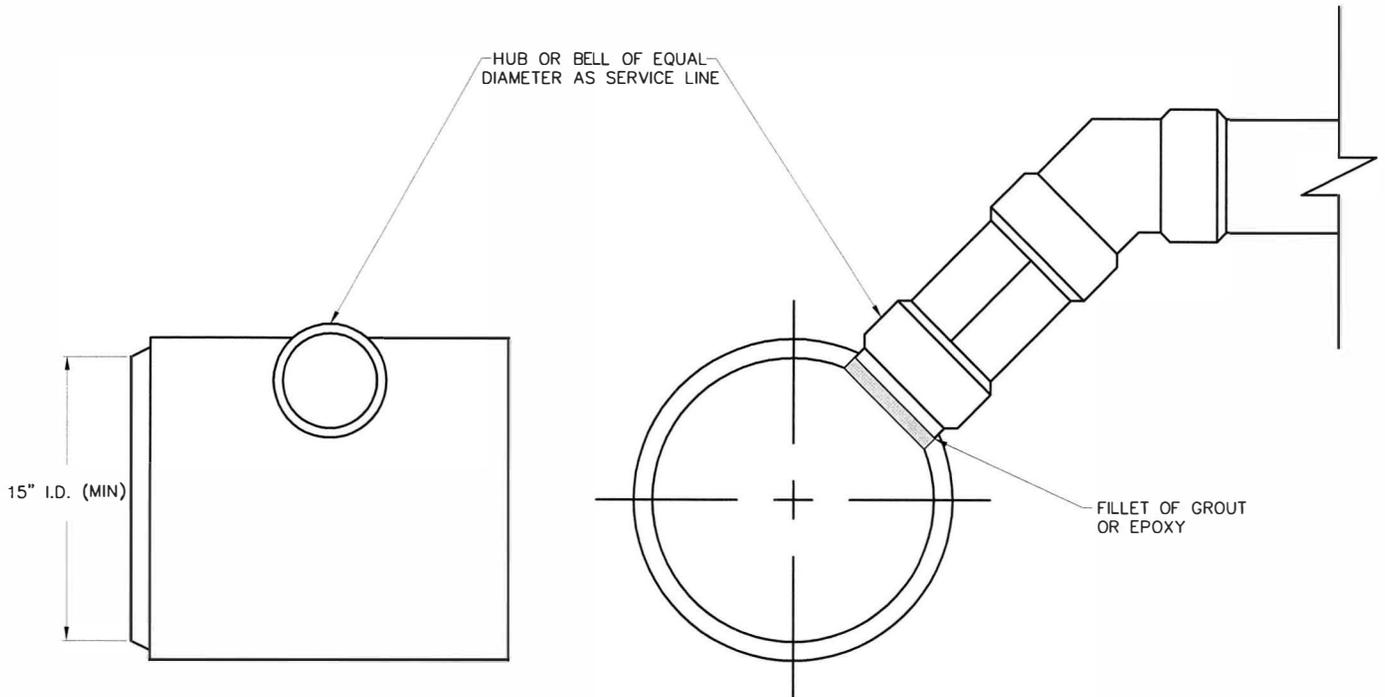
- 1 SEMI-POSITIVE DISPLACEMENT PUMP GRINDER PUMP  
1Hp, 240V, 1725 RPM, 1 PHASE
- 2 HDPE WETWELL, DUAL-WALL
- 3 1½" PVC CHECK VALVE & ANTI-SIPHON VALVE
- 4 1½" DISCHARGE, FNPT
- 5 1½" PVC UNION
- 6 1½" PVC BALL VALVE
- 7 4" SCH. 40PVC INLET
- 8 POWER/ALARM CABLE, 14-6
- 9 ELECTRIC QUICK DISCONNECT
- 10 ALARM/DISCONNECT PANEL (MOD 250-1)

IF FORCE MAIN DISCHARGE LINE  
BURY IS < 6' THEN FREEZE  
PROTECTION IS REQUIRED



**OUTSIDE GRINDER PUMP**

SCALE: NONE

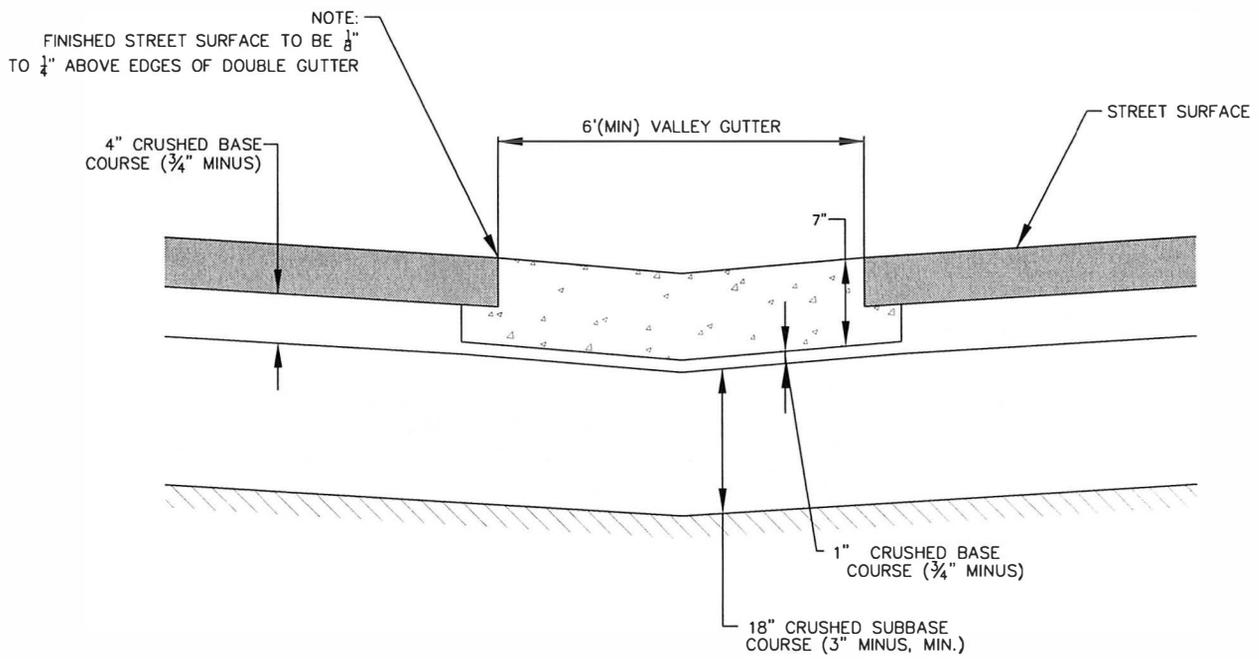


**STORM DRAIN SERVICE CONNECTION**

SCALE: NONE

**NOTES:**

1. THIS TYPE OF CONNECTION SHALL BE USED ON MAINS OF 15 INCHES OR LARGER DIAMETER.
2. HUB OR BELL OF EQUAL DIAMETER AND TYPE OF PIPE WHICH WILL BE USED FOR THE SERVICE LINE SHALL BE USED FOR THE CONNECTION FITTING TO THE EXISTING MAIN.
3. HUB OR BELL MUST NOT PROTRUDE MORE THAN  $\frac{1}{4}$  INCH INTO EXISTING MAINS.
4. ALL CONNECTIONS TO MAINS SHALL BE WATERTIGHT. A FILLET OF GROUT OR EPOXY SHALL BE APPLIED AROUND THE DIAMETER OF THE HUB OR BELL TO ASSURE A WATERTIGHT OR LEAK PROOF CONNECTION.
5. THIS TYPE OF CONNECTION SHALL BE APPROVED BY THE CITY PRIOR TO INSTALLATION.
6. ALL CONSTRUCTION PHASES OF THIS TYPE OF CONNECTION SHALL BE INSPECTED BY THE CITY OF WHITEFISH'S PUBLIC WORKS DEPARTMENT.
7. LINES UNDER 15" I.D. WILL REQUIRE A SADDLE.

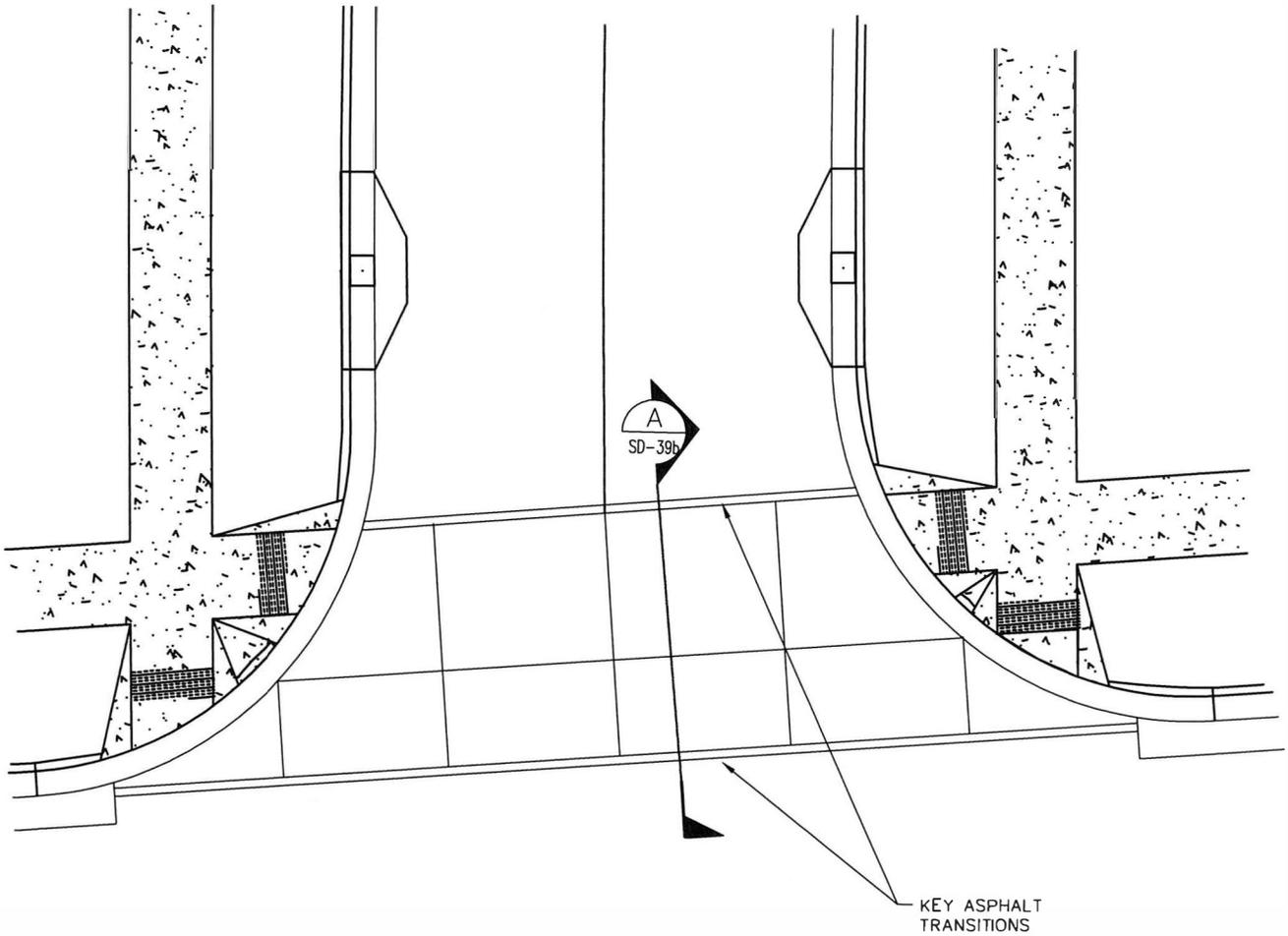


**CONCRETE VALLEY GUTTER**

SCALE: NONE

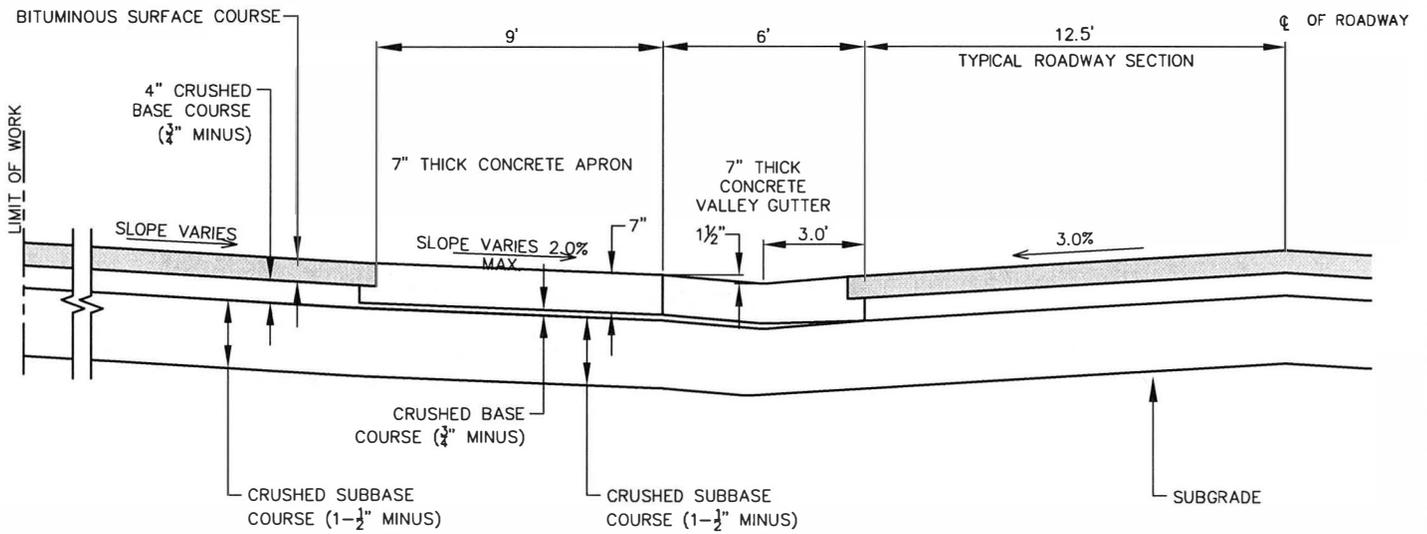
**NOTES:**

1. USE OF VALLEY GUTTERS ARE NOT GENERALLY ALLOWED BY THE PUBLIC WORKS DEPARTMENT.
2. INCLUDING VALLEY GUTTERS IN THE ROAD AND DRAINAGE PLANS REQUIRES PRIOR APPROVAL OF THE CITY ENGINEER.
3. REINFORCEMENT REQUIRED IN VALLEY GUTTERS.



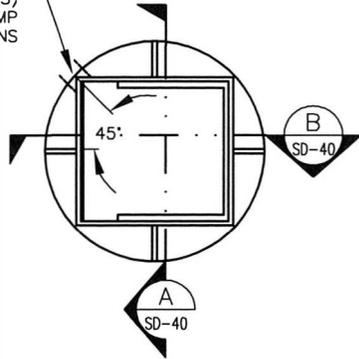
**PLAN VIEW CONCRETE VALLEY GUTTER WITH APRON**

SCALE: NONE

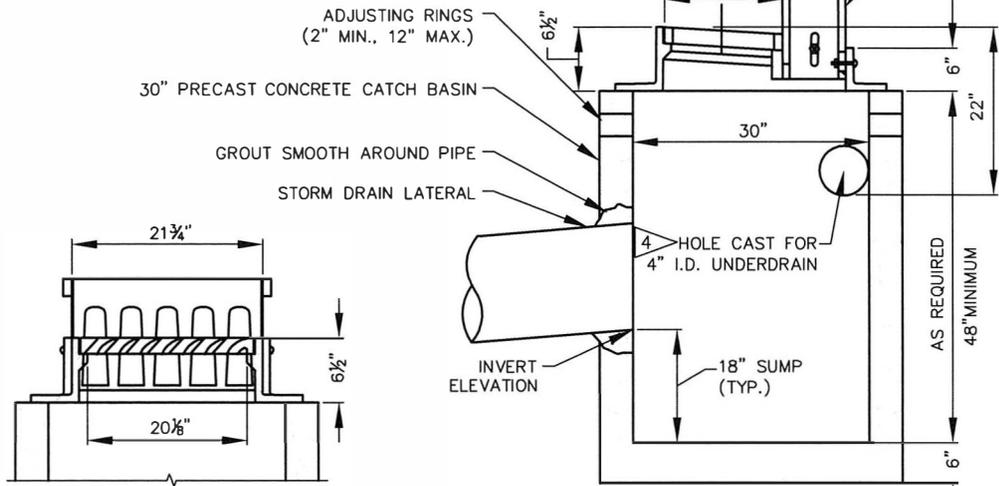
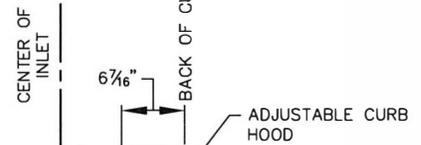
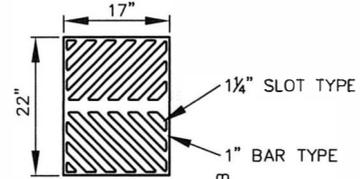


**CONCRETE VALLEY GUTTER WITH APRON**   
SCALE: NONE SD-19a

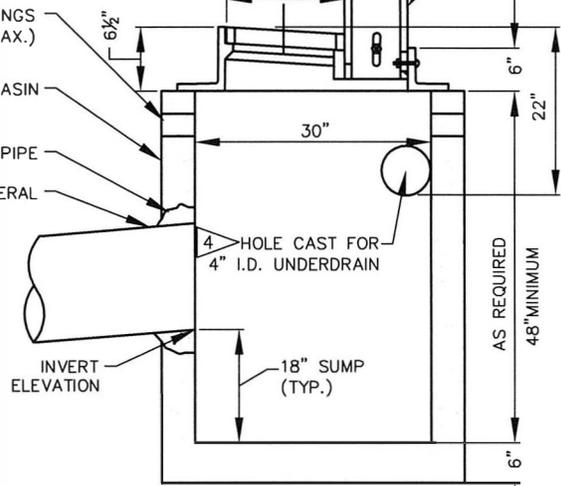
HOLE CAST FOR 4" I.D. UNDERDRAIN ON UPHILL SIDE(S) ONLY, BOTH SIDES IN SUMP LOCATIONS



**PLAN**



**SECTION A**  
SCALE: NONE SD-40



**SECTION B**  
SCALE: NONE SD-40

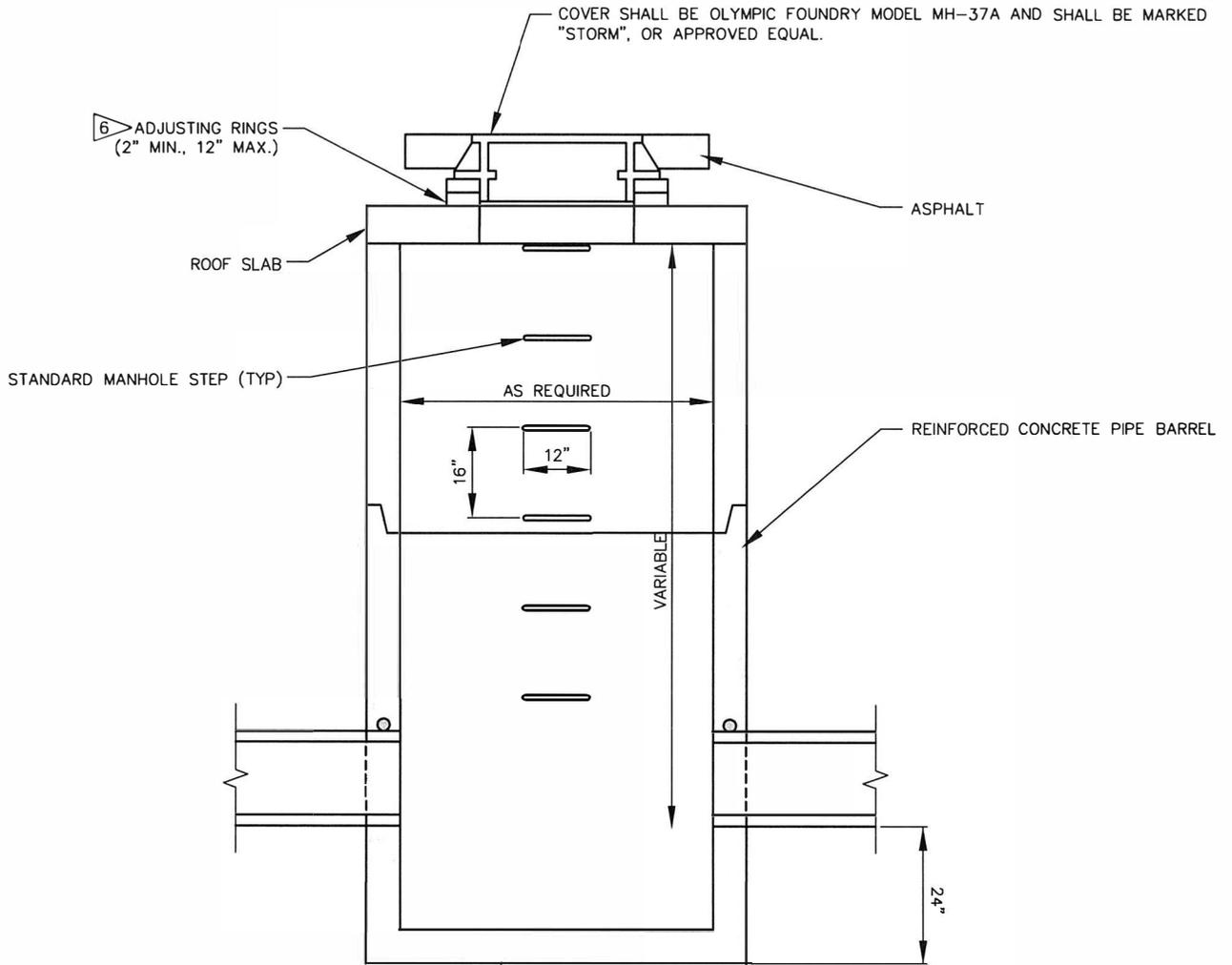
**NOTES:**

1. ALL CURB INLETS SHALL BE OLYMPIC FOUNDRY MODEL SM49B OR EJIW MODEL 7222M1 OR 7222M3 (HERRINGBONE GRATE).
2. ALL HOLES IN NEW INLETS SHALL BE CAST OR CORED.
3. ALL INLETS SHALL HAVE 'DUMP NO WASTE' FORGED IN GRATE, OR SIMILAR.

4. CONTRACTOR SHALL VERIFY INLETS WHICH REQUIRE UNDERDRAINS.

**STORM DRAIN INLET DETAIL**

SCALE: NONE



CONCRETE BASE SHALL BE INTEGRAL CAST WITH THE BASE SECTION. SEPARATE PRECAST BASES ARE NOT ACCEPTABLE.

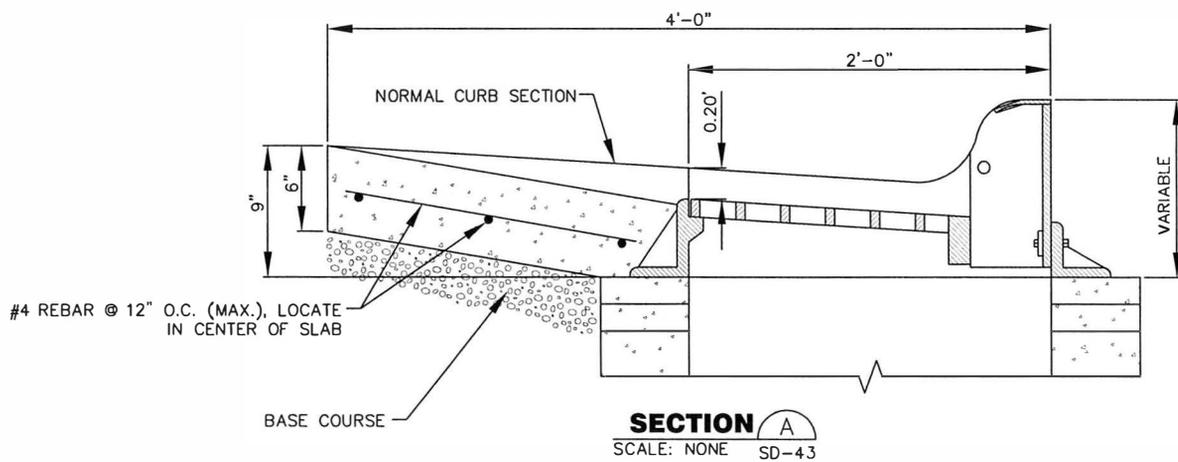
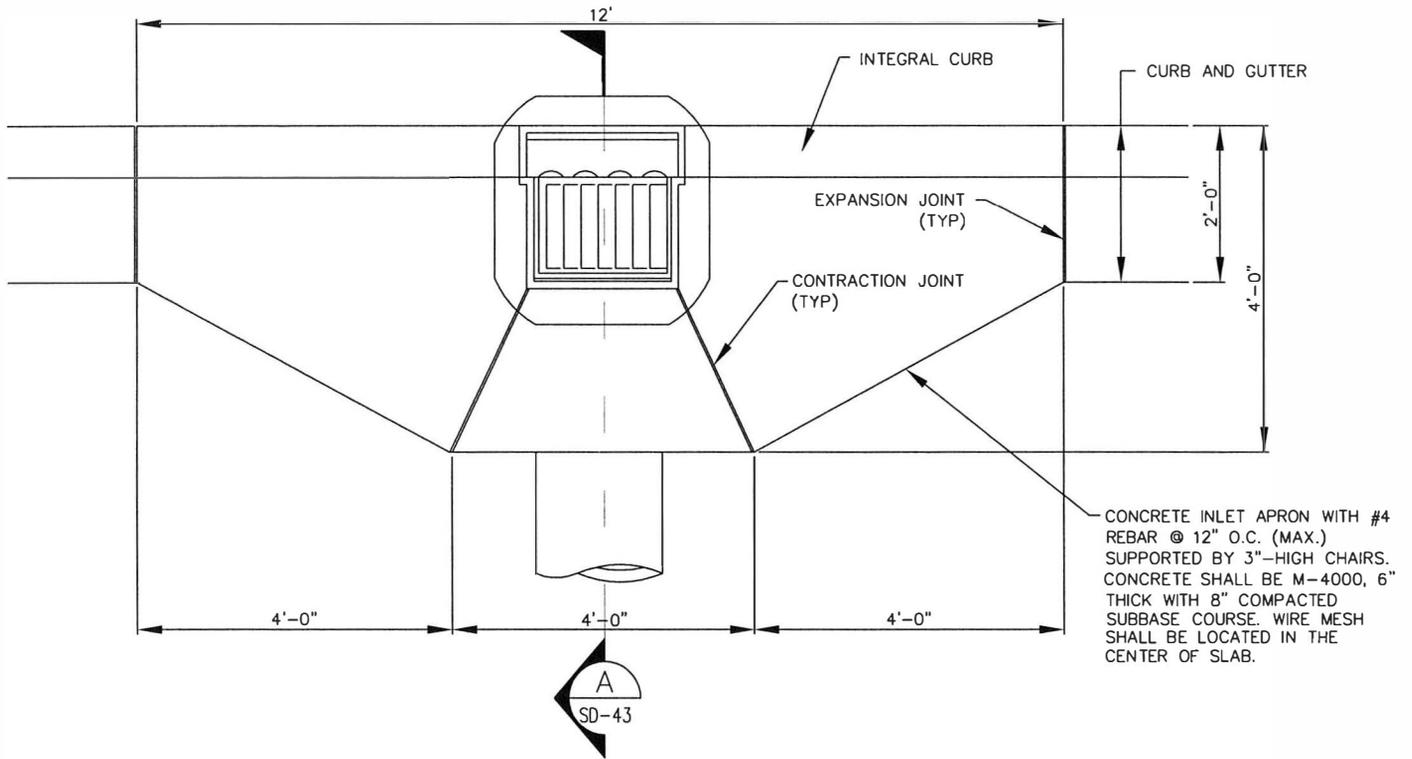
**NOTES:**

1. ALL JOINTS BETWEEN MANHOLE SECTIONS, ADJUSTING RINGS, AND MANHOLE FRAME SHALL BE WATERTIGHT. JOINT MATERIAL SHALL BE "RAM-NEK" OR EQUAL.
  2. PRECAST REINFORCED CONCRETE MANHOLES SHALL CONFORM TO ASTM C-478.
  3. ALL HOLES IN NEW MANHOLES SHALL BE CAST OR CORED.
  4. ALL STORM MANHOLES SHALL BE STRAIGHT MANHOLES.
  5. ADJUST FRAME AND LID TO MATCH CROWN AND GRADE OF STREET.
6. FIELD SET ADJUSTMENT RINGS TO MATCH STREET/FINISHED GROUND. MANHOLES IN STREETS SHALL INCLUDE AT LEAST ONE (1) LADTECH POLYETHYLENE MANHOLE ADJUSTING RING, WEDGE DESIGN, OR APPROVED EQUAL.

**STORM DRAIN MANHOLE**

SCALE: NONE



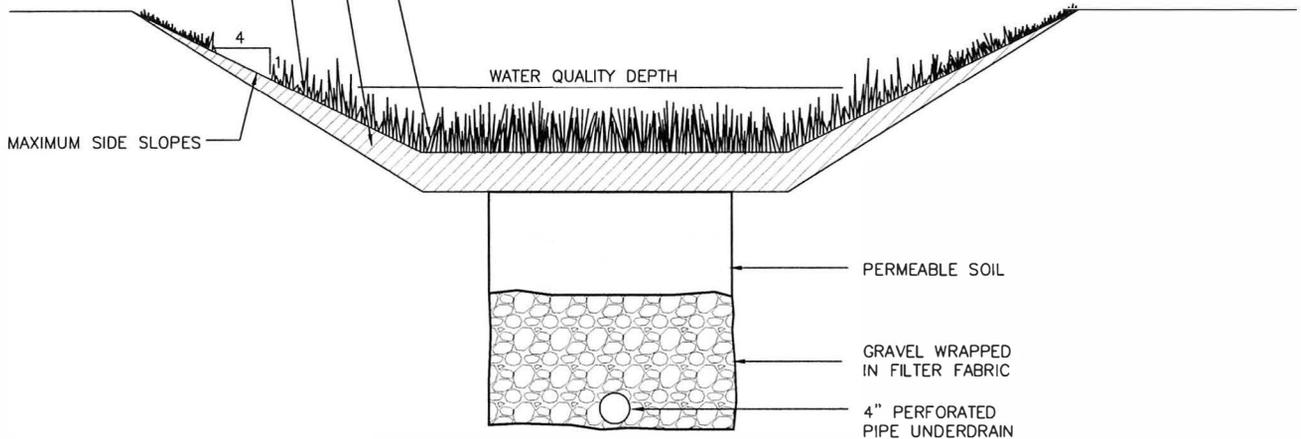


**NOTE:**  
PROVIDE CONCRETE INLET APRON AT ALL CURB INLETS.

**INLET APRON**  
SCALE: NONE

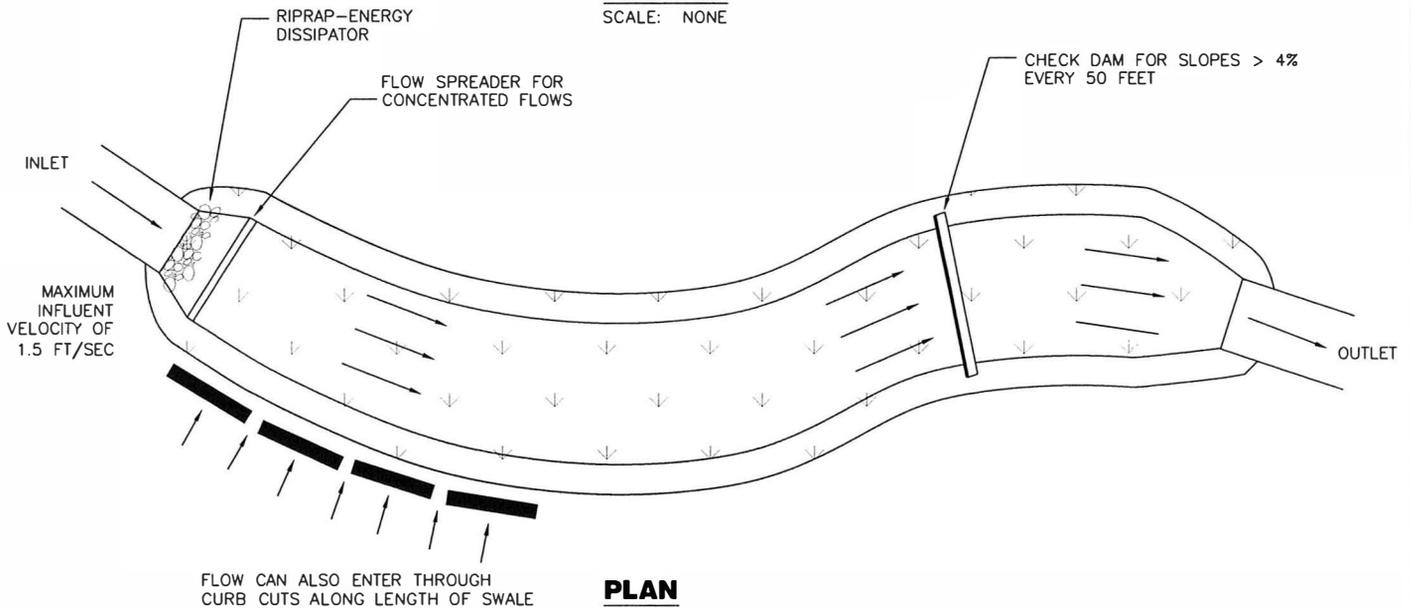
BIOSWALE VEGETATION—INCLUDE SEED MIX, PLANTING RATES, SITE PREPARATION PROCEDURES, AND MAINTENANCE REQUIREMENTS IN PLAN

OVEREXCAVATE SWALE BY 6" FOR TOPSOIL



**SECTION**

SCALE: NONE



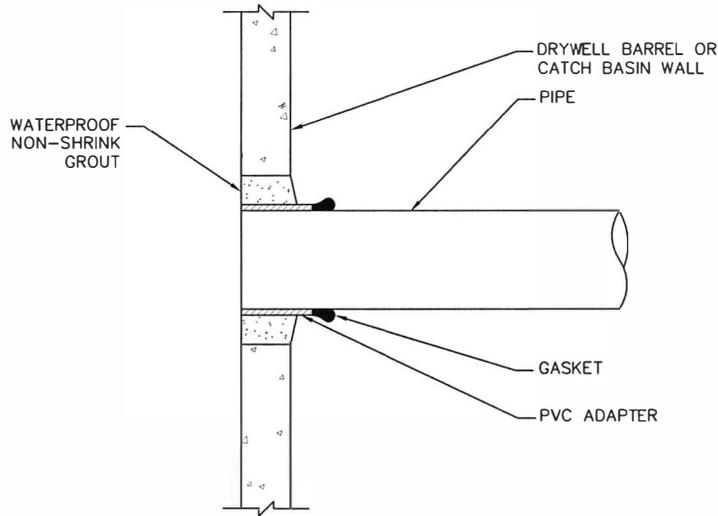
**PLAN**

SCALE: NONE

1. AN ENERGY DISSIPATOR AND FLOW SPREADER SHOULD BE INSTALLED AT THE ENTRANCE TO THE SWALE TO REDUCE VELOCITY AND EVENLY DISTRIBUTE FLOWS ACROSS THE SWALE.
2. MAXIMUM ALLOWABLE SIDE-SLOPE IS 4:1.
3. GRASS HEIGHT MAINTAINED IN ACCORDANCE WITH DESIGN SPECIFICATIONS. DESIGN GRASS HEIGHT BETWEEN 4 TO 6 INCHES.
4. VELOCITY FOR WATER QUALITY DESIGN STORM MAY NOT EXCEED 2 FEET PER SECOND WITH A GOAL OF 1 FOOT PER SECOND.
5. N VALUE ABOVE WATER QUALITY HEIGHT DETERMINED BASED ON TYPE OF VEGETATION USED. TYPICAL VALUE IS 0.035.
6. IF THE SWALE BOTTOM SLOPE EXCEEDS 4% OR SOILS VERY PERMEABLE, INSTALL CHECK DAMS EVERY 50 FEET TO SLOW THE VELOCITY TO PROHIBIT SCOURING AND PROMOTE INFILTRATION.
7. IF THE SWALE BOTTOM SLOPE IS LESS THAN 1% INSTALL UNDERDRAIN SYSTEM TO PREVENT STANDING WATER.
8. FLOWS IN EXCESS OF WATER QUALITY FLOW SHOULD BE DIVERTED AROUND THE SWALE. IF NECESSARY FOR SWALE TO CONVEY FLOOD WATERS, PROVISIONS SHALL BE MADE TO ENSURE CONVEYANCE IN ACCORDANCE WITH CITY STANDARDS. PROVIDE 1 FOOT FREEBOARD IF NECESSARY FOR FLOOD CONTROL.
9. EROSION CONTROL PRACTICES MUST BE IMPLEMENTED AND MAINTAINED UNTIL VEGETATION IN THE SWALE HAS BECOME ESTABLISHED.
10. THE SWALE BOTTOM SHOULD BE 4–6 FEET WIDE (2 FEET MINIMUM).
11. MAINTENANCE OF SWALE WILL BE THE RESPONSIBILITY OF THE PROPERTY OWNER OR HOMEOWNER'S ASSOCIATION. THE PUBLIC WORKS DEPARTMENT WILL NOT ASSUME MAINTENANCE RESPONSIBILITIES FOR BIOSWALES.

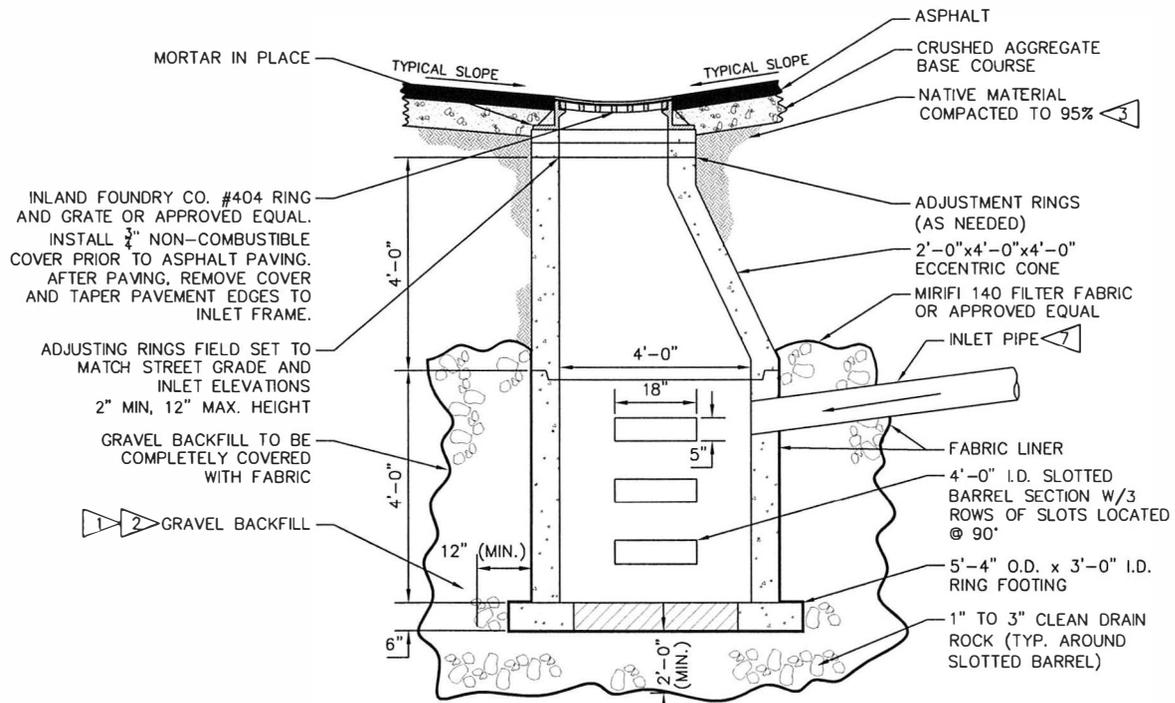
**DETAIL NOTE:**

PVC PIPE ADAPTERS AND GASKET MAY VARY IN SHAPE AND SIZE AS ILLUSTRATED IN DETAIL BY ACCEPTABLE ALTERNATE IN ACCORDANCE WITH ASTM C428.



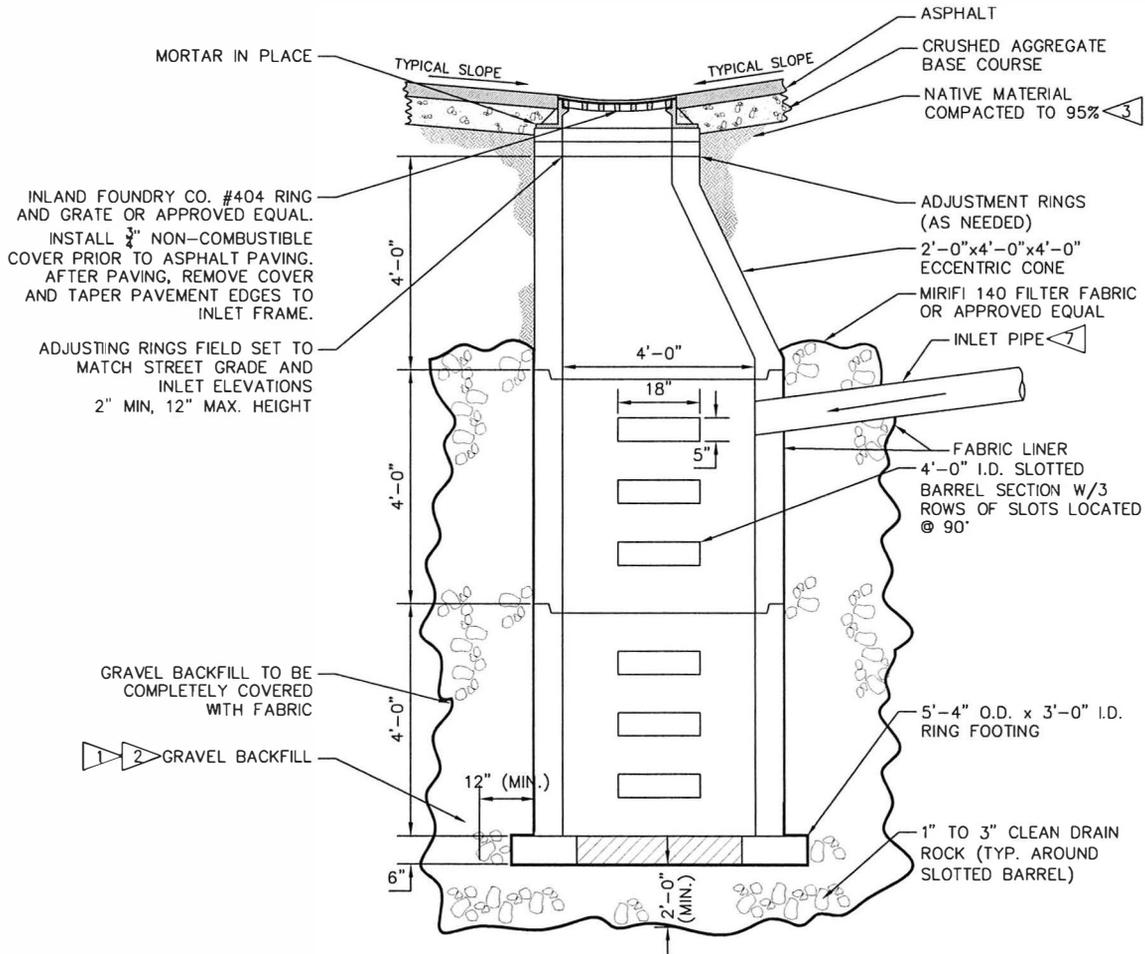
**PVC ADAPTER (SAND COLLAR)**

SCALE: NONE



**DRYWELL - TYPE 'A'**

SCALE: NONE

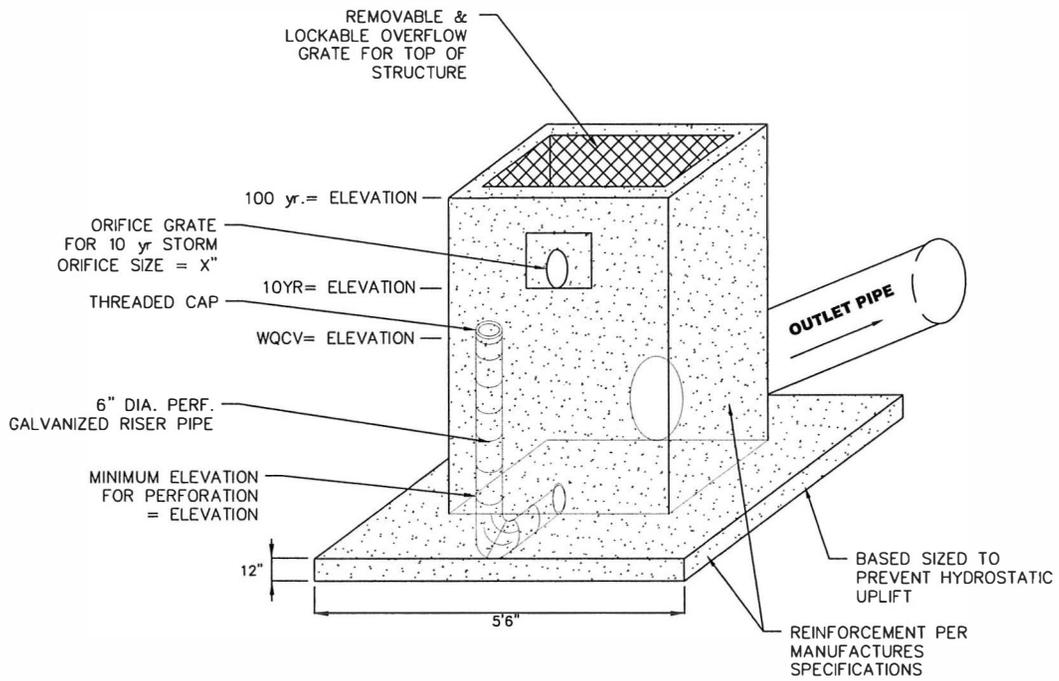


**DRYWELL - TYPE 'B'**

SCALE: NONE

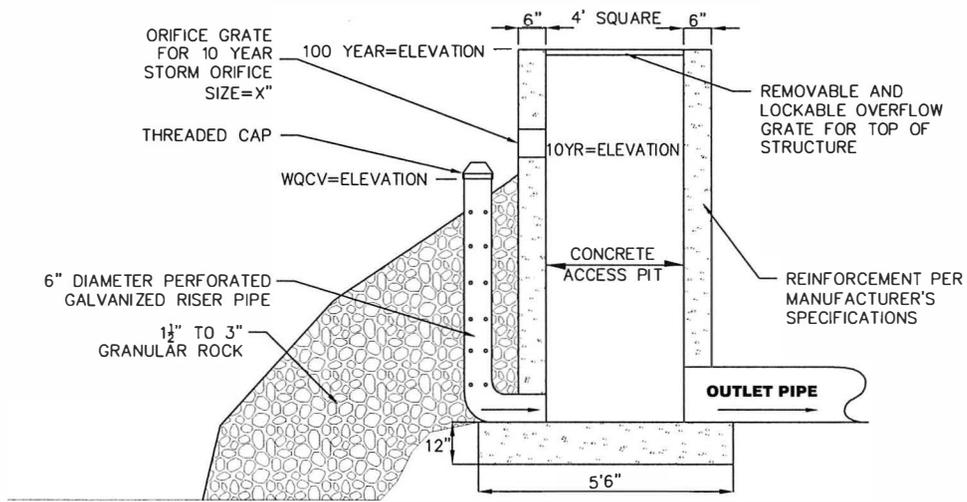
**DRYWELL NOTES:**

- 1 ▷ GRAVEL BACKFILL QUANTITY FOR DRYWELLS:  
TYPE "A" - 30 CUBIC YARDS MINIMUM / 42 TONS.  
TYPE "B" - 40 CUBIC YARDS MINIMUM / 56 TONS.
- 2 ▷ SPECIAL BACKFILL MATERIAL FOR DRYWELLS SHALL CONSIST OF WASHED GRAVEL GRADED FROM 1" TO 3" WITH A MAXIMUM OF 5% PASSING THE U.S. No. 200 SCREEN, AS MEASURED BY WEIGHT. A MAXIMUM OF 10% OF THE AGGREGATE, AS MEASURED BY WEIGHT, MAY BE CRUSHED OR FRACTURED ROCK. THE REMAINING 90% SHALL BE NATURALLY OCCURRING UNFRACTURED MATERIAL.
- 3 ▷ NATIVE BACKFILL: WITH PRIOR APPROVAL OF THE CITY AND THE ENGINEER, ON-SITE EXCAVATED SOIL MAY BE USED TO BACKFILL WATER MAINS, WATER SERVICES, FIRE HYDRANT LEADS, SEWER MAINS AND SEWER SERVICES. BLOCKY OR PLATY CLAY, AND SATURATED OR NEAR SATURATED SOILS, WILL NOT BE PERMITTED FOR USE AS BACKFILL MATERIAL. BACKFILL MATERIAL SHALL BE PLACED IN 12" MAXIMUM DRY DENSITY, AS DETERMINED BY AASHTO T-99 OR ASTM D698. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A PROCTOR (MOISTURE-DENSITY RELATIONSHIP) FOR THE BACKFILL MATERIAL.
4. ADJUSTMENT BLOCKS SHALL BE CEMENT CONCRETE.
5. PRECAST RISER MAY BE USED IN COMBINATION WITH OR IN LIEU OF ADJUSTING BLOCKS.
6. WHEN PVC PIPE IS USED A PVC ADAPTER SHALL BE INSTALLED.
- 7 ▷ PIPES SHALL BE GROUTED INTO DRYWELLS.



**OUTLET STRUCTURE**

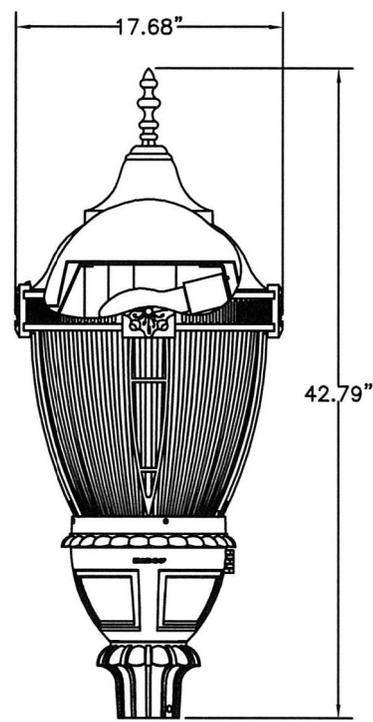
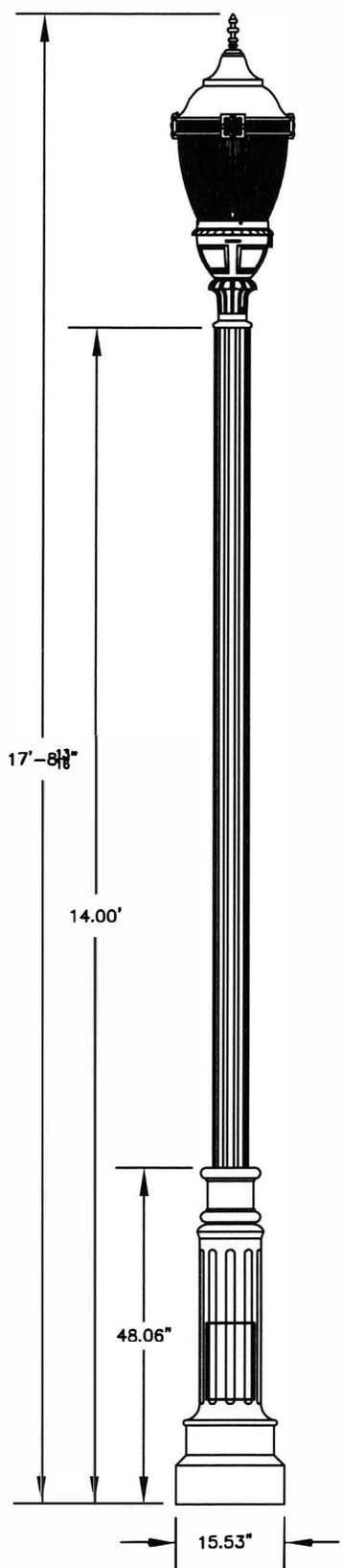
SCALE: NONE



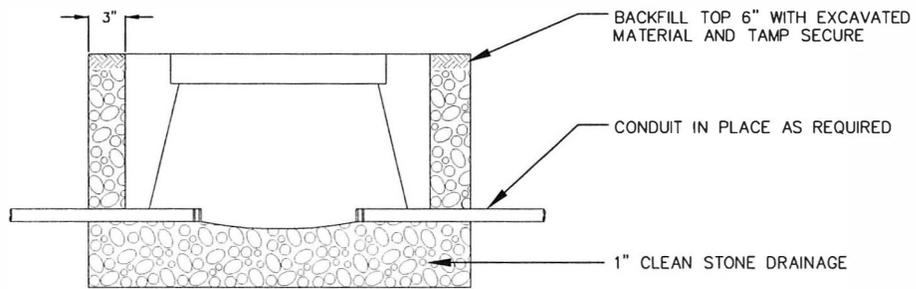
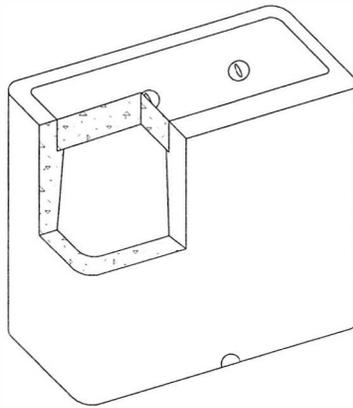
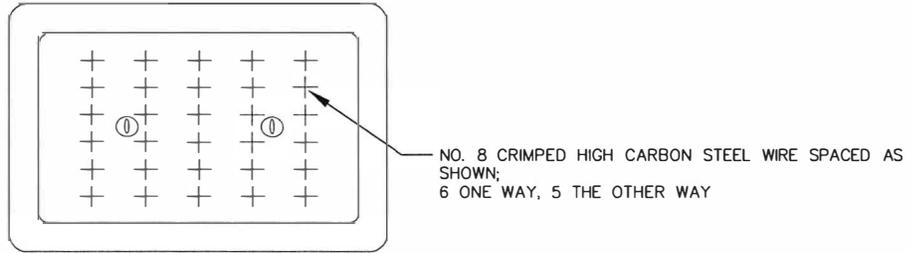
**OUTLET STRUCTURE**

SCALE: NONE

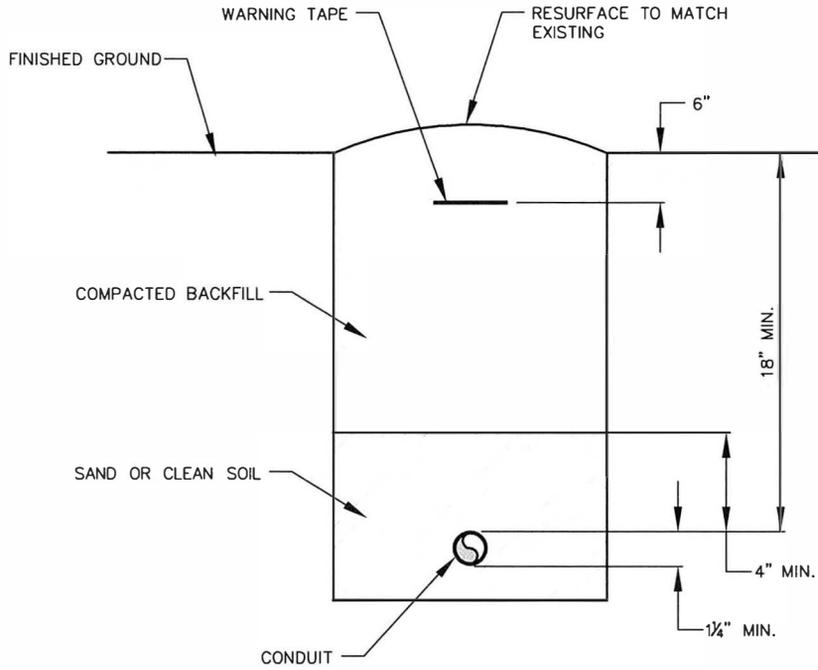
Ordering Guide:  
HADCO BRAND Special Model Number  
(Specific to City of Whitefish)  
LUMINAIRE #C2316-50-HPS-J-240V  
POLE #CP2316-14-J  
240V-50W, HPS, MEDIUM BASE  
COLOR-GREEN



LUMINAIRE DETAIL

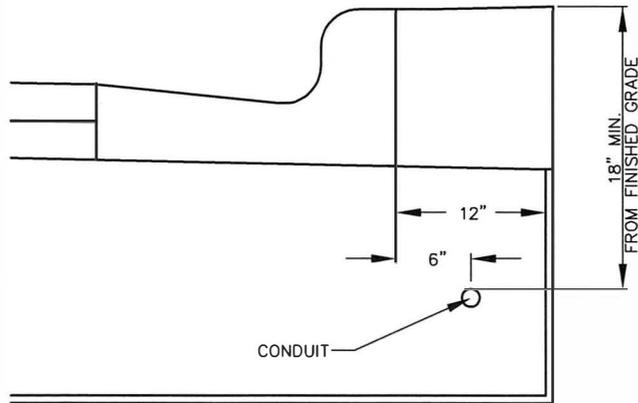


**TYPE 1 PULL BOX**  
SCALE: NONE



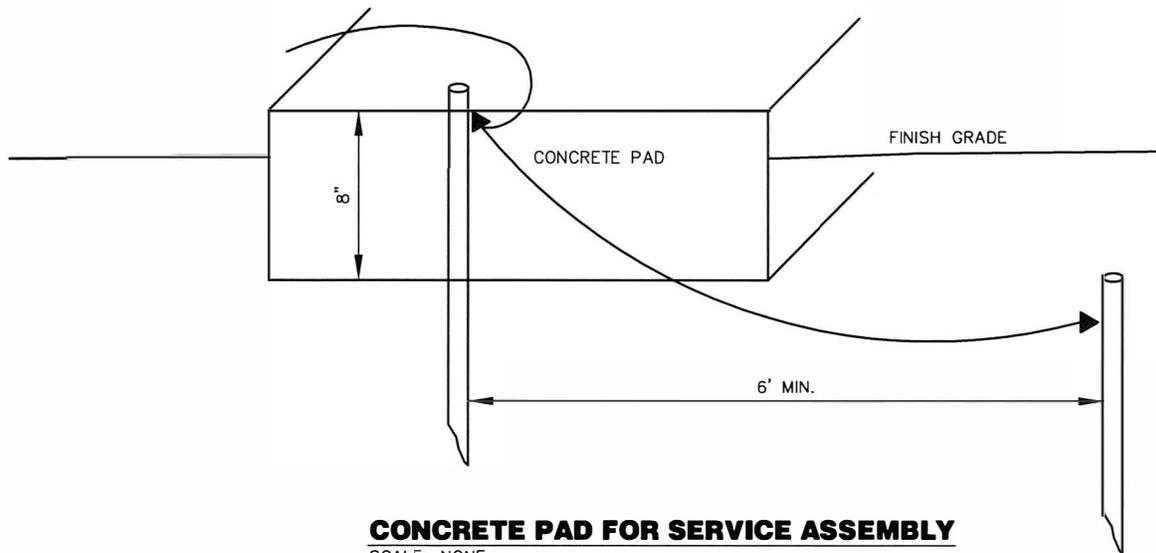
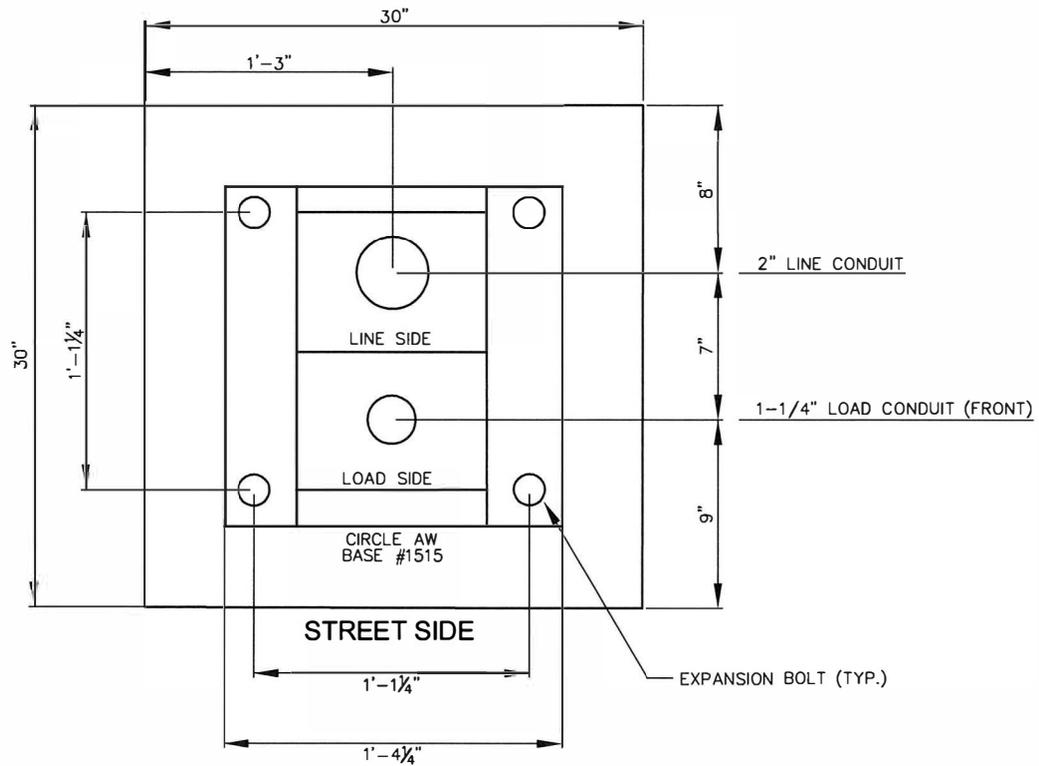
**NOTES:**

1. COORDINATE TRENCHING TO SHARE TRENCHES WITH OTHER UTILITIES WHEN FEASIBLE



**TYPICAL STREET LIGHTING CONDUIT**

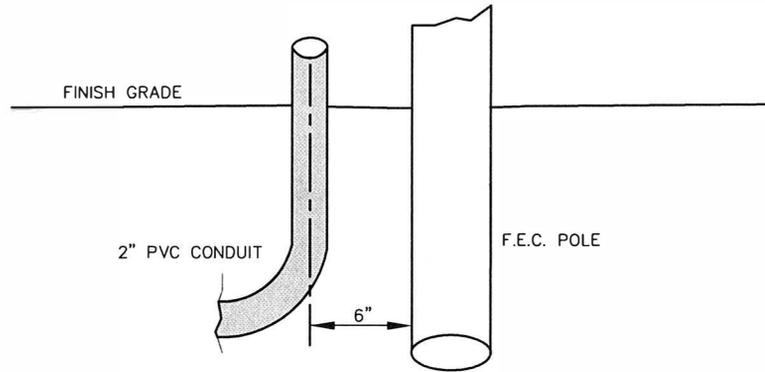
SCALE: NONE



**CONCRETE PAD FOR SERVICE ASSEMBLY**  
SCALE: NONE

**NOTES:**

1. 2-8' COPPER CLAD GROUND RODS. INSTALL 6' APART. #6 AWG GROUND WIRE WITH 6' FREE CONDUCTOR FOR CONNECTION TO SERVICE.
2. CONCRETE PAD TO BE 8" DEEP-PLACE 3/8" EXPANSION BOLTS.
3. MOUNTING BOLTS TO BE FIELD INSTALLED.

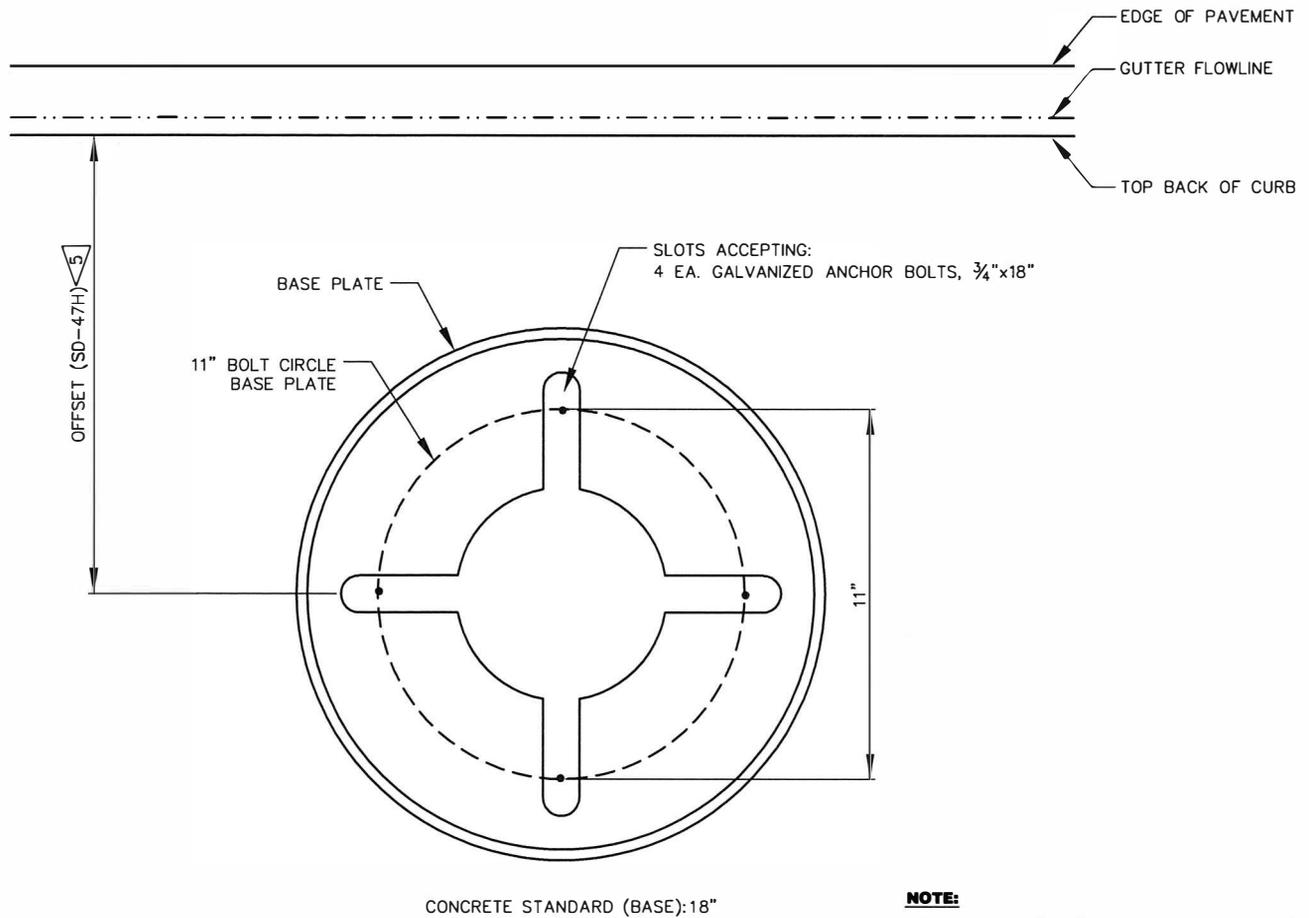


**NOTES:**

1. 2" PVC RISER AT F.E.C. POLE STUB UP SEPARATION 6" TO CENTERLINE.

**PVC RISER**

SCALE: NONE

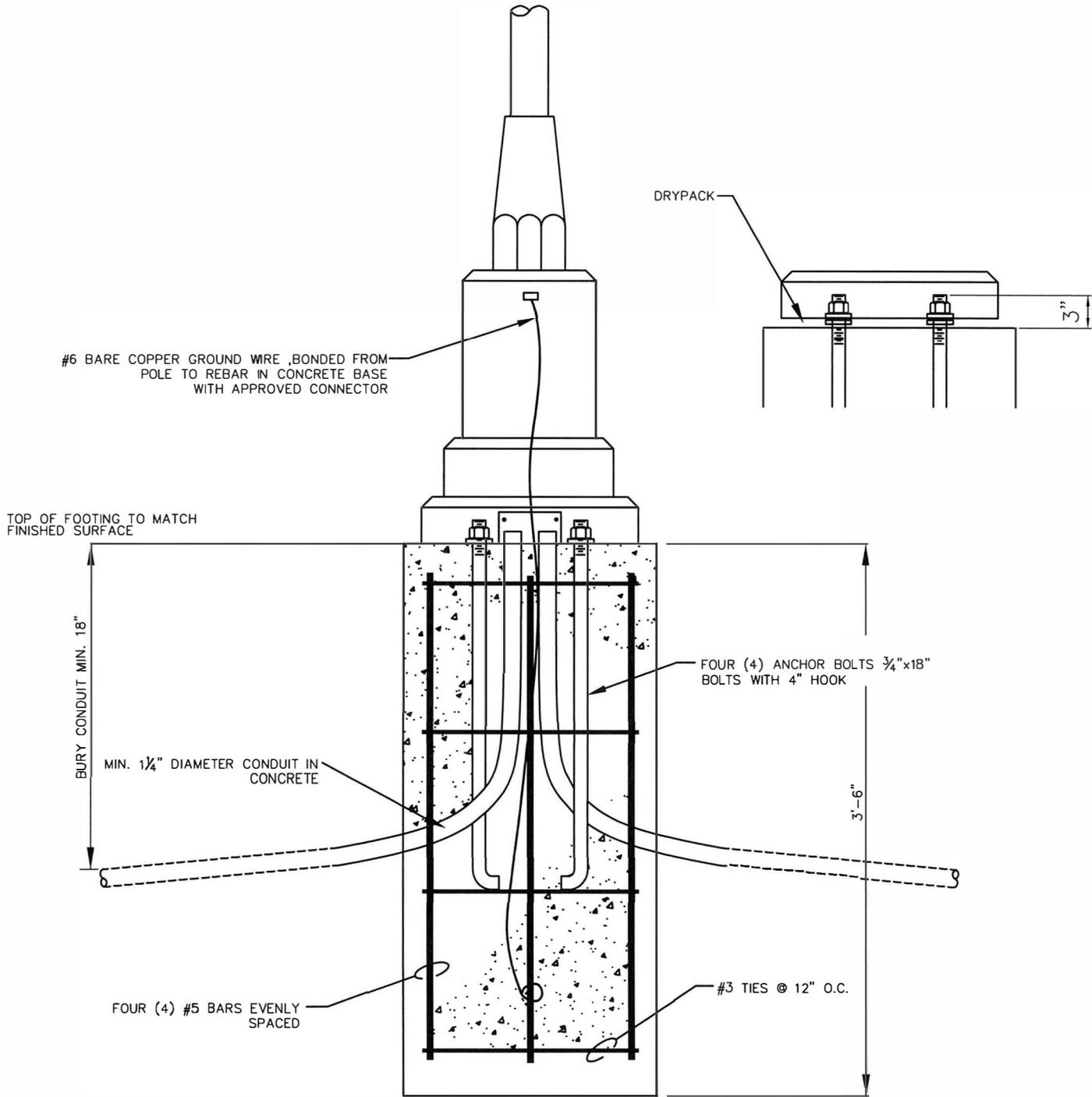


**NOTE:**

WHEN ORDERING LIGHTS HAVE BOLTS AND BASE TEMPLATE SENT SEPARATELY PRIOR TO INSTALLATION OF CONCRETE LIGHTING BASE.

**BASE PLATE**

SCALE: NONE

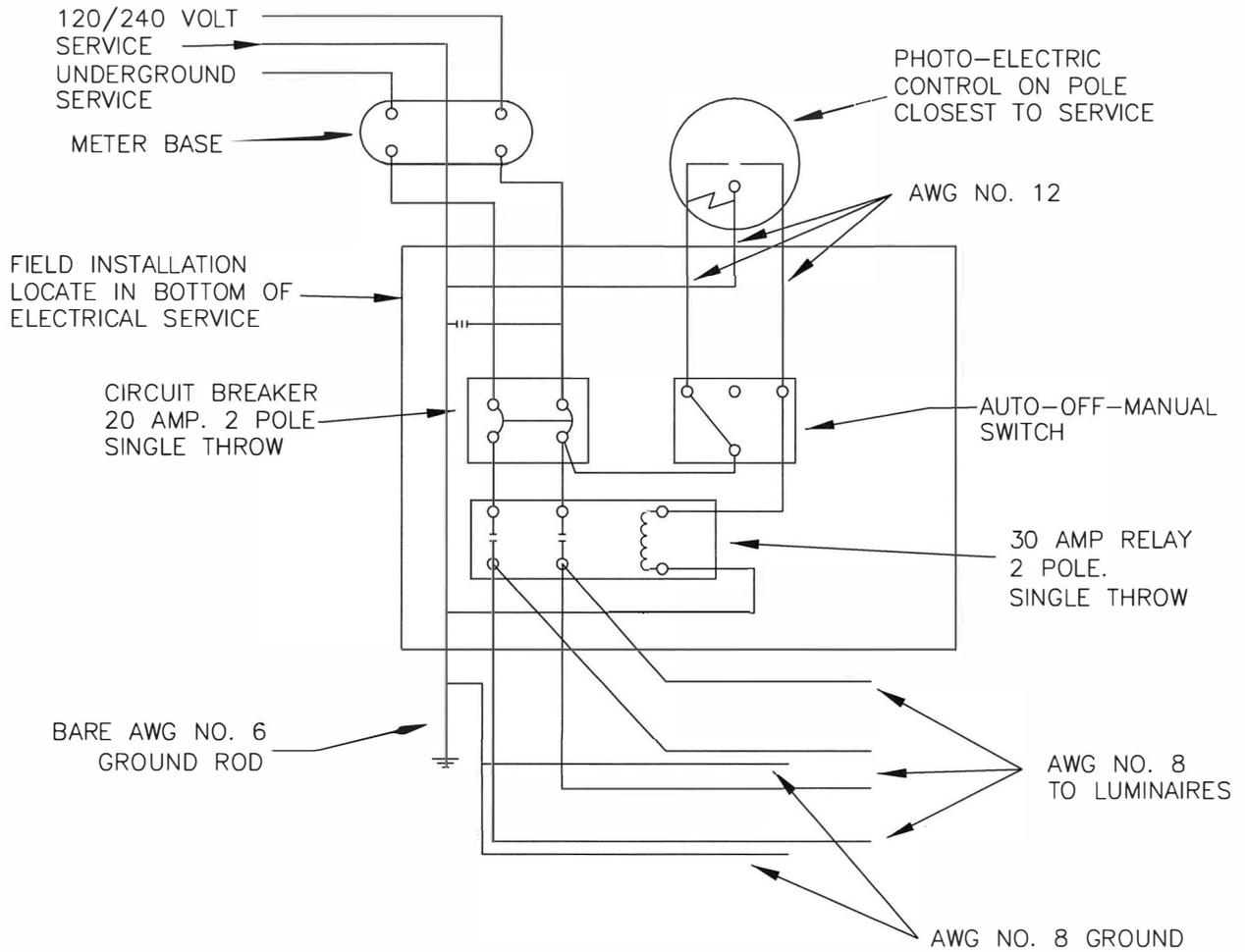


**NOTES:**

1. GROUND LIGHT POLE BASES PER MANUFACTURER'S RECOMMENDATIONS. ALL GROUNDING MATERIAL AND LABOR TO BE INCLUDED IN PRICE OF BASE.
2. SET ANCHOR BOLTS WITH THREADS ENTIRELY EXPOSED OR 3" OF THREADS EXPOSED.

**LIGHT POLE BASE**

SCALE: NONE



- SERVICE: CIRCLE AW / B-LINE #CMP411 MC-1 WITH BASE #MB1515  
BASE SHALL BE INCLUDED FOR ALL SERVICE INSTALLATIONS
- CIRCUIT BREAKERS: USE ITE Q 120, Q 220 AS NEEDED  
CONTACTOR AND SELECTOR SWITCH FIELD INSTALLED IN SERVICE PEDESTAL BELOW CIRCUIT BREAKERS
- CONTACTOR: LIGHTING CONTACTOR SHALL BE SQUARE D BRAND #8903-LO40-V02 SERIES (OR EQUAL)
- SELECTOR SWITCH: SQUARE D #9001 KS-43 BH13 - SEL. SW. 9001 KN-260-H.O.A. - LEGEND PLATE (OR EQUAL)
- PHOTO CONTROL: MULTI #P2275 (OR EQUAL) LOCATED IN CLOSEST POLE WITH PHOTO CONTROL RECEPTACLE
- POLE FUSE KIT: EACH LUMINAIRE FUSE KIT SHALL HAVE TWO (2) WATERTIGHT BREAK AWAY STYLE FUSE HOLDERS WITH DUAL ELEMENT 3 AMP MIDGET FUSES. HOMAC BRAND FUSE HOLDER #SLK-MD (OR EQUAL) WITH BUSSMANN FUSE #FNM-3 (OR EQUAL)

## **LIGHTING NOTES:**

### **Section 1600**

#### **Electrical Specifications for Decorative Street Lights**

Revised: 12-13-07

#### **Before Construction:**

Contact The City of Whitefish, Public Works Department Electrician – at 406-863-2454 for wiring "Information Packet" and "List of Substitution Equals".

#### **Inspections:**

- 1) Call for electrical conduit rough-in inspection before covering conduits.
- 2) Call for electrical final inspection and complete working test before project sign-off (project will not be complete until working test is finalized).
- 3) Inspection contact number: 406-863-2454 or 406-253-6183

#### **Conduits and Ground Boxes:**

- 1) Minimum size conduit to be used is 1 1/4" Schedule 40 PVC buried at a depth of not less than 18". Conduit runs from power source to service assembly shall be 2-inch schedule 40 PVC conduit.
- 2) Conduit **shall** follow behind curb on boulevard side where practical. Conduit **shall** be placed no more than 6" from curb.
- 3) Ground boxes **shall** be of concrete material, Type I or II, and installed flush with finished grade. Ground boxes shall be arranged to drain (gravel bottom etc.).

#### **Wiring Methods:**

- 1) Wire installed in conduit runs **shall** not be smaller than #8 THHN copper stranded conductor.
- 2) Wire installed in poles from base to luminaire **shall** be **#10 THHN** copper stranded conductor.
- 3) Ground box splices **shall** be made water tight.

#### **Pole and Luminaire Ordering:**

- 1) Pole and Luminaire ordering information :  
*Hadco Brand Special Model Number (specific to City of Whitefish)*  
*C2316 = Luminaire*  
*CP2316 = Pole*

#### **Pole Installation and Wiring:**

- 1) Poles **shall** be installed plumb and level.
- 2) Anchoring bolts and nuts shall be corrosion resistant and installed with an anti seize compound on threads.
- 3) After installation, pole bases **shall** be grouted solid to concrete standard.
- 4) Each Luminaire **shall** have two (2) water tight break away fuse holders with dual element 3 Amp midget fuses. Homac brand fuse holder #SLK-MD, (or equal) with Bussmann brand fuse #FNM-3, (or equal).
- 5) Lamp shall be 50W HPS (High Pressure Sodium) Clear Medium Base:

G.E. #LU50/MED  
Sylvania #LU50/MED  
Philips #C50S68/M

- 6) Wiring installed from base to Luminaire **shall** be **#10 THHN** copper conductor.

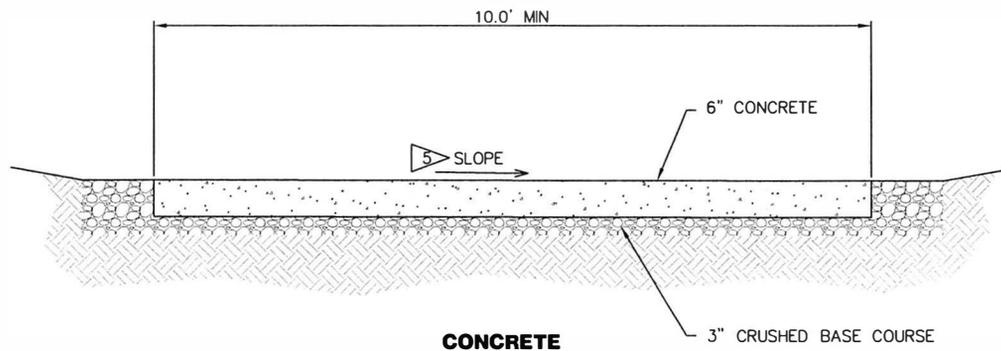
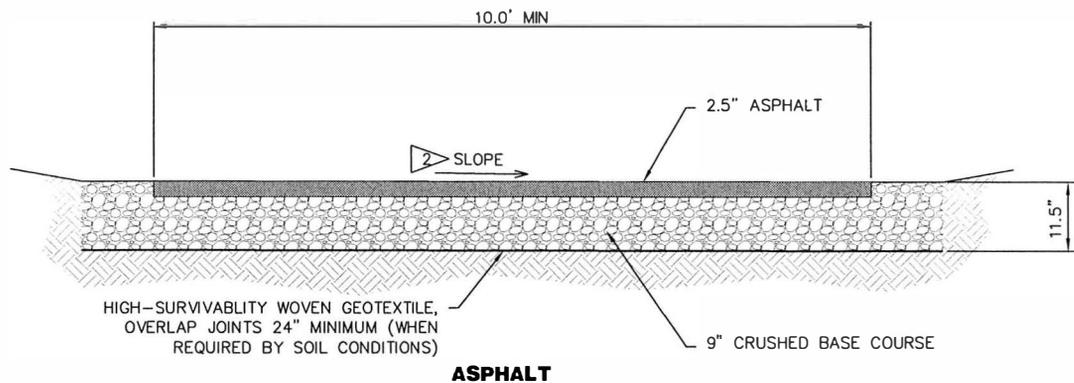
#### **Service Ordering Guide:**

Service shall be 100Amp, 120/240Volt, 1 Phase:

- 1) Circle AW/B-Line Brand # CMP4111, MC-1 With Base # MB1515
- 2) Milbank Brand # CP3B-DXX With Base # CP-16PDMNT-CALT

#### **Spacing of Lights on Residential Streets:**

Decorative lights shall be spaced every 150 to 180 feet along residential streets. If necessary the spacing may extend in some areas to 200 feet. The light location should alternate from side to side of the street. Lights shall be placed a minimum of 3 feet from the back of curb. Residential street lights must be the type shown in Detail No. 1 and the lighting plan sheet must be done to scale.



**BIKE PATH**

SCALE: NONE

**DETAIL NOTES:**

1. BIKE PATHS SHALL BE DESIGNED TO SUPPORT A MINIMUM 12,500 POUNDS.
2. ASPHALT PATHS SHALL BE A MINIMUM OF 10 FEET WITH A CROSS SLOPE OF 2.0% AND A 1 FOOT WIDE GRAVEL BORDER ALONG EACH EDGE. THE MINIMUM WIDTH MAY BE REDUCED TO 8 FEET WITH THE APPROVAL OF THE CITY OF WHITEFISH.
3. PATH BED SHALL CONSIST OF A MINIMUM 9 INCHES OF CRUSHED GRAVEL COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T99, UNLESS OTHERWISE DICTATED BY SUB-SOIL TYPE MATERIALS BEING COMPACTED TO ROAD STANDARD.
4. THE OVERLAY SHALL CONSIST OF 2.5 INCHES OF ASPHALT COMPACTED TO 93% OF MAXIMUM DENSITY, AS DETERMINED BY ASTM D-2041. CONSTRUCTION SEAL SHALL BE APPLIED AT 0.08 GALLONS/SQUARE YARD AFTER INSTALLATION.
5. CONCRETE PATHS SHALL BE A MINIMUM OF 10 FEET WITH A CROSS SLOPE OF 2.0%. THE MINIMUM WIDTH MAY BE REDUCED TO 8 FEET WITH THE APPROVAL OF THE CITY OF WHITEFISH.
6. PATH BASE SHALL CONSIST OF A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99. CONCRETE SHALL BE A MINIMUM OF 6 INCHES OF M4000 REINFORCED WITH 1.5 lbs. PER CUBIC YARD OF FIBER MESH.
7. WHERE TERRAIN ALLOWS, SLOPE OF THE PATH SHOULD NOT EXCEED 12:1.

SYMBOL: ——— PEV ———

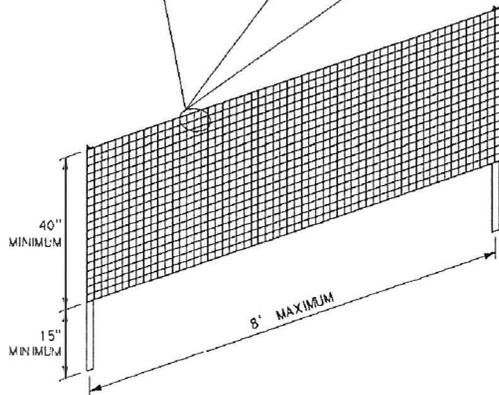
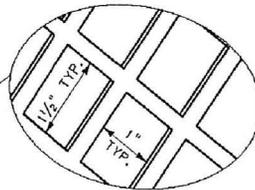
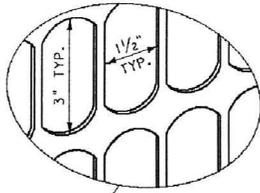
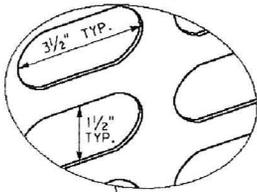
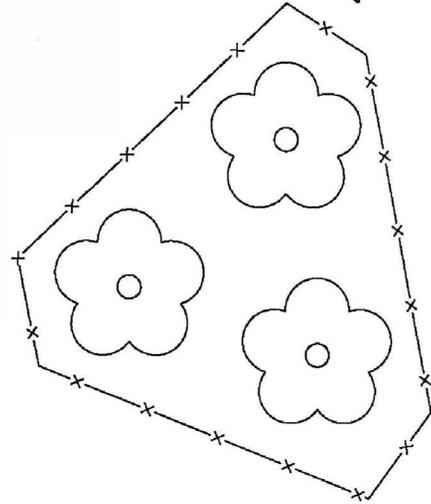
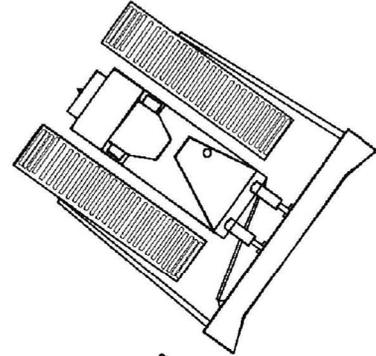
PRESERVATION OF EXISTING VEGETATION SS-2:

PRESERVATION OF EXISTING VEGETATION IS THE IDENTIFICATION AND PROTECTION OF DESIRABLE VEGETATION THAT PROVIDES EROSION AND SEDIMENT CONTROL BENEFITS. PROVIDE PRESERVATION OF EXISTING VEGETATION PRIOR TO COMMENCEMENT OF CLEARING AND GRUBBING OPERATIONS OR OTHER SOIL DISTURBING ACTIVITIES. MARK THE AREA AS DESIGNATED ON THE CONSTRUCTION PLANS USING TEMPORARY FENCING MADE OF ORANGE POLYPROPYLENE THAT IS STABILIZED AGAINST ULTRAVIOLET LIGHT. AFFIX FENCING TO METAL "T" POST USING 11 GAGE WIRE. PLACE FENCING AN ADEQUATE DISTANCE FROM TREES AND BUSHES TO PREVENT ROOT AND IRRIGATION SYSTEM DAMAGE.

UPON WRITTEN APPROVAL BY THE ENGINEER, THE CONTRACTOR MAY BE ALLOWED TO FLAG OR VERBALLY DESIGNATE AREAS OF EXISTING VEGETATIVE PRESERVATION.

PRESERVATION OF EXISTING VEGETATION MAY BE USED IN CONJUNCTION WITH VEGETATIVE BUFFER (SS-14), WIND EROSION CONTROL (WE-1) AND SNOW ACCUMULATION (SN-1).

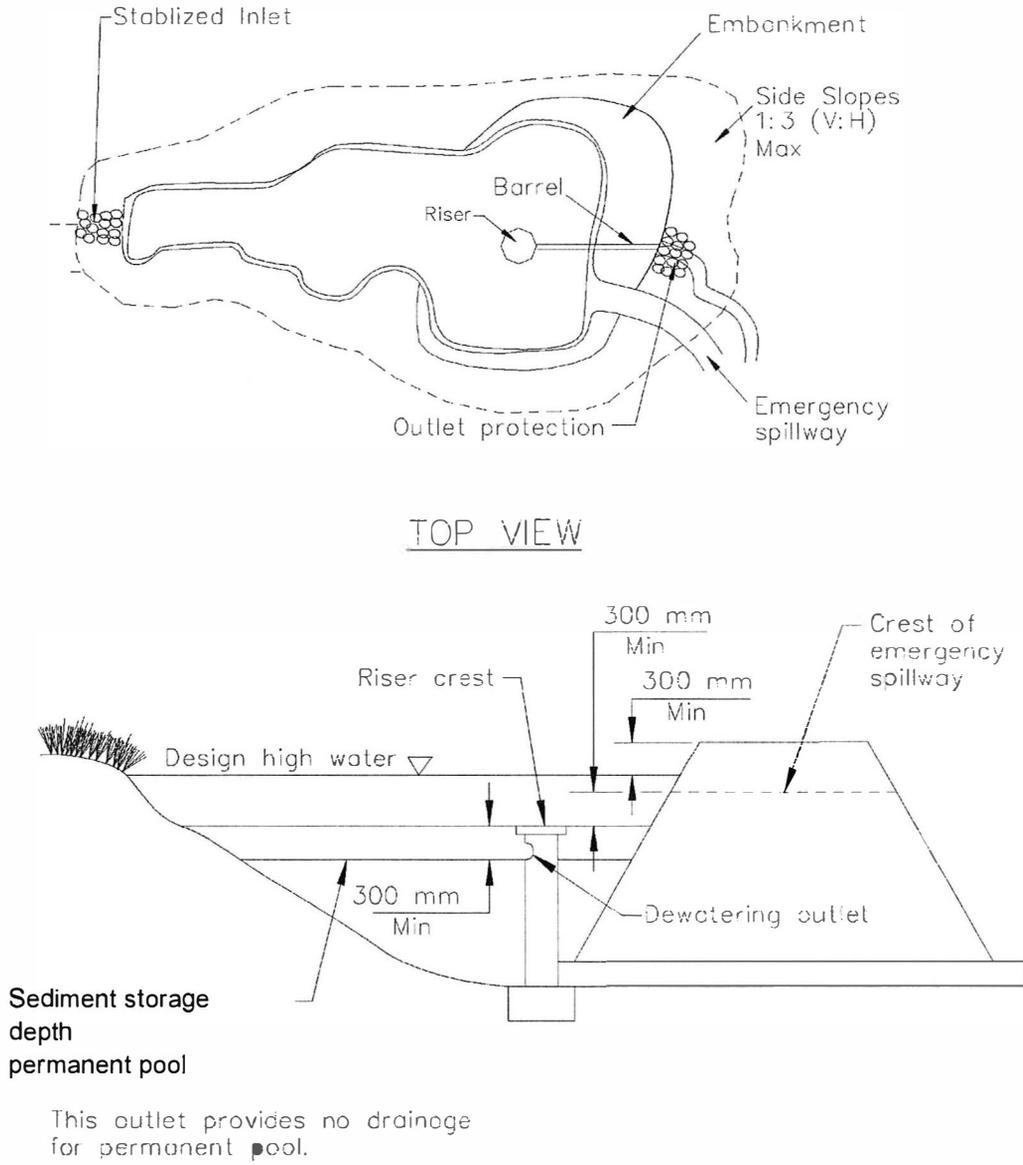
FOLLOW CLEAR ZONE REQUIREMENTS FOR ALL FENCING PLACED WITHIN THE CLEAR ZONES.



DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 208	DWG. NO. 208-02
PRESERVATION OF EXISTING VEGETATION (SS-2)	
EFFECTIVE: FEBRUARY 2005	
 MONTANA DEPARTMENT OF TRANSPORTATION <i>serving you with pride</i>	

# Sediment/Desilting Basin

**SC-2**



**FIGURE 1: SINGLE ORIFICE DESIGN**  
NOT TO SCALE



SYMBOL: ——— TS ———

TEMPORARY SEEDING SS-4:

TEMPORARY SEEDING IS THE ESTABLISHMENT OF A TEMPORARY VEGETATIVE COVER BY SEEDING WITH CEREAL BARLEY. USE TEMPORARY SEEDING ON AREAS 3:1 OR FLATTER THAT WILL BE EXPOSED FOR LONGER THAN 14 DAYS AND THAT WILL UNDERGO FURTHER DISTURBANCE. EXCLUDE ROCK SLOPES THAT CANNOT BE EXCAVATED BY RIPPING.

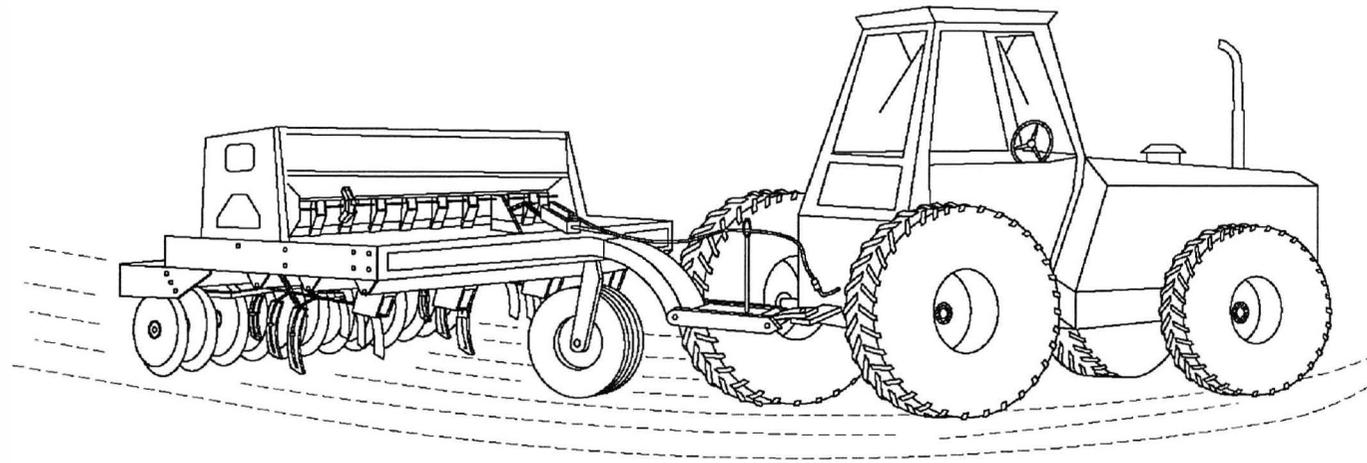
SEEDING DATES AND APPLICATION RATES ARE AS FOLLOWS:

- APR. 1 TO JUN. 30: CEREAL BARLEY AT 12 LB./ACRE
- JUL. 1 TO AUG. 31: TEMPORARY SEEDING NOT RECOMMENDED
- SEP. 1 TO NOV. 15: CEREAL BARLEY AT 12 LB./ACRE

DO NOT TEMPORARY SEED FROM SEP. 1 TO NOV. 15 IF THE AREA IS TO BE PERMANENTLY SEEDED THAT FALL.

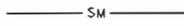
CONTACT THE MDT AGRONOMIST, THROUGH THE ENGINEER, PRIOR TO USING SUBSTITUTIONS OR PLACING TEMPORARY SEEDING OUTSIDE THESE DATES. DRILL SEED SLOPES OF 3:1 OR FLATTER. FOR SLOPES STEEPER THAN 3:1, REFER TO EROSION SEEDING.

ANY TEMPORARY SEEDING EFFORTS THAT DO NOT PROVIDE ADEQUATE COVER MUST BE RE SEEDED AS REQUIRED BY THE ENGINEER.



SLOPES 3:1 OR FLATTER

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 208	DWG. NO. 208-06
TEMPORARY SEEDING (SS-4)	
EFFECTIVE: FEBRUARY 2005	
 MONTANA DEPARTMENT OF TRANSPORTATION	

SYMBOL: 

**STRAW MULCH SS-6:**

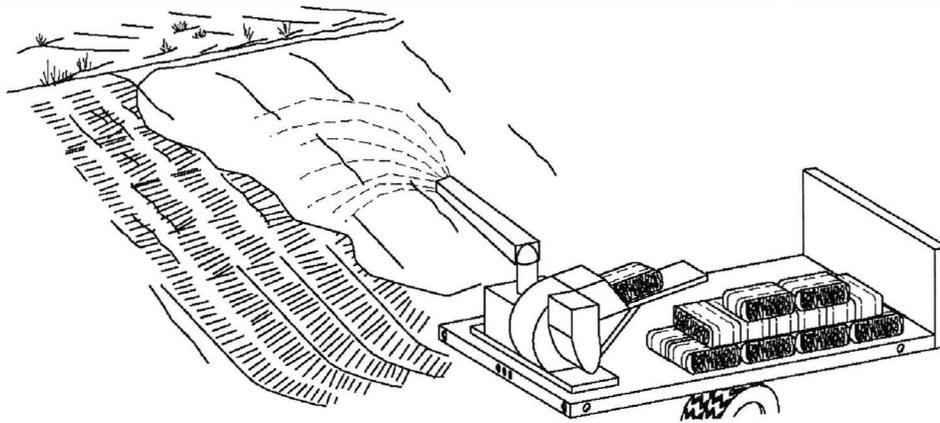
STRAW MULCH CONSISTS OF PLACING A UNIFORM LAYER OF STRAW AND ANCHORING IT INTO THE SOIL WITH A STUDDED ROLLER OR DISK OR BINDING THE STRAW TOGETHER WITH AN ENGINEER APPROVED TACKIFIER.

USE STRAW MULCH FOR SOIL STABILIZATION AS A TEMPORARY SURFACE COVER ON DISTURBED AREAS UNTIL SOILS CAN BE PREPARED OR RE-VEGETATION/PERMANENT VEGETATION IS ESTABLISHED. STRAW MULCH IS COMMONLY USED IN COMBINATION WITH TEMPORARY SEEDING, BMPs SS-4 & SS-15, AND/OR PERMANENT SEEDING TO ENHANCE PLANT ESTABLISHMENT.

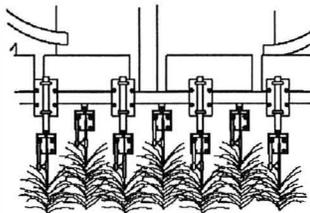
ALL STRAW MULCH IS REQUIRED TO BE CERTIFIED WEED FREE AND DERIVED FROM WHEAT, BARLEY OR RICE. ENGINEERS APPROVAL IS REQUIRED PRIOR TO ANY PLACEMENT OF STRAW MULCH.

STRAW MULCH CAN BE APPLIED BY HAND OR BLOWN UNDER LOW WIND CONDITIONS. OBTAIN ENGINEERS APPROVAL FOR PLACEMENT METHODS PRIOR TO PLACEMENT. EVENLY DISTRIBUTE STRAW MULCH AT A MINIMUM LOOSE RATE OF 4000 LB./ACRE. IMMEDIATELY FOLLOWING PLACEMENT, CRIMP OR APPLY TACKIFIERS TO RETAIN MULCH. CRIMP USING DISKS OR A PUNCH-TYPE ROLLER. IF TACKIFIERS ARE USED, FOLLOW GUIDELINES PROVIDED IN BMP SS-5. WHEN EITHER TEMPORARY OR PERMANENT SEEDING IS COMBINED WITH THE STRAW MULCH BMP, COMPLETE SEEDING OPERATIONS PRIOR TO STRAW MULCH PLACEMENT. REFER TO BMPs SS-4 AND SS-15 FOR SEEDING GUIDELINES.

REAPPLICATION OF STRAW MULCH AND TACKIFIER MAY BE REQUIRED BY THE ENGINEER TO MAINTAIN EFFECTIVE SOIL STABILIZATION OVER DISTURBED AREAS AND SLOPES.



STRAW BLOWER



STRAW CRIMPING

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	208-10
SECTION 208	
STRAW MULCH (SS-6)	
EFFECTIVE: FEBRUARY 2005	
 MONTANA DEPARTMENT OF TRANSPORTATION	

SYMBOL: ———— HM ————

HYDRAULIC MULCH SS-3:

HYDRAULIC MULCH CONSISTS OF APPLYING A MIXTURE OF SMALL PIECES OF CELLULOSE FIBERS WHICH CAN BE MADE FROM SHREDDED WOOD FIBERS OR RECYCLED PAPER AND A STABILIZING EMULSION AND TACKIFIER (SUBJECT TO ENGINEERS DISCRETION) USING HYDRO-MULCHING EQUIPMENT. HYDRAULIC MULCH IS APPLIED TO DISTURBED AREAS REQUIRING TEMPORARY PROTECTION UNTIL PERMANENT VEGETATION IS ESTABLISHED OR DISTURBED AREAS THAT MUST BE RE-DISTURBED FOLLOWING AN EXTENDED PERIOD OF INACTIVITY.

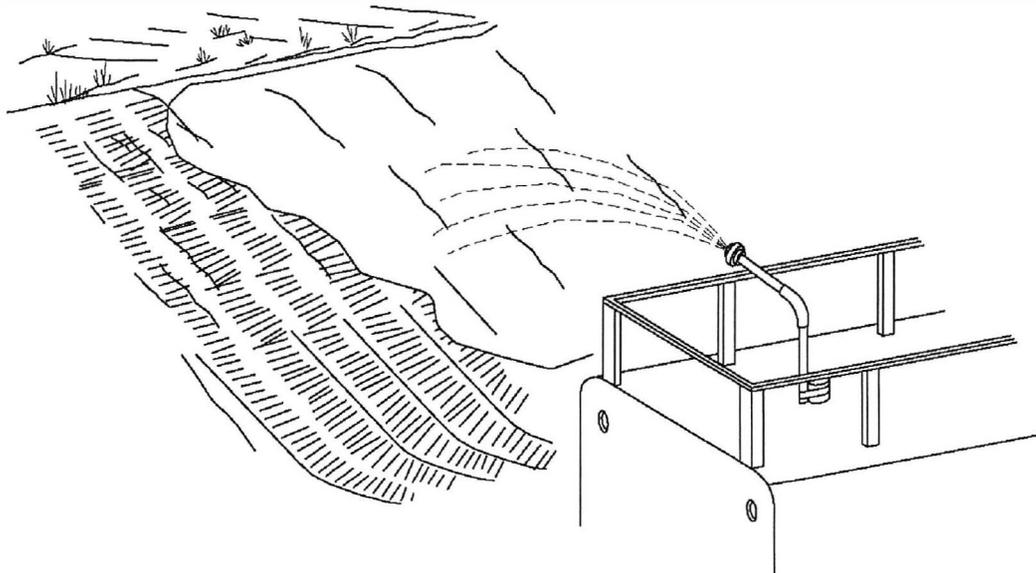
APPLY HYDRAULIC MULCH A MINIMUM OF 24 HOURS PRIOR TO A STORM EVENT TO ALLOW FOR ADEQUATE DRYING.

HYDRAULIC MULCH SELECTION MUST MEET MDT SPECIFICATIONS AND BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT. ROUGHEN EXISTING EMBANKMENT FOLLOWING GUIDELINES SPECIFIED IN BMP SS-12. WHEN EITHER TEMPORARY SEEDING OR PERMANENT SEEDING IS COMBINED WITH THE HYDRAULIC MULCH BMP, COMPLETE SEEDING OPERATIONS PRIOR TO HYDRAULIC MULCHING OPERATIONS. REFER TO BMPs SS-4 AND SS-5 FOR SEEDING REQUIREMENTS. REMOVE ANY OVER SPRAY FROM ROADWAYS OR SIDEWALKS IMMEDIATELY FOLLOWING APPLICATION.

REAPPLY HYDRAULIC MULCH TO ANY DISTURBED AREAS FOLLOWING A RAIN EVENT OR RESULTING FROM CONSTRUCTION ACTIVITIES.

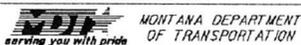
RECYCLED PAPER MULCH SHOULD CONTAIN 100% POST CONSUMED PAPER.

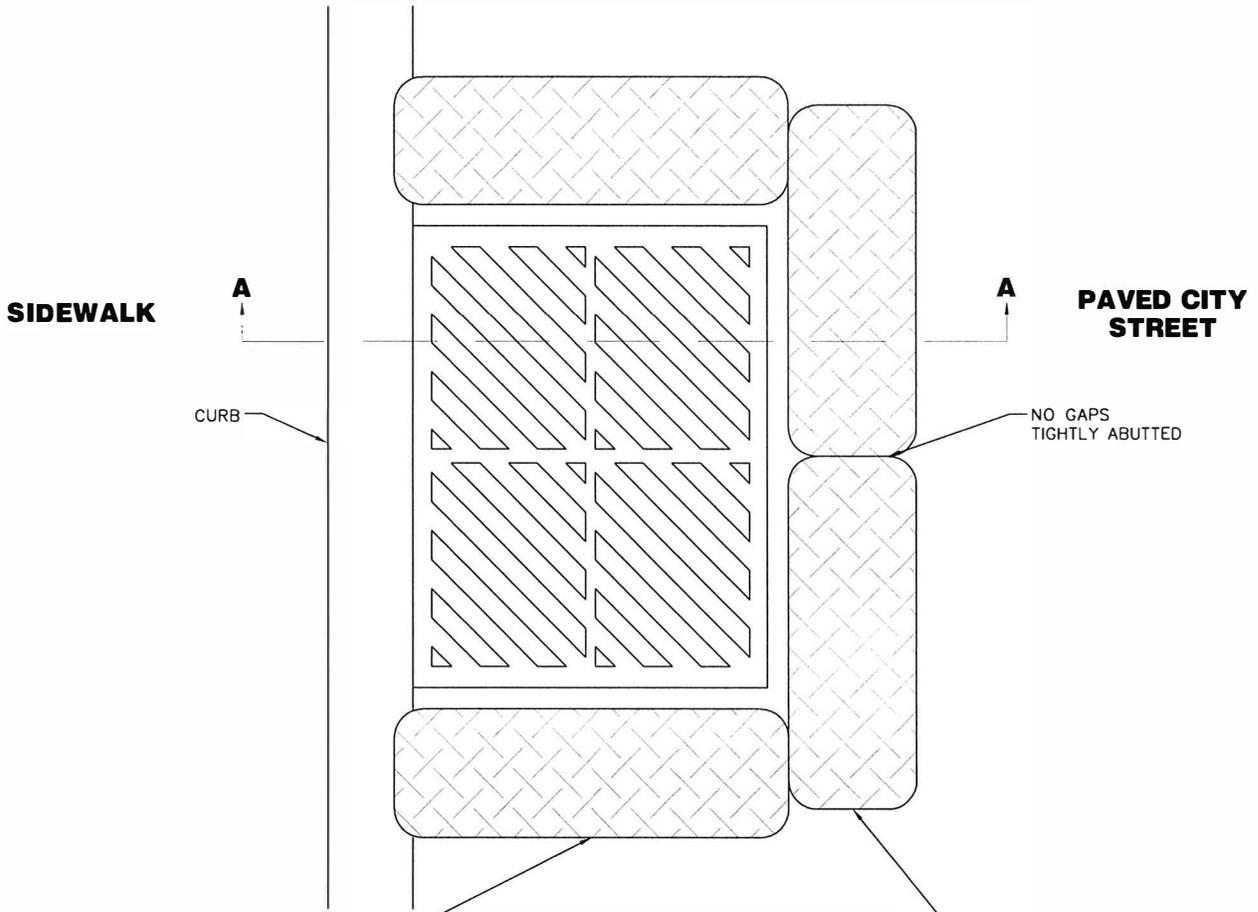
REFER TO BMP SS-5 (SOIL BINDER) FOR TACKIFIER REQUIREMENTS. ADD ENVIRONMENTALLY SAFE GREEN DYE AS A VISUAL AID DURING APPLICATION.



HYDRAULIC MULCH		
PRODUCT	MATERIAL	APPLICATION RATE *
PAPER-BASED HYDRAULIC MULCH	PAPER	1000 LB./ACRE (MIN)
WOOD-BASED HYDRAULIC MULCH	WOOD OR WOOD & PAPER	1000 LB./ACRE (MIN)

\* APPLICATION RATES VARY WITH SLOPE & MUST BE APPROVED BY THE ENGINEER

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 208	DWG. NO. 208-04
HYDRAULIC MULCH (SS-3)	
EFFECTIVE: FEBRUARY 2005	
	

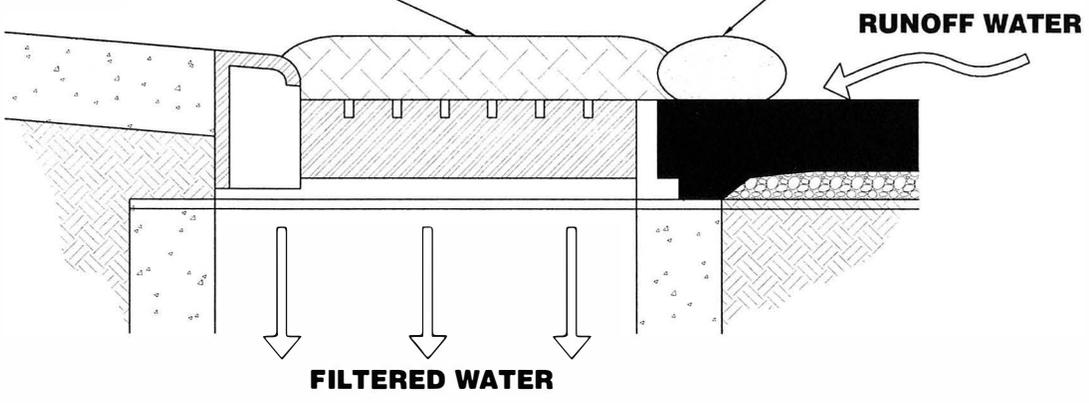


**PLAN VIEW**

SCALE: NONE

SAND BAGS FILLED WITH WASHED COARSE AGGREGATE OR STRAW WADDLES

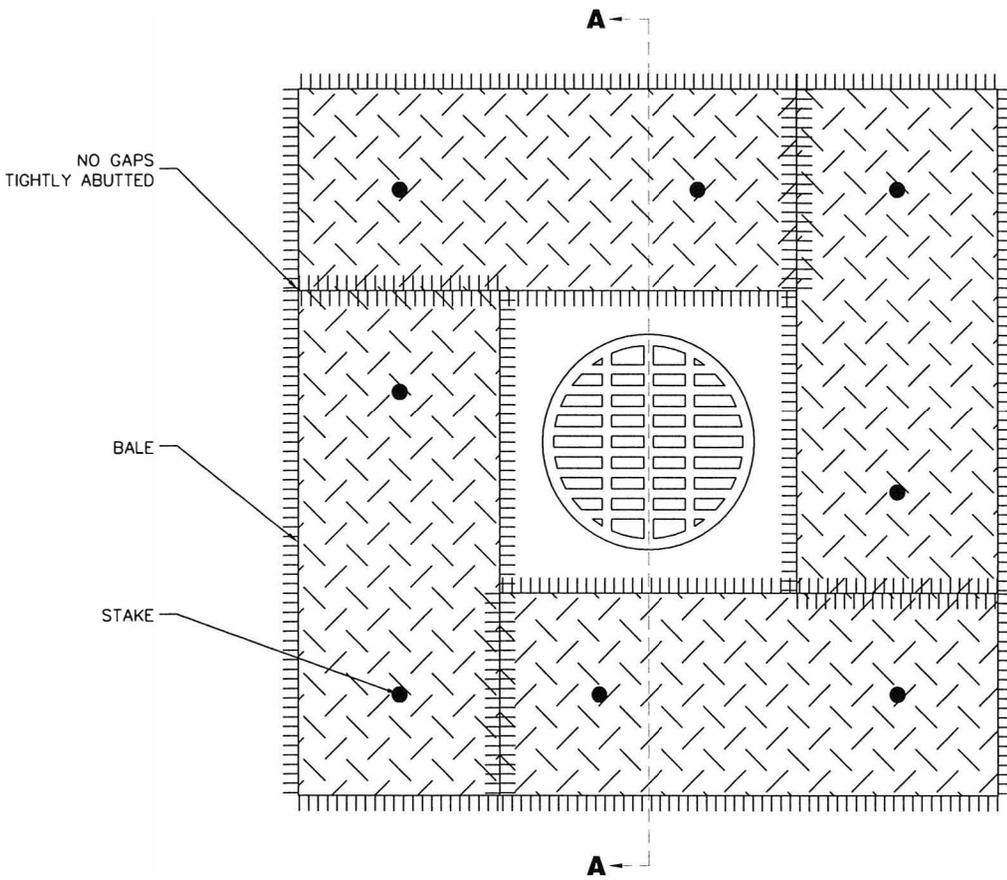
SAND BAGS FILLED WITH WASHED COARSE AGGREGATE OR STRAW WADDLES



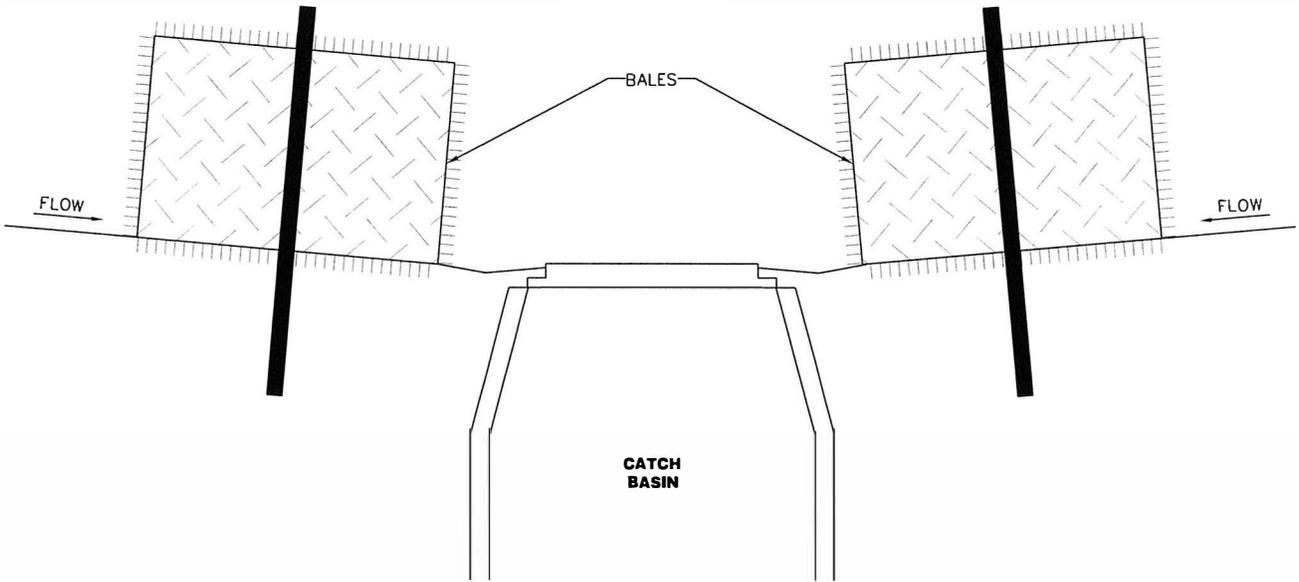
**SECTION "A-A"**

SCALE: NONE

THIS APPLICATION FOR PAVED STREETS.



**PLAN VIEW**

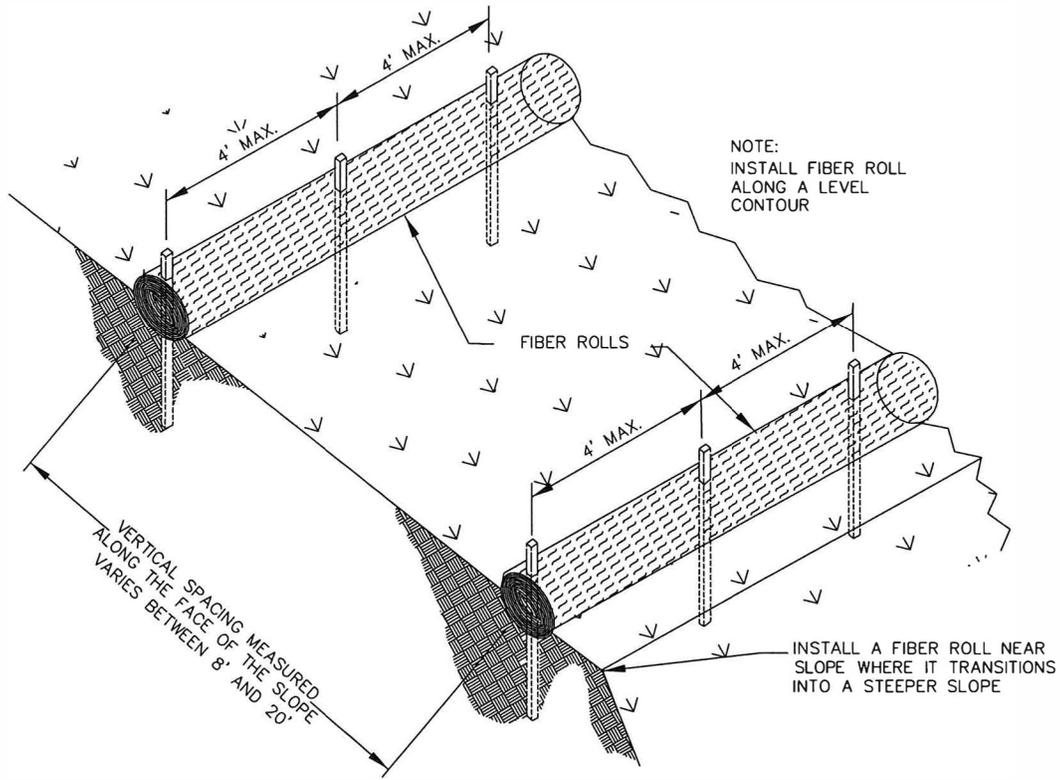


**SECTION "A-A"**

SCALE: NONE

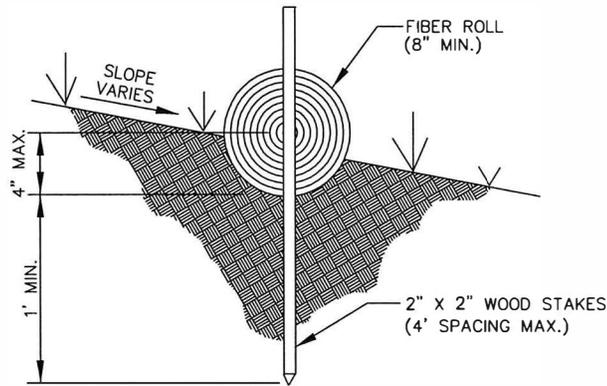
**DETAIL NOTES:**

1. BALES ARE TO BE PLACED 4' IN THE SOIL, TIGHTLY ABUTTING WITH NO GAPS, STAKED AND BACKFILLED AROUND THE ENTIRE PERIMETER.
2. NOT RECOMMENDED FOR RECEIVING CONCENTRATED FLOWS, SUCH AS STREETS OR HIGHWAY MEDIANS.



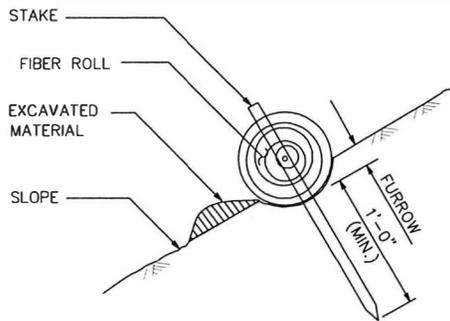
**TYPICAL FIBER ROLL INSTALLATION**

SCALE: NONE

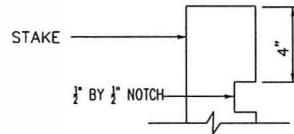


**ENTRENCHMENT DETAIL**

SCALE: NONE



**SECTION**

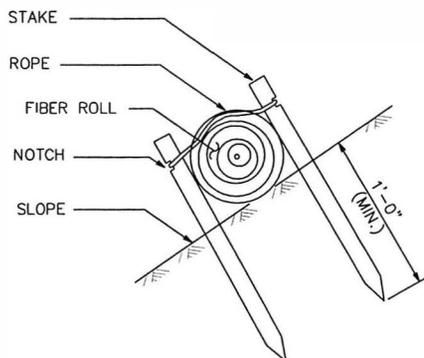


**ELEVATION**

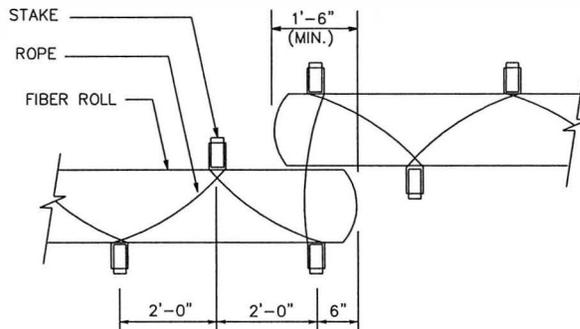
**STAKE NOTCH DETAIL**

**FIBER ROLL (TYPE 1)**

SCALE: NONE



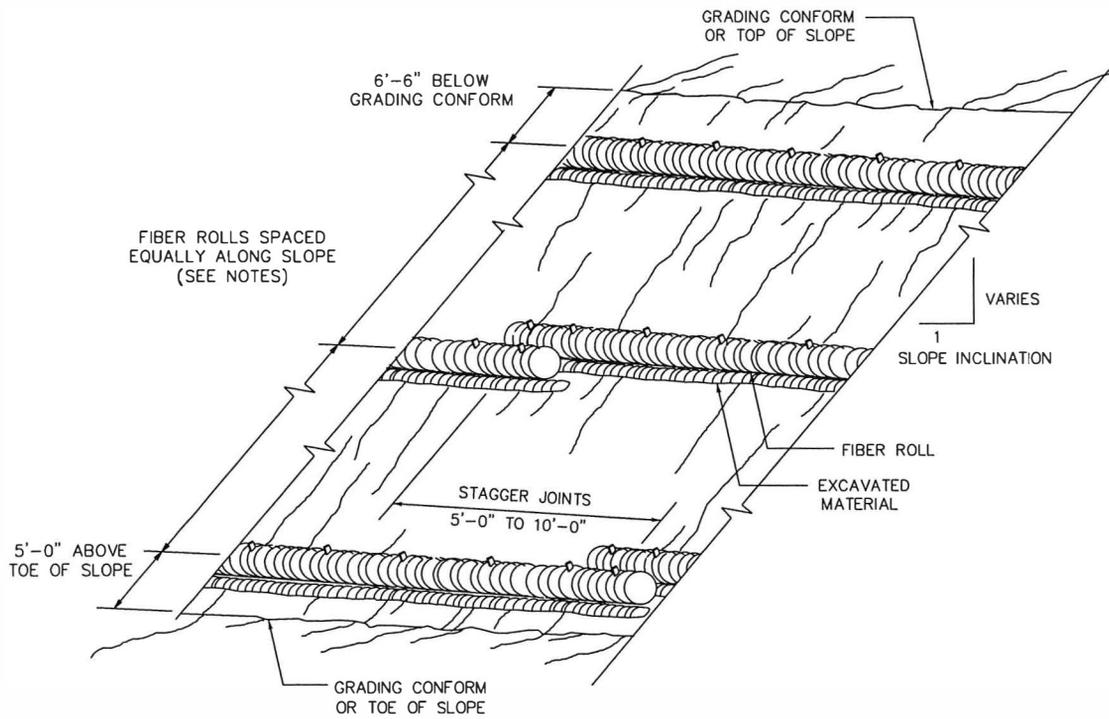
**SECTION**



**PLAN**

**FIBER ROLL (TYPE 2)**

SCALE: NONE



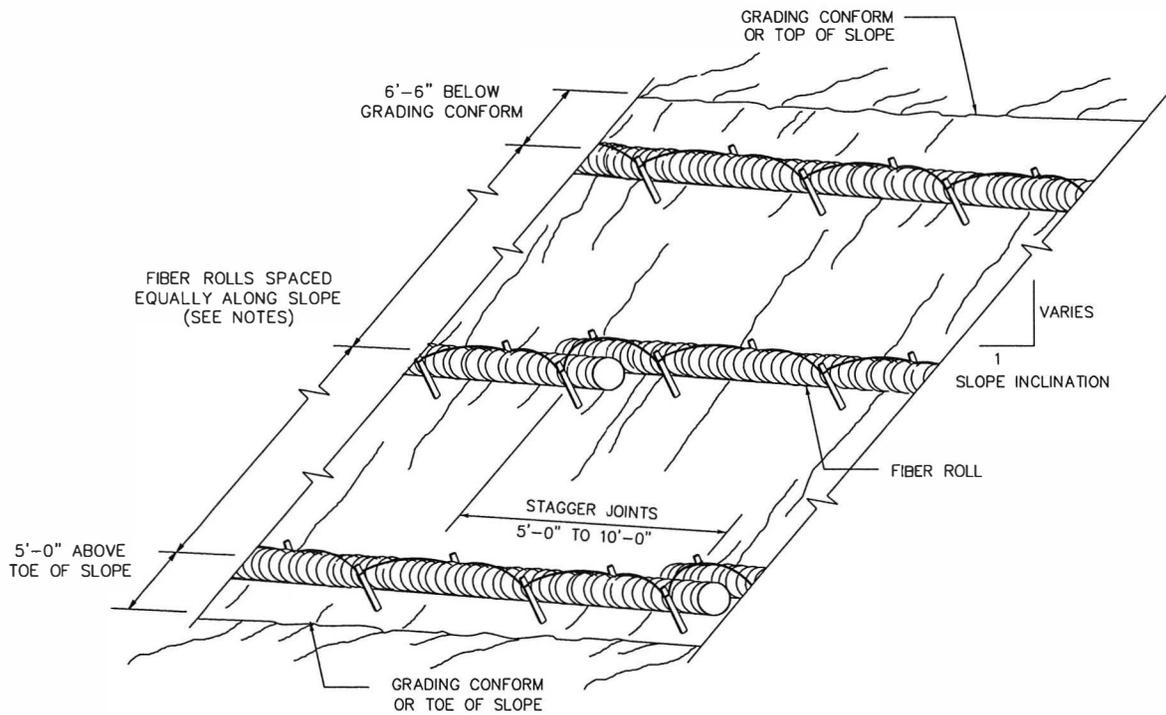
**PERSPECTIVE**

**FIBER ROLL (TYPE 1)**

SCALE: NONE

**NOTES:**

1. FIBER ROLL SPACING VARIES DEPENDING UPON SLOPE INCLINATION.
2. INSTALLATIONS SHOWN IN THE PERSPECTIVES ARE FOR SLOPE INCLINATION OF 10:1 AND STEEPER.



**PERSPECTIVE**

**FIBER ROLL (TYPE 2)**

SCALE: NONE

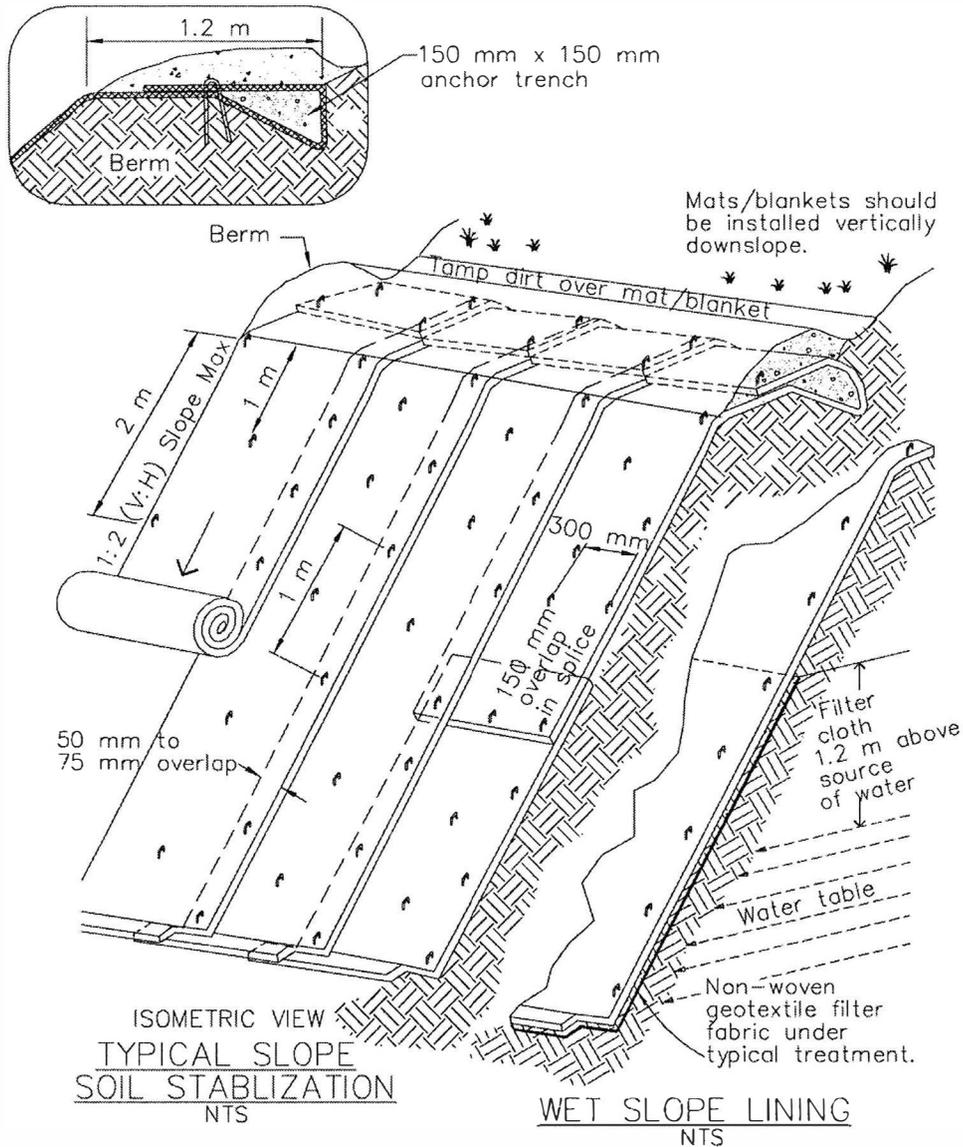
**NOTES:**

1. FIBER ROLL SPACING VARIES DEPENDING UPON SLOPE INCLINATION.
2. INSTALLATIONS SHOWN IN THE PERSPECTIVES ARE FOR SLOPE INCLINATION OF 10:1 AND STEEPER.

# Geotextiles, Mats, Plastic Covers and Erosion Control Blankets

**SS-7**

## Typical Installation Detail



**NOTES:**

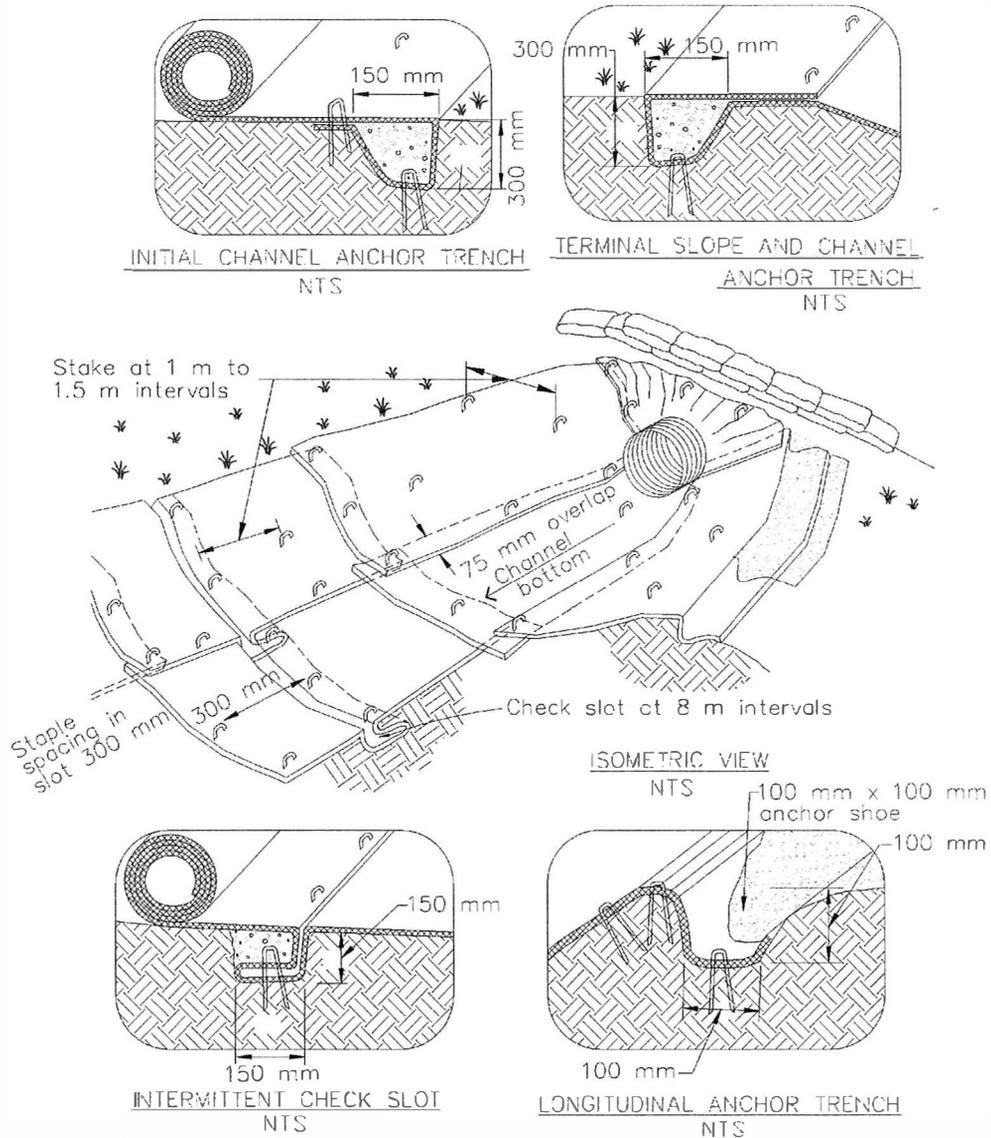
1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations



# Geotextiles, Mats, Plastic Covers and Erosion Control Blankets

**SS-7**

## Typical Installation Detail

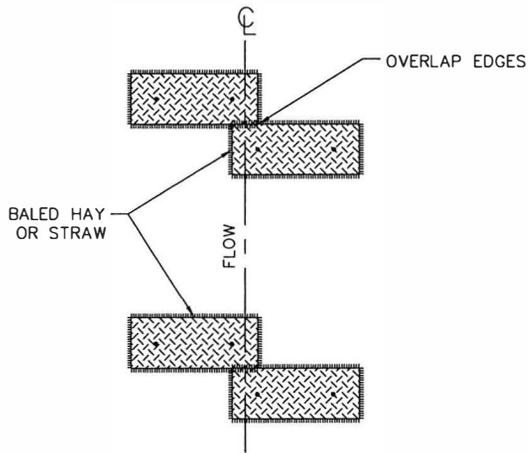


**NOTES:**

1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

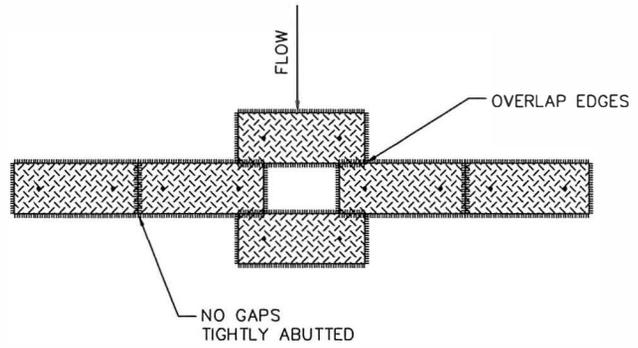


**NARROW DITCH**



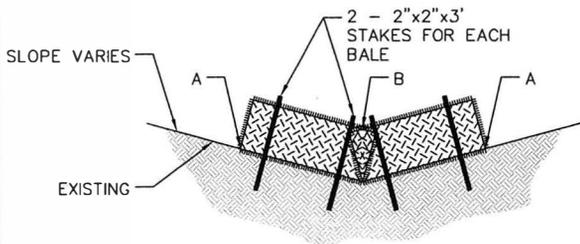
PROPER PLACEMENT OF STRAW BALE BARRIER IN SMALL SWALE

**WIDE DITCH**



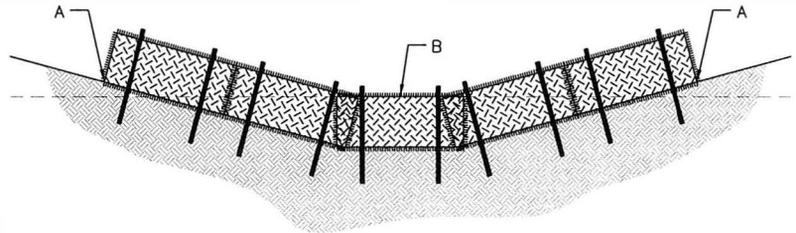
END POINTS "A" SHOULD BE HIGHER THAN POINT "B"

**PLAN**



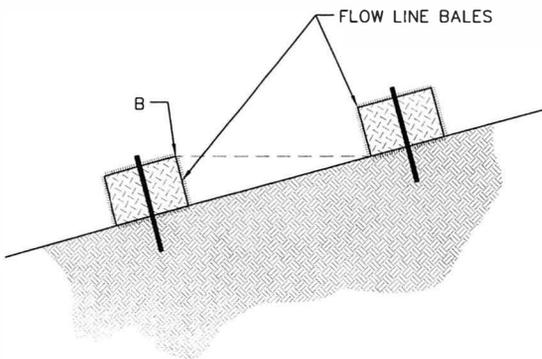
END POINTS "A" MUST BE HIGHER THAN FLOW LINE POINT "B"

**PLAN**



PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE WAY

**ELEVATION**

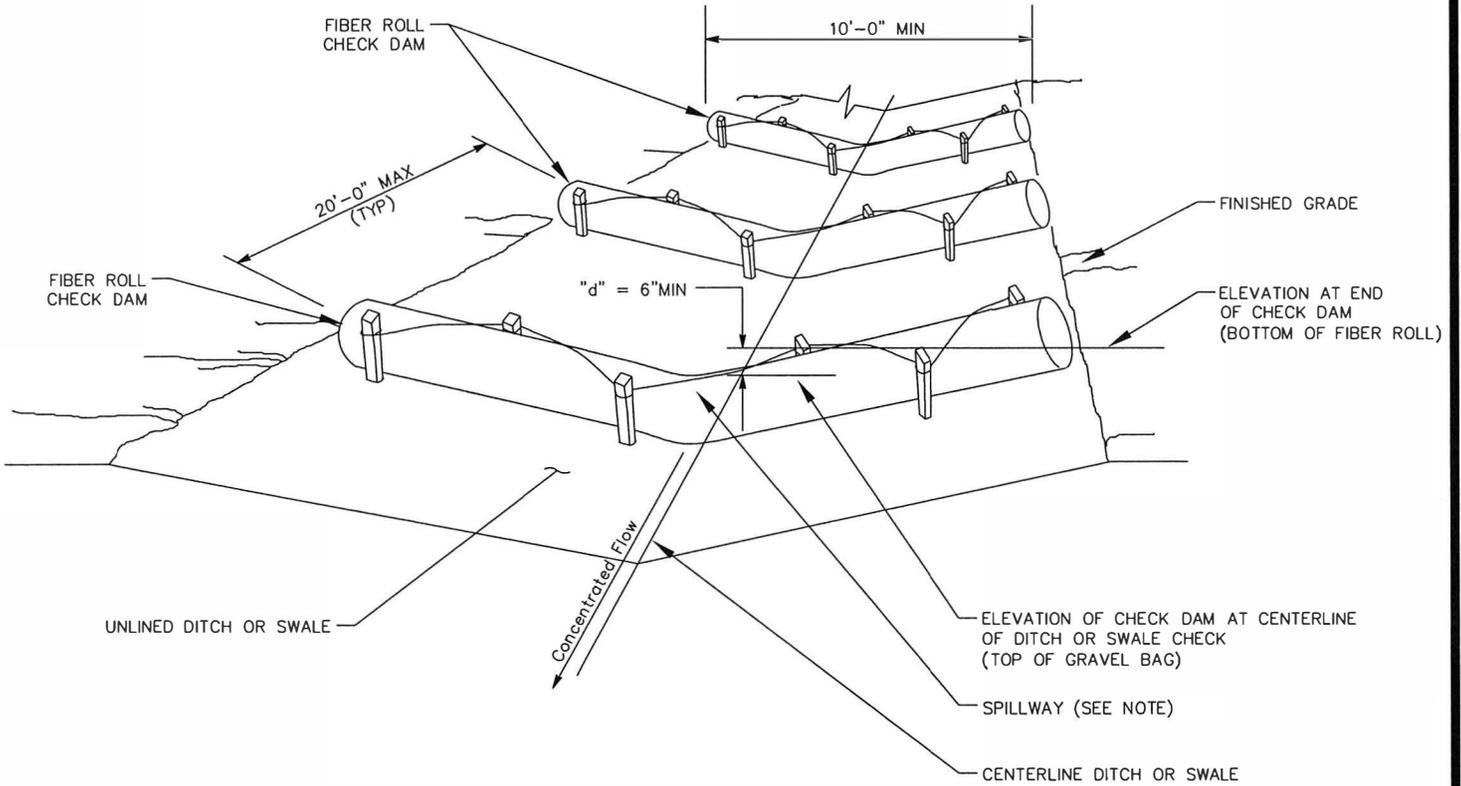


**PROFILE**

**ELEVATION**

**DETAIL NOTE:**

PLACE DOWNSTREAM BALES SUCH THAT POINT "B" IS APPROXIMATELY LEVEL WITH THE LOWEST ELEVATION OF THE UPSTREAM BALE.

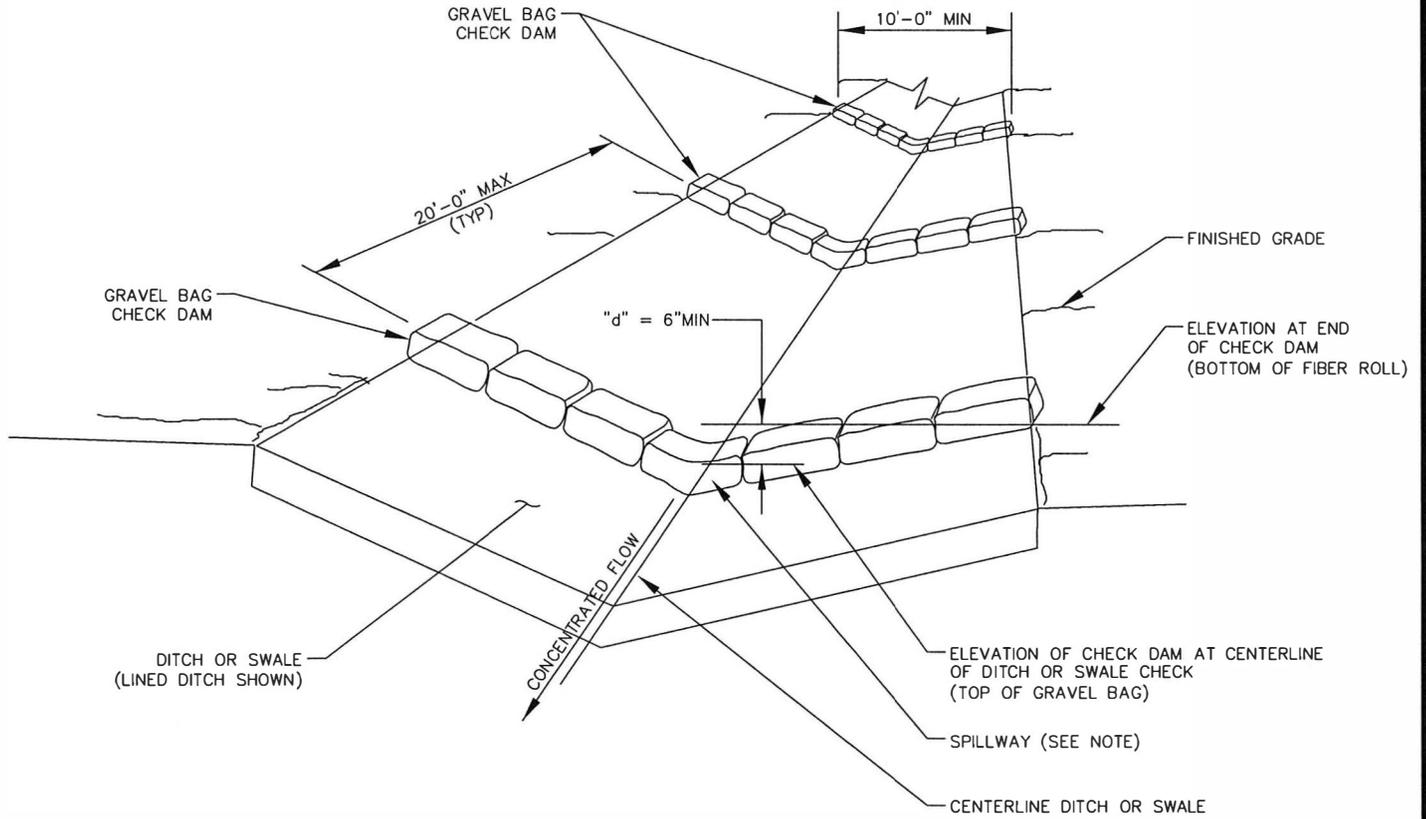


**TEMPORARY CHECK DAM (TYPE 1)**

SCALE: NONE

**NOTE:**

SPILLWAY DEPTH "d" SHALL BE MAINTAINED TO PREVENT FLANKING OF CONCENTRATED FLOW AROUND THE ENDS OF EACH CHECK DAM.

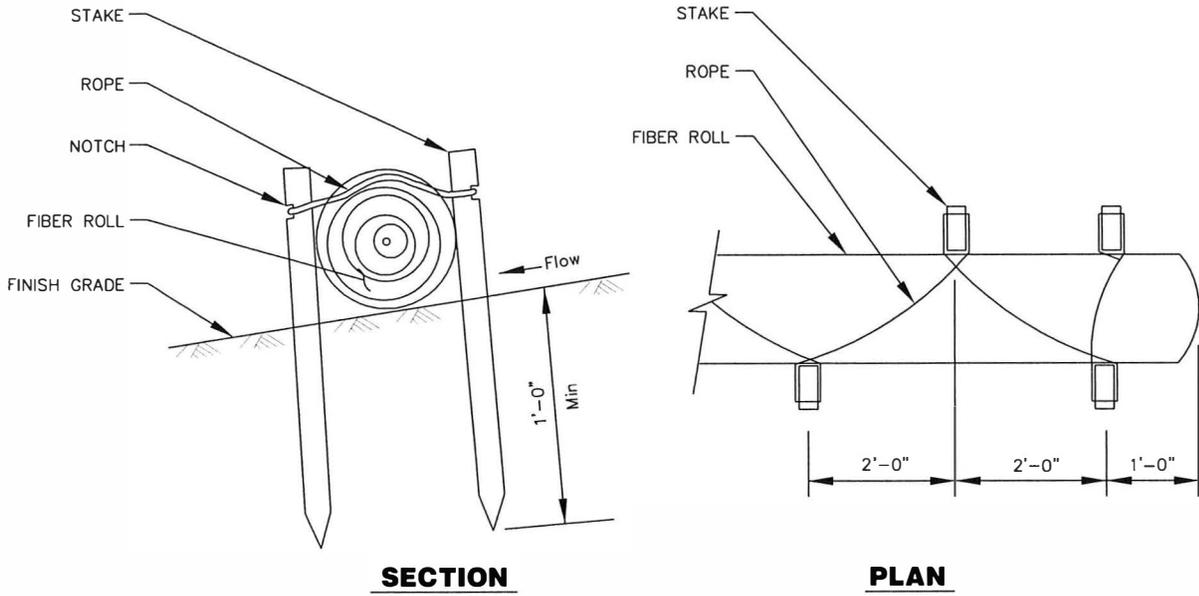


**TEMPORARY CHECK DAM (TYPE 2)**

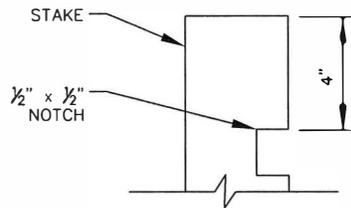
SCALE: NONE

**NOTE:**

SPILLWAY DEPTH "d" SHALL BE MAINTAINED TO PREVENT FLANKING OF CONCENTRATED FLOW AROUND THE ENDS OF EACH CHECK DAM.



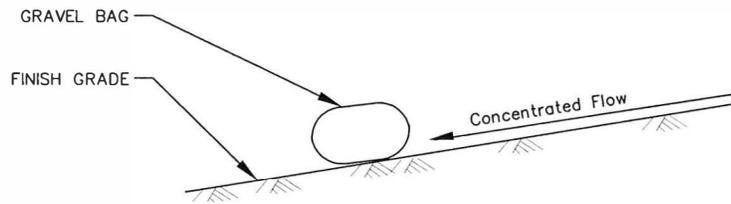
**STAKING AND LASHING DETAIL**



**ELEVATION**  
**STAKE NOTCH DETAIL**

**TEMPORARY CHECK DAM (TYPE 1)**

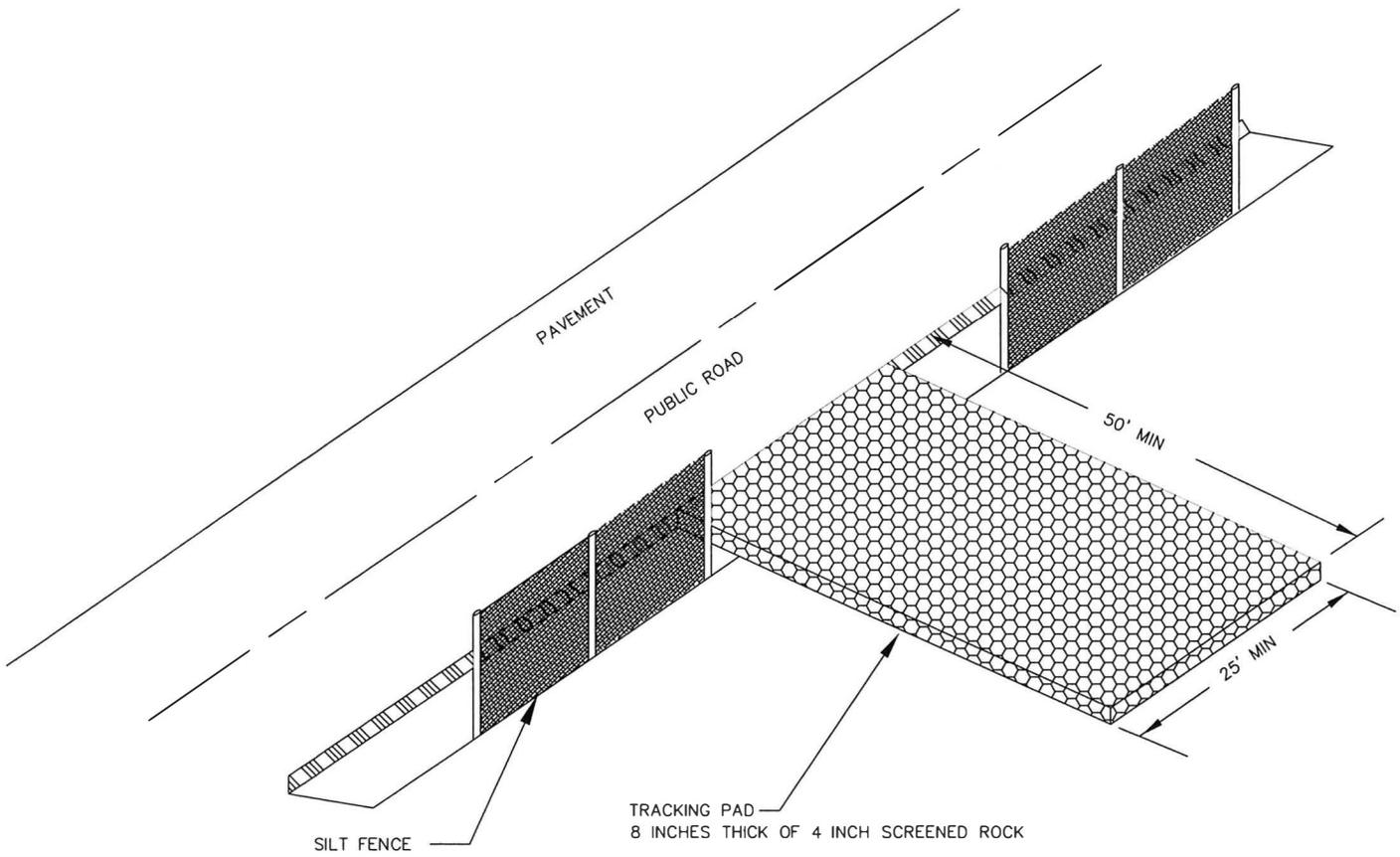
SCALE: NONE



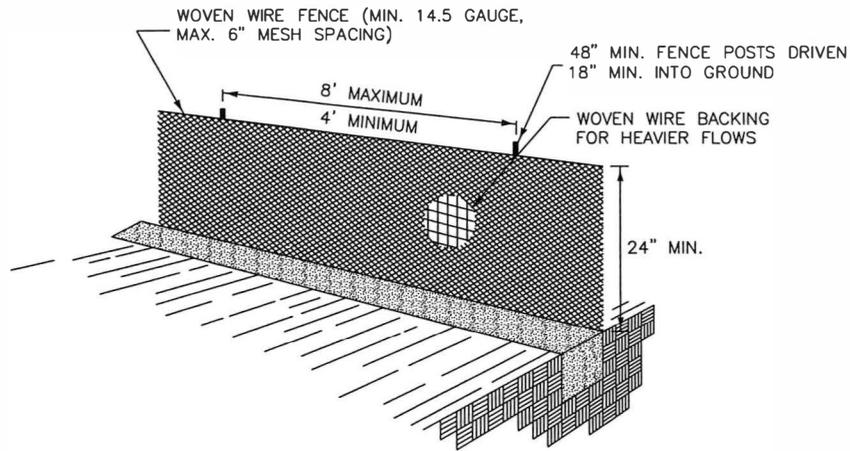
**SECTION**

**TEMPORARY CHECK DAM (TYPE 2)**

SCALE: NONE

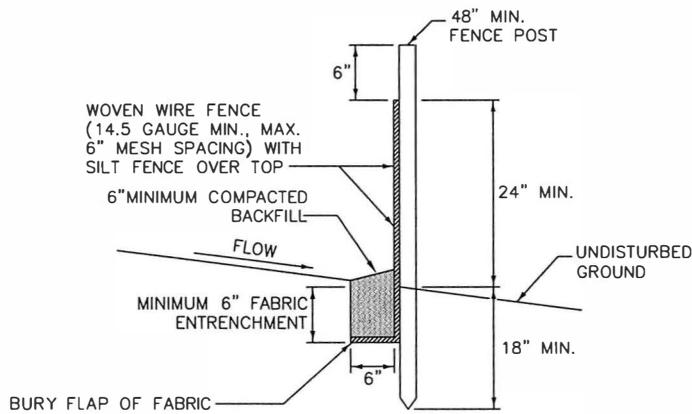


ALL VEHICLES ENTERING AND EXITING THE CONSTRUCTION SITE MUST GO ACROSS THE ROCK PAD TO PREVENT MUD AND DIRT FROM TRACKING OFFSITE. ROCK SHALL BE REPLENISHED IF TRACKING OCCURS. ALL MATERIALS SPILLED, DROPPED, WASHED OR TRACKED FROM VEHICLES ONTO STREETS MUST BE REMOVED IMMEDIATELY.



**SILT FENCE - PLAN VIEW**

SCALE: NONE



**SILT FENCE - CROSS SECTION**

SCALE: NONE

**NOTES:**

1. SILT FENCE SHALL BE INSTALLED BEFORE ANY EARTH REMOVAL OR EXCAVATION TAKES PLACE.
2. SET POSTS MAXIMUM 8 FEET ON CENTER AND EXCAVATE 6"x6" TRENCH UPSLOPE ALONG THE LINE OF POSTS.
3. ATTACH FILTER FABRIC TO POSTS AND EXTEND IT INTO TRENCH.
4. BACKFILL AND COMPACT EXCAVATED SOIL.