



City of Springfield, Missouri

**Standard Drawing Details for Public
Improvements**

Adopted: 7/1/2015

Dan Smith
Director of Public Works

STANDARD DRAWING DETAILS

1. STANDARD SANITARY SEWER DRAWINGS (SAN-PREFIX)

SAN-1	MANHOLE RING AND COVER (TYPE A)
SAN-2	MANHOLE RING AND COVER (NON-ROCKING)
SAN-3	STANDARD FOUR-FOOT DIAMETER MANHOLE
SAN-4	NEW MANHOLE ON EXISTING LINE
SAN-5	UNASSIGNED
SAN-6	DROP MANHOLE
SAN-7	OFF SET MANHOLE
SAN-8	GASKET SEALING DETAILS FOR PRECAST MANHOLES
SAN-9	FLOW LINES FOR MANHOLE BASES
SAN-10	HOUSE CONNECTIONS – LESS THAN 12 FEET
SAN-11	HOUSE CONNECTIONS – 12 FEET TO 20 FEET
SAN-12	BEDDING STANDARDS
SAN-13	AMPHOLES
SAN-14	UNASSIGNED
SAN-15	BORING DETAILS
SAN-16	STANDARD CONE CONFIGURATION FOR MANHOLES
SAN-17	UNASSIGNED
SAN-18	GREASE INTERCEPTOR
SAN-19	SAMPLING MANHOLE
SAN-20	INSERT-A-TEE TAP
SAN-21	IMPERVIOUS TRENCH SEAL
SAN-22	CONNECTION TO LINED MANHOLES
SAN-23	CONNECTION TO EXISTING MANHOLES
SAN-24	TYPICAL CLEANOUT RISER
SAN-25	TRACER WIRE DETAIL

2. STANDARD STORM SEWER DRAWINGS (SS-PREFIX)

SS-1	STANDARD JUNCTION BOX
SS-2	STORM SEWER MANHOLE
SS-3	NON-RECESSED CURB INLET
SS-4-A	RING AND COVER FOR STORM SEWER INLET
SS-4-C	RING AND COVER FOR STORM SEWER INLET
SS-5	AREA INLET
SS-6	CURB INLET
SS-7	UNASSIGNED
SS-8	PRECAST INLET TOPS
SS-9	CONCRETE BOX TOP RIDING SURFACE
SS-10	CONCRETE BOX ROADWAY FILL
SS-11	APPROACH TO BOX CULVERTS
SS-12-A	UNASSIGNED
SS-12-B	VERTICAL & SLOPING SLOT OUTLET CALCULATION
SS-12-C	UNASSIGNED
SS-12-D	UNASSIGNED
SS-13	PAVED DITCH TRANSITIONS, DETAILS
SS-14-A	VEGATATIVE FILTER STRIP, WATER QUALITY BMP
SS-14-B	UNASSIGNED
SS-14-C	UNASSIGNED
SS-14-D	VERTICAL BOX DETENTION OUTLET
SS-15	CONCRETE BOX CULVERT, MINIMUM REINFORCEMENT DETAILS

3. STANDARD STREET DRAWINGS (ST-PREFIX)

ST-1	TYPICAL STREET SECTIONS
ST-2	CURB AND GUTTER/DRIVEWAY OPENING
ST-3	JOINT DETAILS – CONCRETE PAVEMENT
ST-4	JOINT LOCATION – CONCRETE PAVEMENT
ST-5	STANDARD CUL-DE-SAC
ST-6	PARKING STALL LAYOUT ELEMENTS
ST-7	MAILBOX PLACEMENT
ST-8	TYPICAL RESIDENTIAL DRIVEWAY & SIDEWALK
ST-9	TYPICAL COMMERCIAL DRIVEWAY & SIDEWALK
ST-10	CURB RAMP TYPE I
ST-11	CURB RAMP TYPE II
ST-12	CURB RAMP WITH DETECTABLE WARNING
ST-13	EXISTING PAVEMENT REPAIR DETAIL
ST-14	UNASSIGNED
ST-15	UNASSIGNED
ST-16	UNASSIGNED
ST-17	UNASSIGNED
ST-18	HANDRAIL
ST-19	TEMPORARY DEAD END STREET TURNAROUND
ST-20	PERMANENT DEAD END STREET TURNAROUND

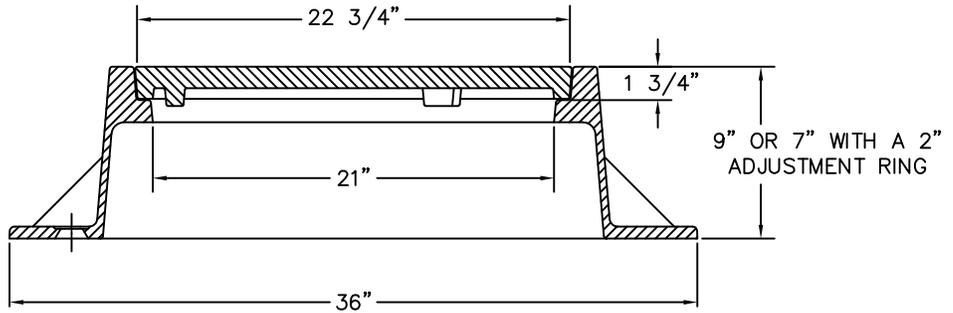
4. STANDARD TRAFFIC SIGNAL DRAWINGS (SAN-PREFIX)

TS-1	SIGNAL SYMBOLS
TS-2	PREFORMED PULL BOXES
TS-3	CAST IN PLACE PULL BOX
TS-4	ALUMINUM PEDESTAL
TS-5	ALUMINUM MAST ARM
TS-6	STEEL MAST ARM
TS-7	POWER SUPPLY WIRING
TS-8	TYPE I POWER SUPPLY
TS-9	TYPE II POWER SUPPLY
TS-9A	TYPE III POWER SUPPLY
TS-10	LIGHTING CONTROLLER
TS-11	GROUNDING AND BONDING
TS-12	SIGNAL HEADS
TS-13	TYPE "A" SIGNAL BASE
TS-14	TYPE "D" SIGNAL BASE
TS-15	CONTROLLER BASES
TS-16	TRENCH AND CONDUIT DETAIL
TS-17	SIGNAL PHASING LAYOUT
TS-18	DETECTOR LOOP INSTALLATION
TS-19	PEDESTRIAN PUSHBUTTONS
TS-20	SPAN WIRE DETAILS WOOD POLES

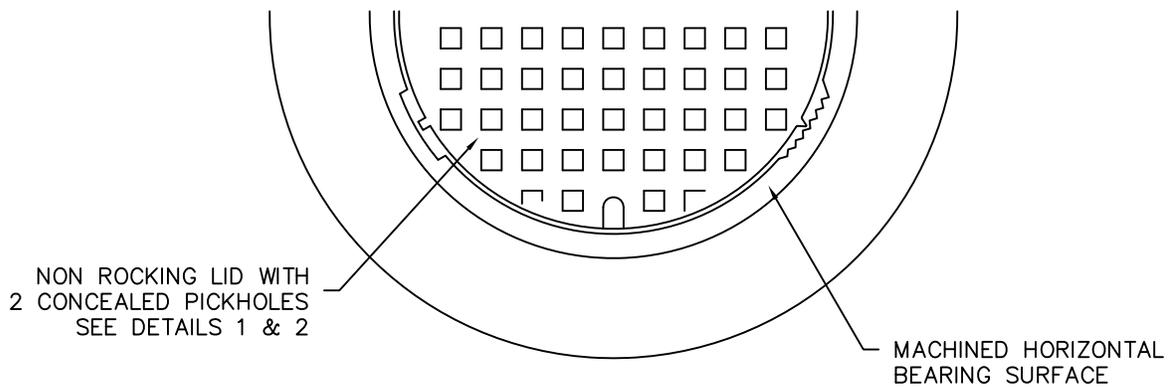
5. STANDARD LANDSCAPE/IRRIGATION DRAWINGS (SAN-PREFIX)

LI-1	TYPICAL SLEEVING DETAIL
LI-2	TYPICAL TRENCHING DETAIL
LI-3	SURGE PROTECTOR CONNECTION
LI-4	DRIPLINE LAYOUT AT SHRUB BEDS
LI-5	DRIPLINE AT SOLO TREE LOCATION
LI-6	DRIPLINE TUBING
LI-7	AIR VACUM RELIEF VALVE
LI-8	PREFORMED IRRIGATION BULL BOX
LP-1	TREE DETAIL
LP-2	SHURB IN TOPSOIL
LP-3	SHOVEL-CUT EDGE

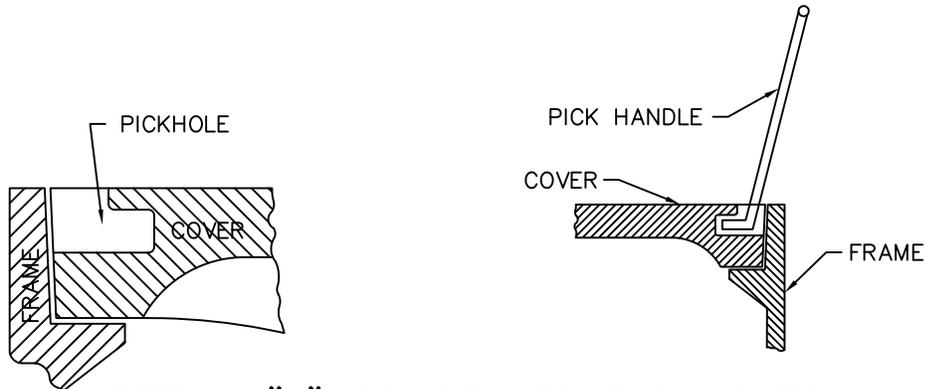
MANHOLE RING & COVER TYPE "A"



TYPE "A" SECTION VIEW

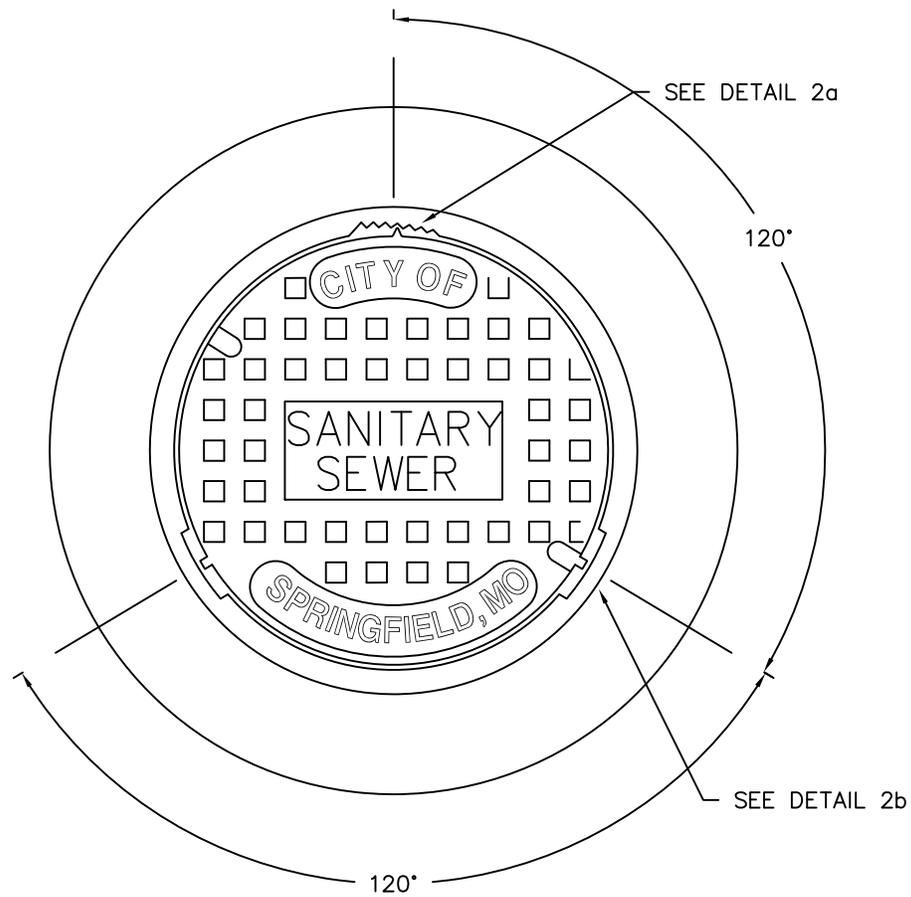


TOTAL WEIGHT
RING AND COVER
TYPE "A" = 540 lbs.



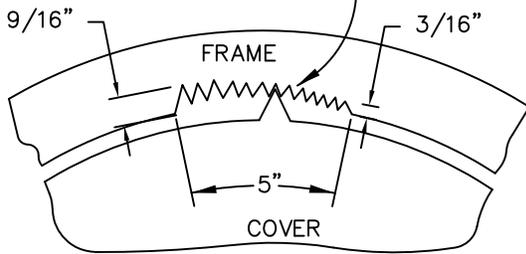
DETAIL "1" CONCEALED PICKHOLES

DETAIL "2" NON ROCKING COVER
 SEE SAN-1 FOR TYPE "A" SECTION VIEW

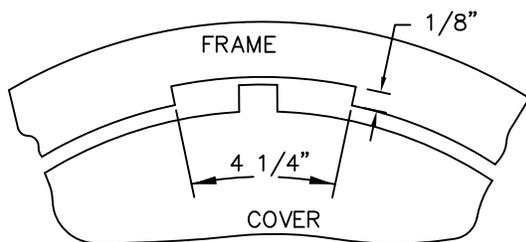
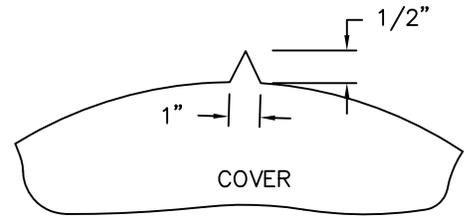


EACH OF THE 16 GROOVES IN THE GRADUATED RACK VARIES THE DIAMETER BY EQUAL AMOUNTS.

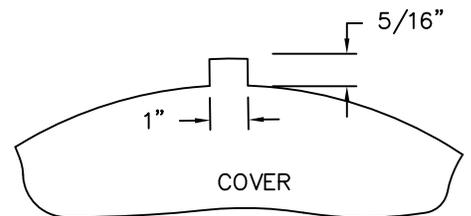
LOADS HS20
 COMPONENT NOS.: FRAME NEENAH 1715-2001, LID 1715-XXXX
 MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
 FINISH: NO PAINT
 WEIGHT: FRAME APPROX. 234#, LID APPROX. 127#



DETAIL 2a



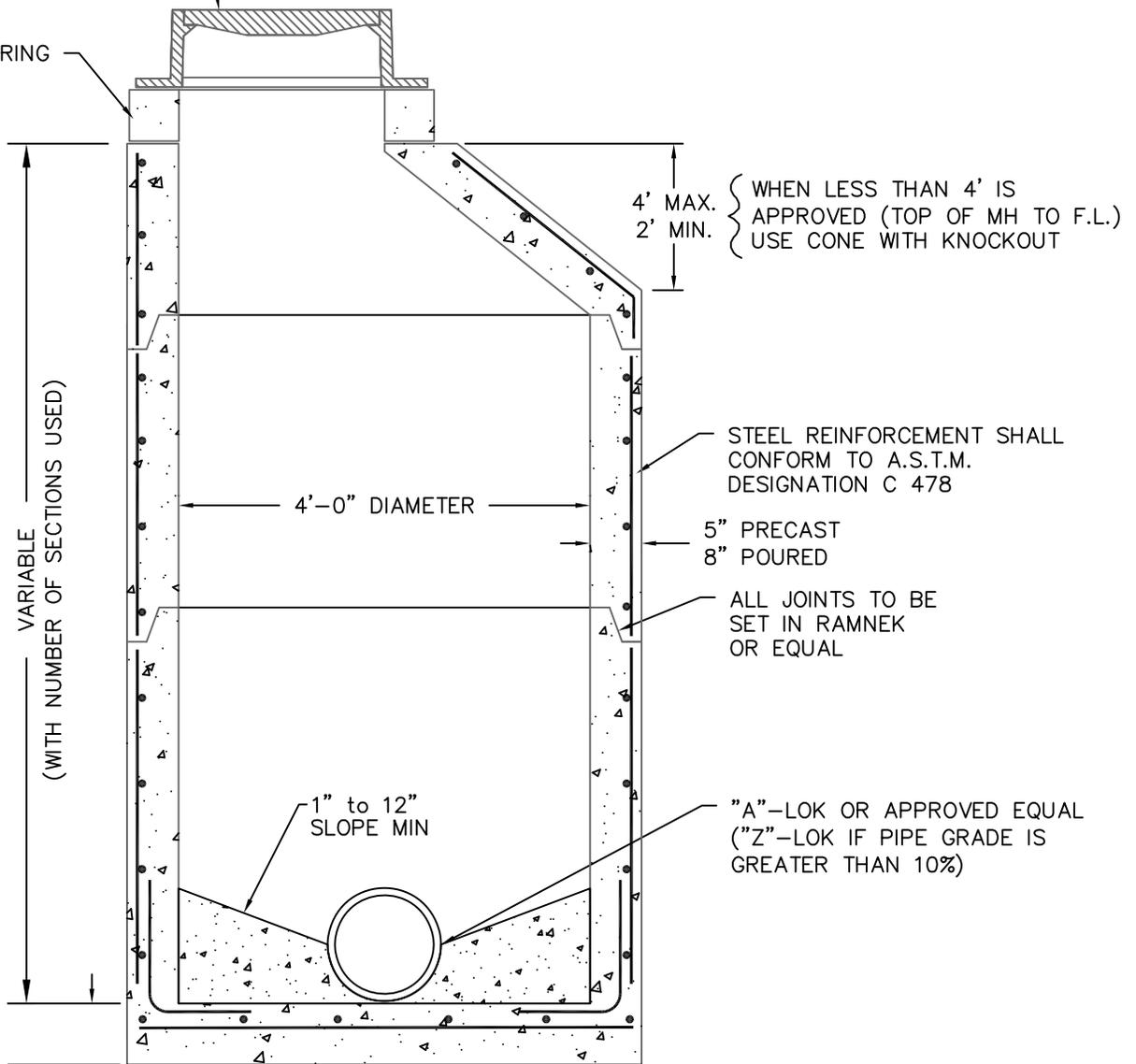
DETAIL 2b



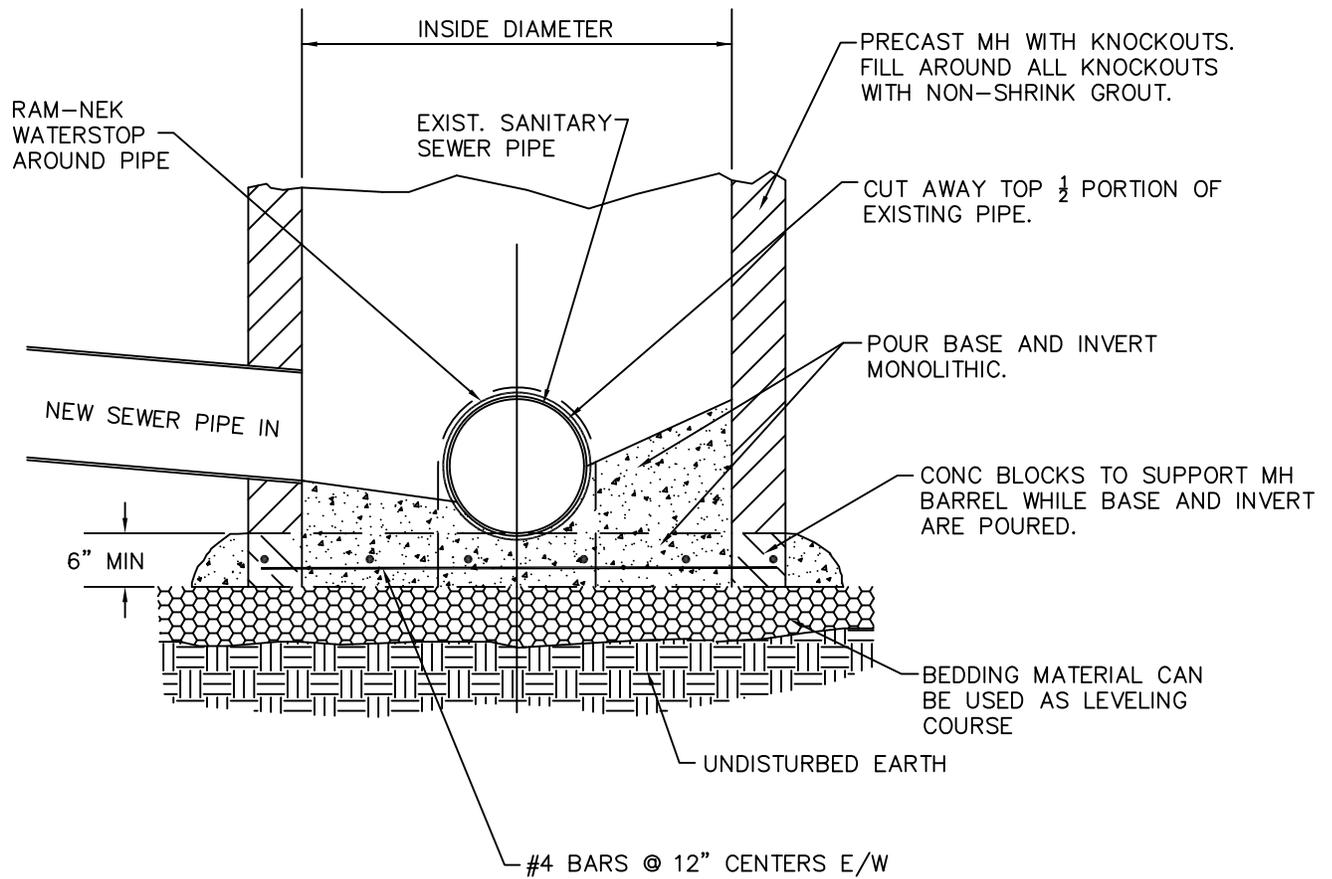
MANHOLE FRAME & COVER
 -TYPE "A". IF MANHOLE IS
 IN FLOODPLAIN OR PRONE
 TO SUBMERSION, USE
 WATER-TIGHT, HINGED
 PAMREX OR EJ 24" ERGO
 NO. EJ001040013L01 LID AND
 FRAME

NOTE:
 NO MORE THAN 2 ADJUSTMENT RINGS,
 NOT TO EXCEED 12-INCHES

ADJUSTMENT RING

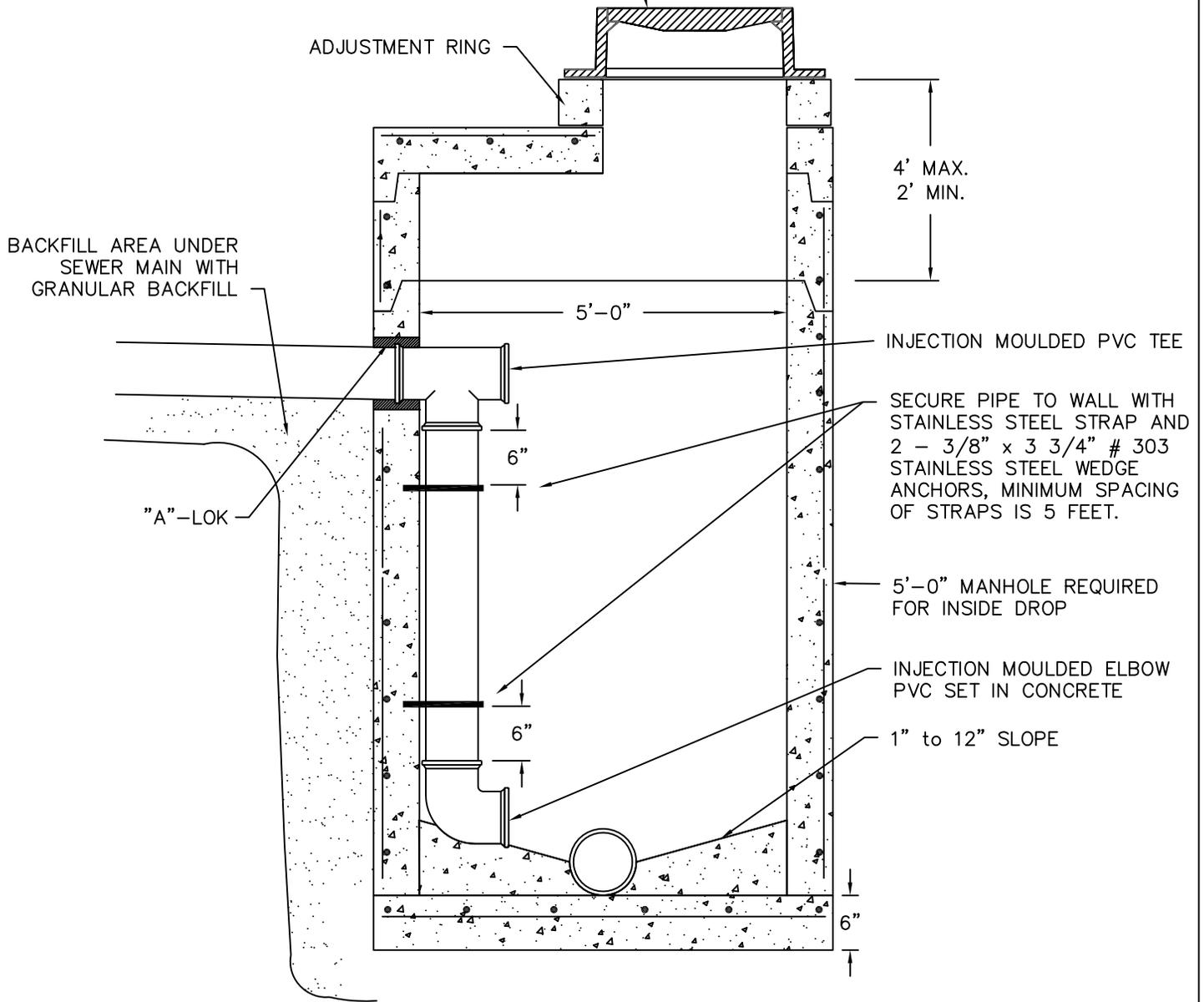


MANHOLE
 8" TO 24" PIPE



MANHOLE FRAME & COVER
 -TYPE "A". IF MANHOLE IS
 IN FLOODPLAIN OR PRONE
 TO SUBMERSION, USE
 WATER-TIGHT, HINGED
 PAMREX OR EJ 24" ERGO
 NO. EJ001040013L01
 LID AND FRAME

NOTE:
 NO MORE THAN 2 ADJUSTMENT RINGS,
 NOT TO EXCEED 12-INCHES

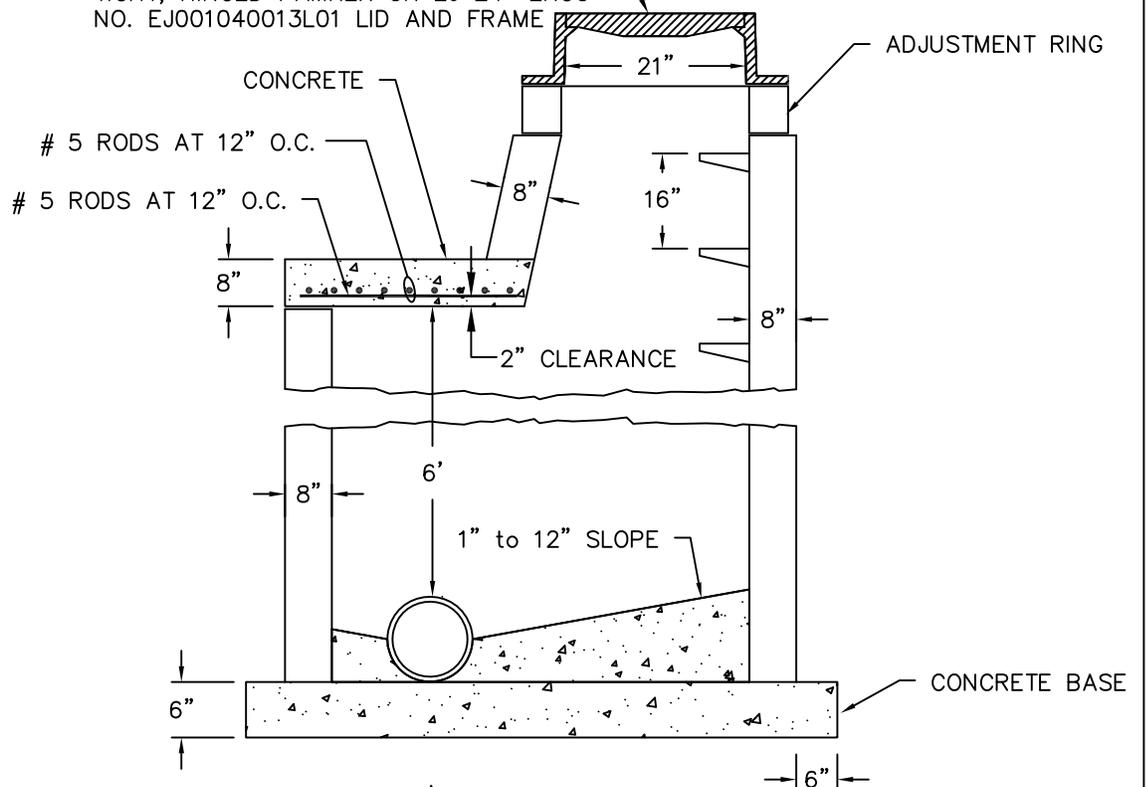


DISTANCE FROM PIPE INLET TO
 MANHOLE FLOWLINE FOR 8" PIPE.
 0'-2' BUILD INSIDE FLUME
 2'-3' SPECIAL DESIGN REQUIRED
 3'- BUILD DROP MANHOLE

CONSTRUCTION METHODS
 FOR DROP MANHOLE TO BE
 SAME AS MANHOLE SAN-3

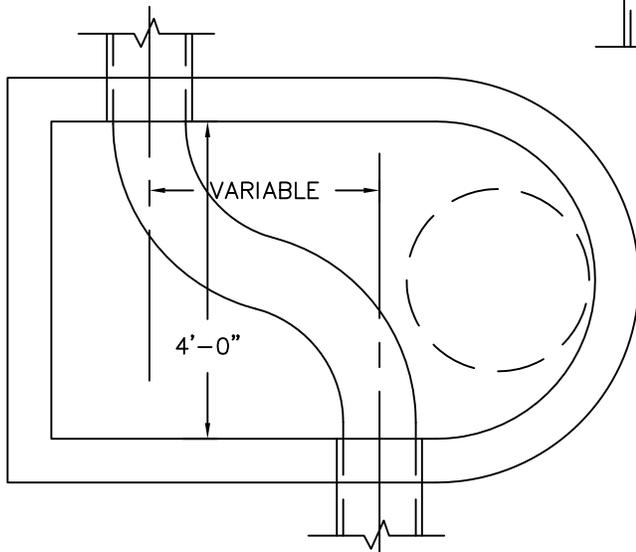
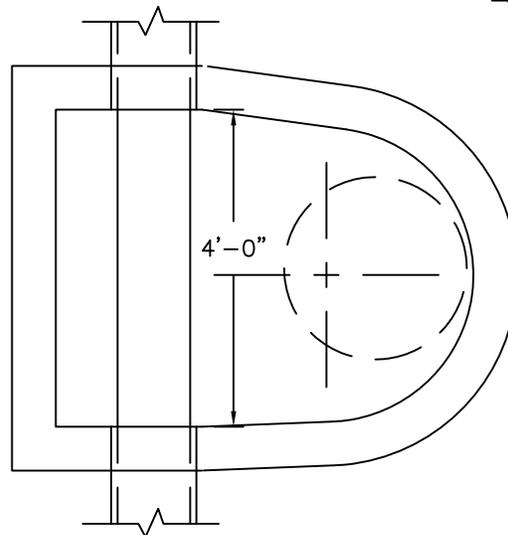
INSIDE DROP MANHOLE 8" TO 24" PIPE

MANHOLE FRAME & COVER -TYPE "A".
 IF MANHOLE IS IN FLOODPLAIN OR
 PRONE TO SUBMERSION, USE WATER-
 TIGHT, HINGED PAMREX OR EJ 24" ERGO
 NO. EJ001040013L01 LID AND FRAME



NOTES:

1. WALLS SHALL BE POURED CONCRETE OR PRECAST.
2. THICKNESS OF WALLS TO BE INCREASED TO 12" AT 12' BELOW UNDERSIDE OF FRAME.
3. CONSTRUCTION METHODS TO BE SAME AS STANDARD MANHOLES.



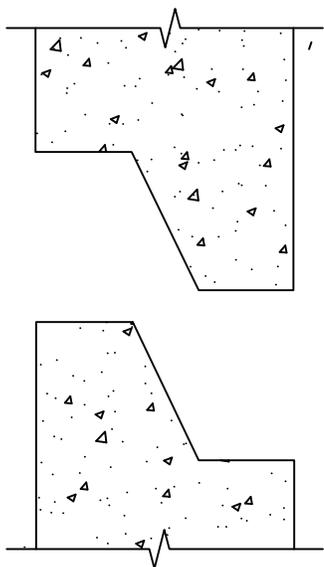
NOTE:
 NO MORE THAN 2 ADJUSTMENT RINGS,
 NOT TO EXCEED 18-INCHES

BITUMASTIC INSTALLATION (OR EQUAL)

SEALING OF TONGUE & GROOVE PRECAST MANHOLES

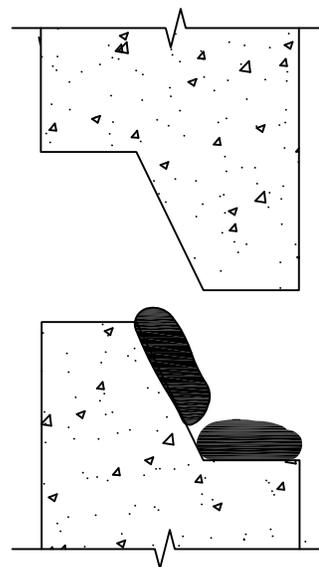
1. SURFACE PREPARATION (CLEANING)

REMOVE ALL LOOSE PARTICLES, DUST,
DIRT, ETC.



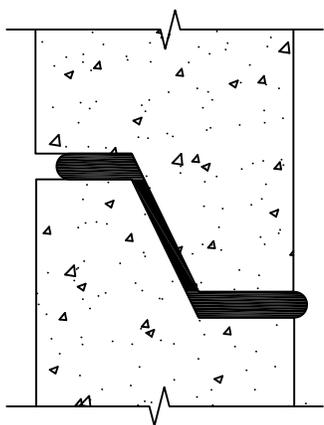
2. APPLYING BITUMASTIC SEAL

PLACE BITUMASTIC ROPE OR EQUAL IN GROOVE.

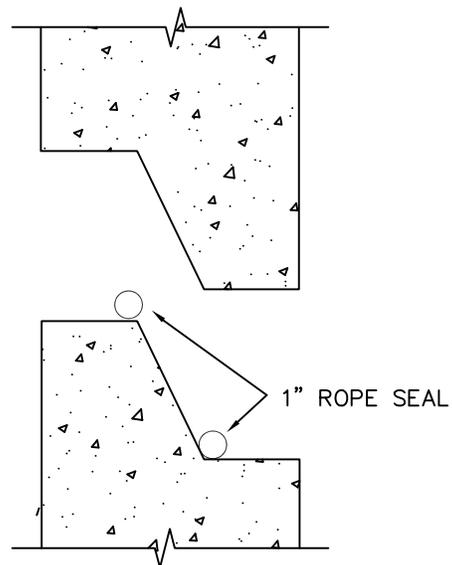


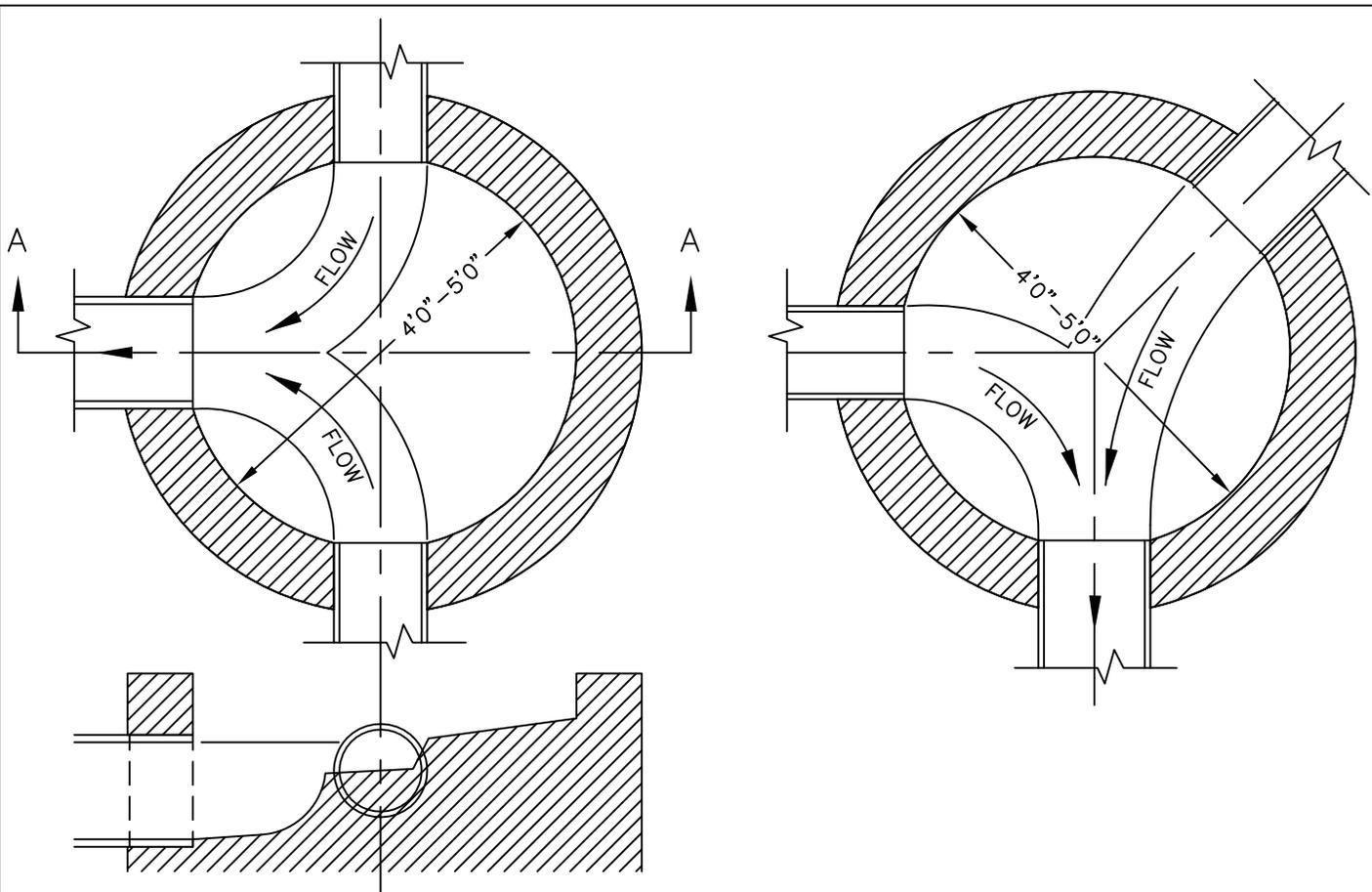
3. COMPLETION OF BITUMASTIC SEAL

LOWER THE NEXT LENGTH OF PIPE
(TONGUE INTO GROOVE) AND SEAL WILL
BE ACCOMPLISHED BY WEIGHT OF PIPE.

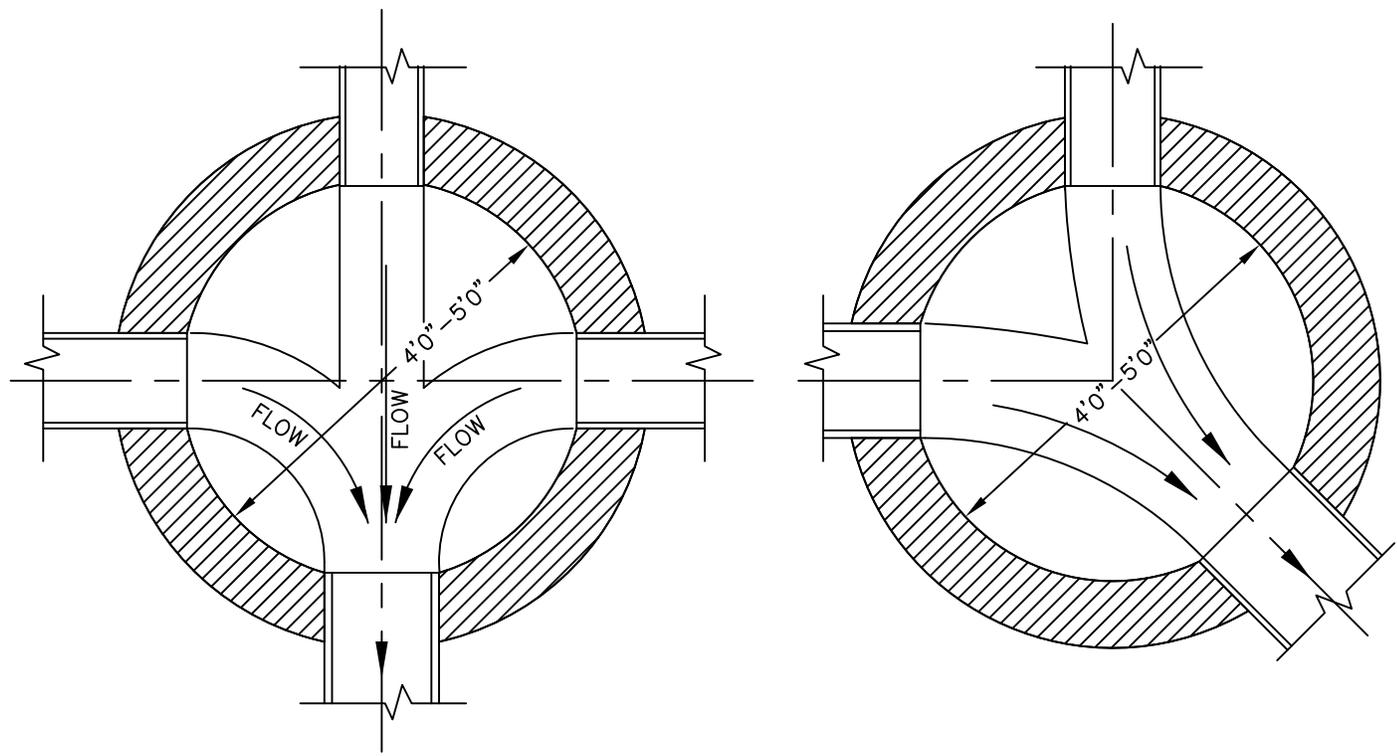


APPLYING ROPE SEAL





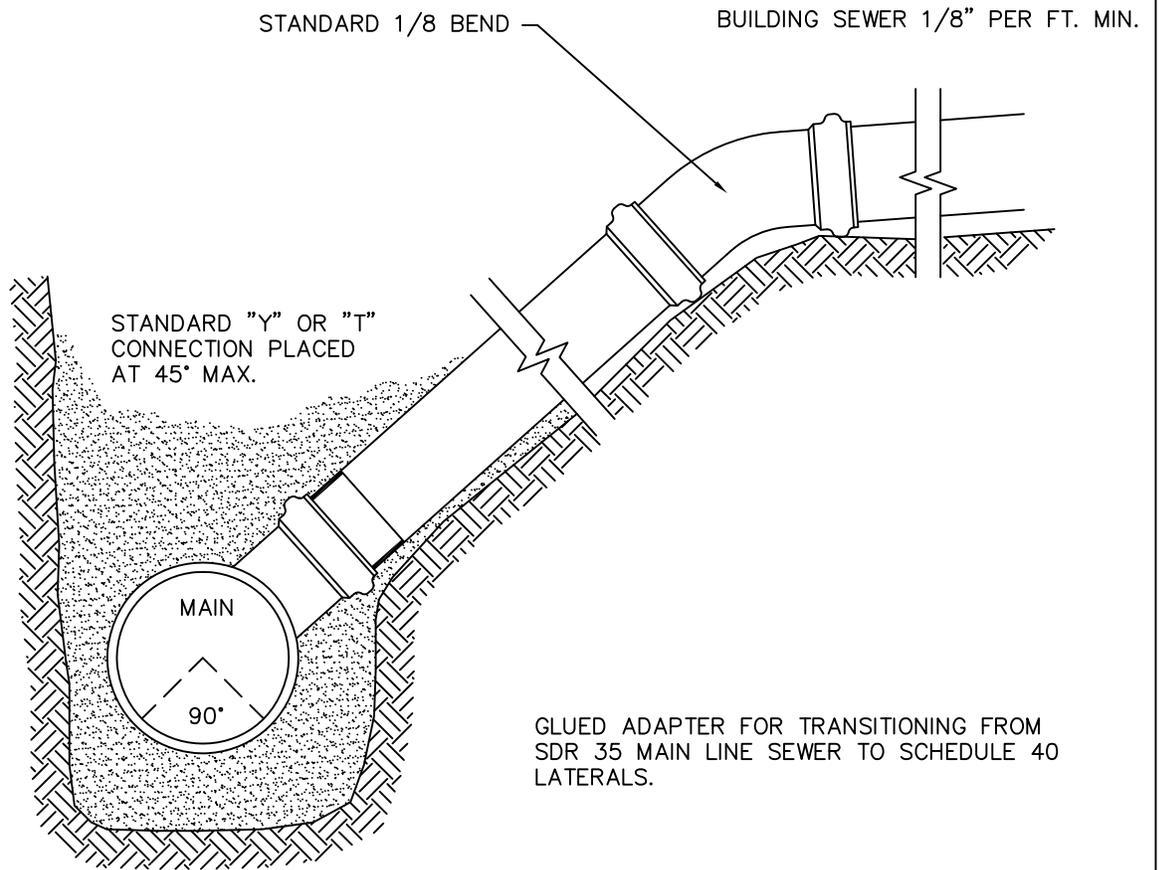
SECTION A-A



PIPES CANNOT ENTER MANHOLES AT ANGLES LESS THAN 90° TO EACH OTHER.

NOTE:

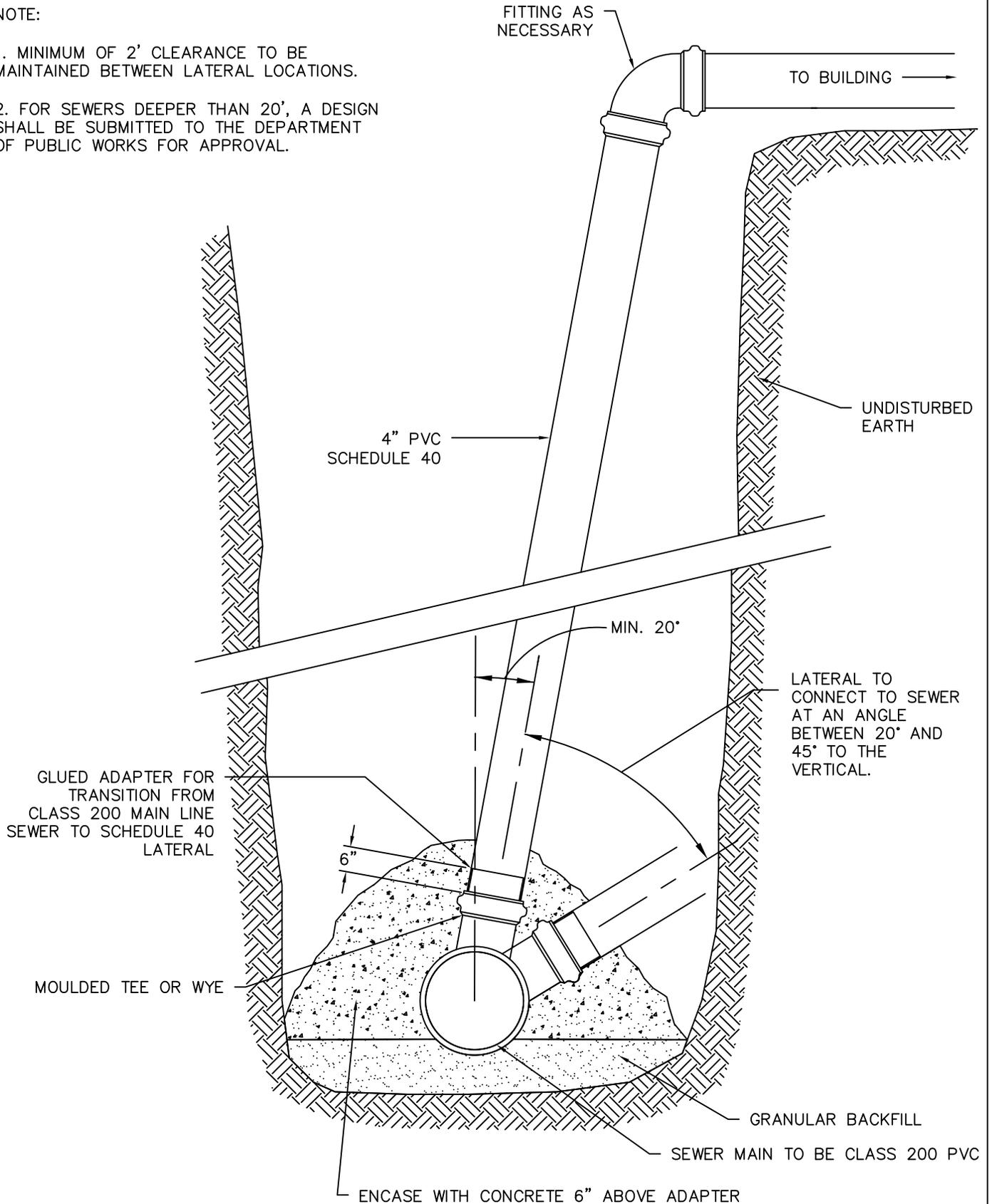
MOULDED TEES ARE REQUIRED FOR ALL LATERALS ON NEW SEWER LINES. ALL LATERALS SHALL BE SCHEDULE 40 PIPE AND JOINTS SHALL BE GLUED WITH AN APPROVED ADHESIVE.

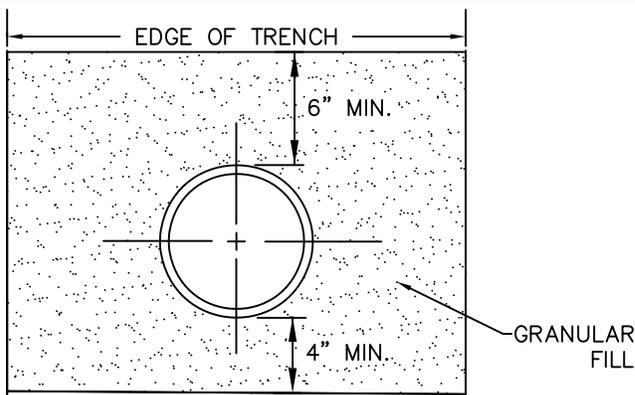


NOTE:

1. MINIMUM OF 2' CLEARANCE TO BE MAINTAINED BETWEEN LATERAL LOCATIONS.

2. FOR SEWERS DEEPER THAN 20', A DESIGN SHALL BE SUBMITTED TO THE DEPARTMENT OF PUBLIC WORKS FOR APPROVAL.

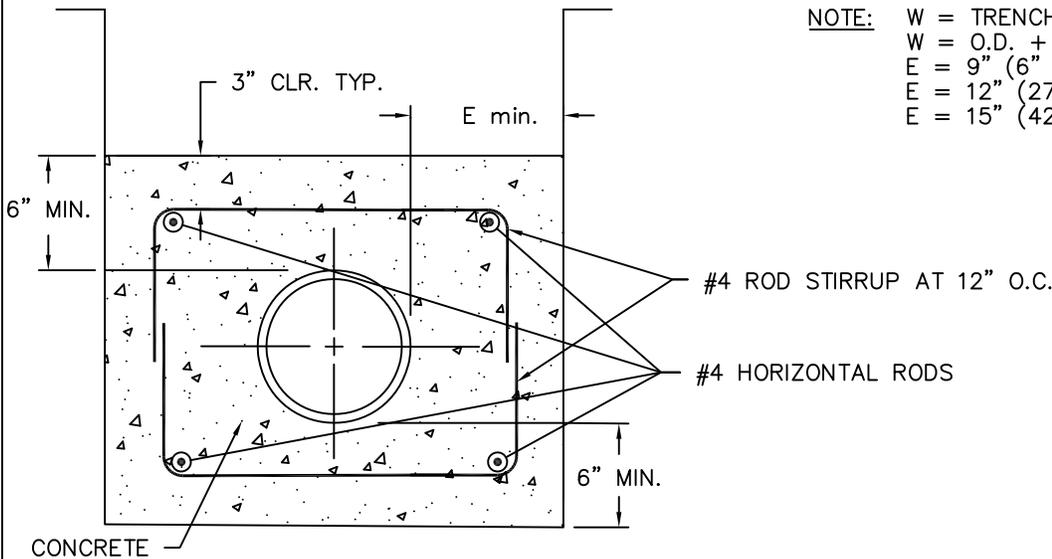




MINIMUM DEPTH OF GRANULAR BACKFILL --
 1/4 PIPE DIAMETER BUT NEVER LESS THAN 4" BELOW
 THE PIPE AND A MINIMUM OF 6" ABOVE THE PIPE.

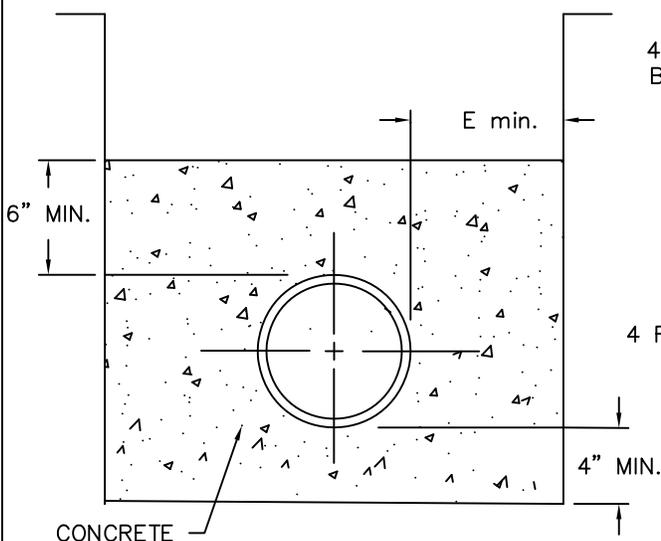
GRANULAR BACKFILL MUST CONFORM TO BEDDING
 MATERIAL. (IN CUTS GREATER THAN 12' MINIMUM
 AGGREGATE COVER IS 12")

IMPROVED BEDDING

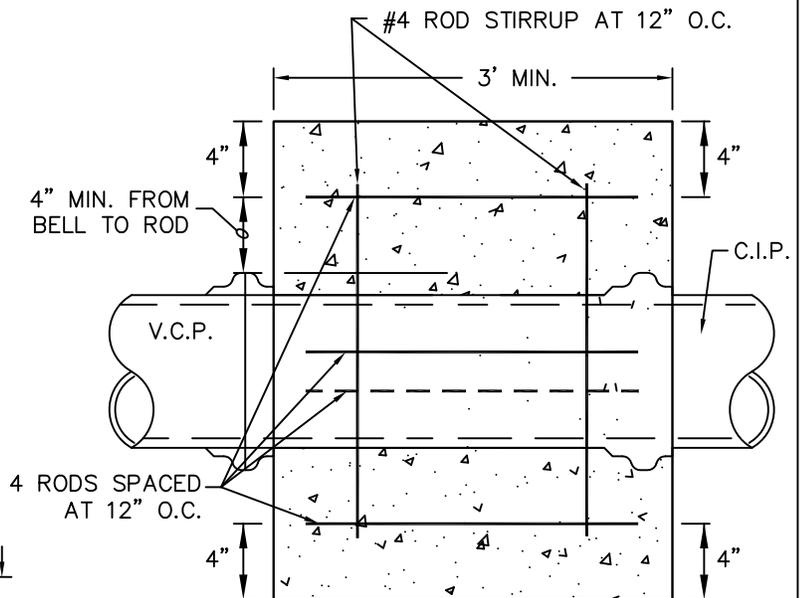


NOTE: W = TRENCH WIDTH
 W = O.D. + 2E
 E = 9" (6" to 24" PIPE)
 E = 12" (27" to 36" PIPE)
 E = 15" (42" to 72" PIPE)

CONCRETE ENCASEMENT IF ON SOIL

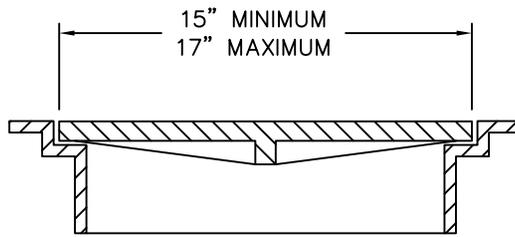


CONCRETE ENCASEMENT IF ON BEDROCK



FOR 8" PIPE A V.C.P.-C.I.P. "ADAPTER"
 FERNCO COUPLING OR EQUAL

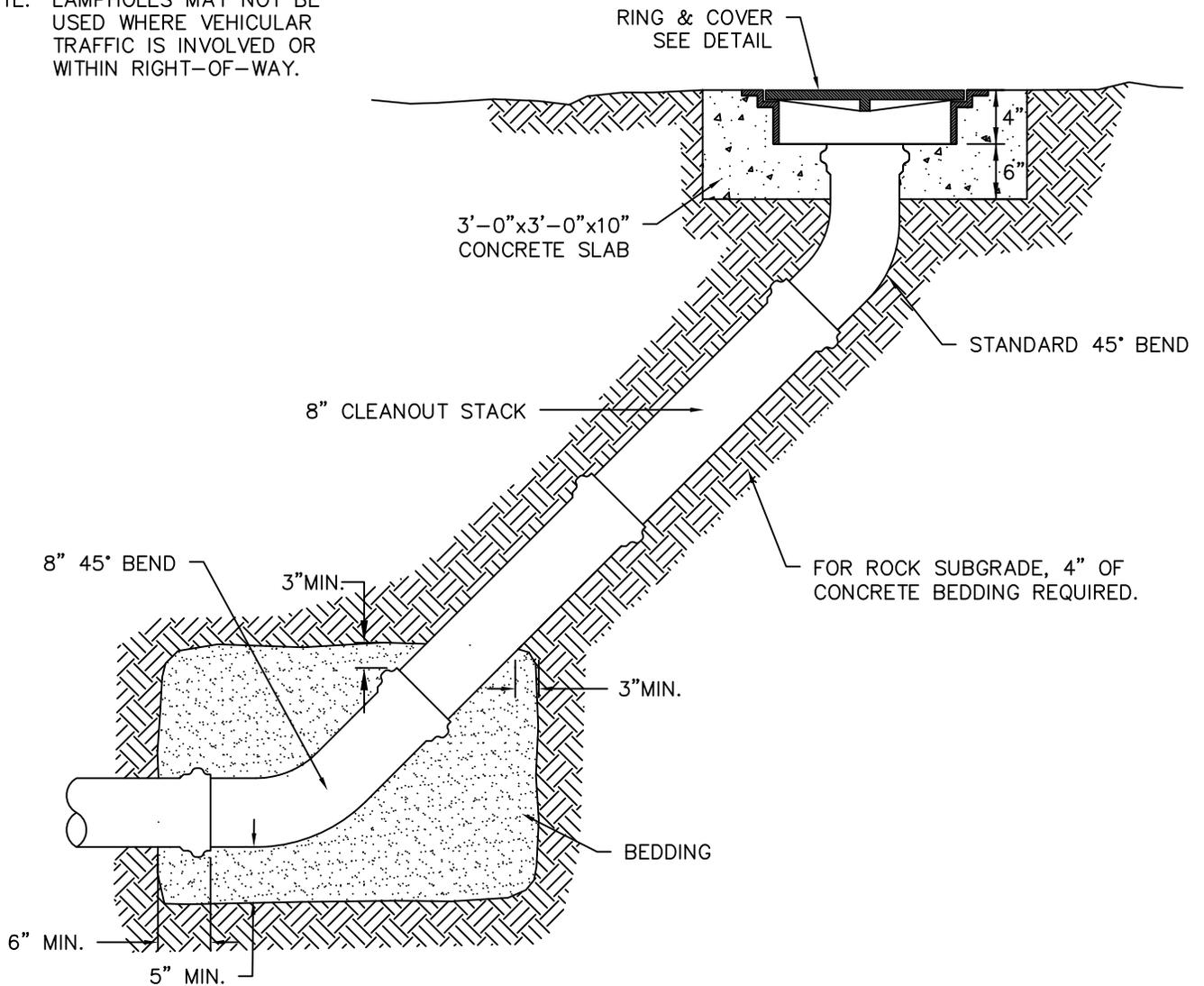
EXISTING V.C.P.-C.I.P. JUNCTION ENCASEMENT



MINIMUM WEIGHT 90 lbs.
NEENAH R-1976 OR EQUAL

RING & COVER DETAIL

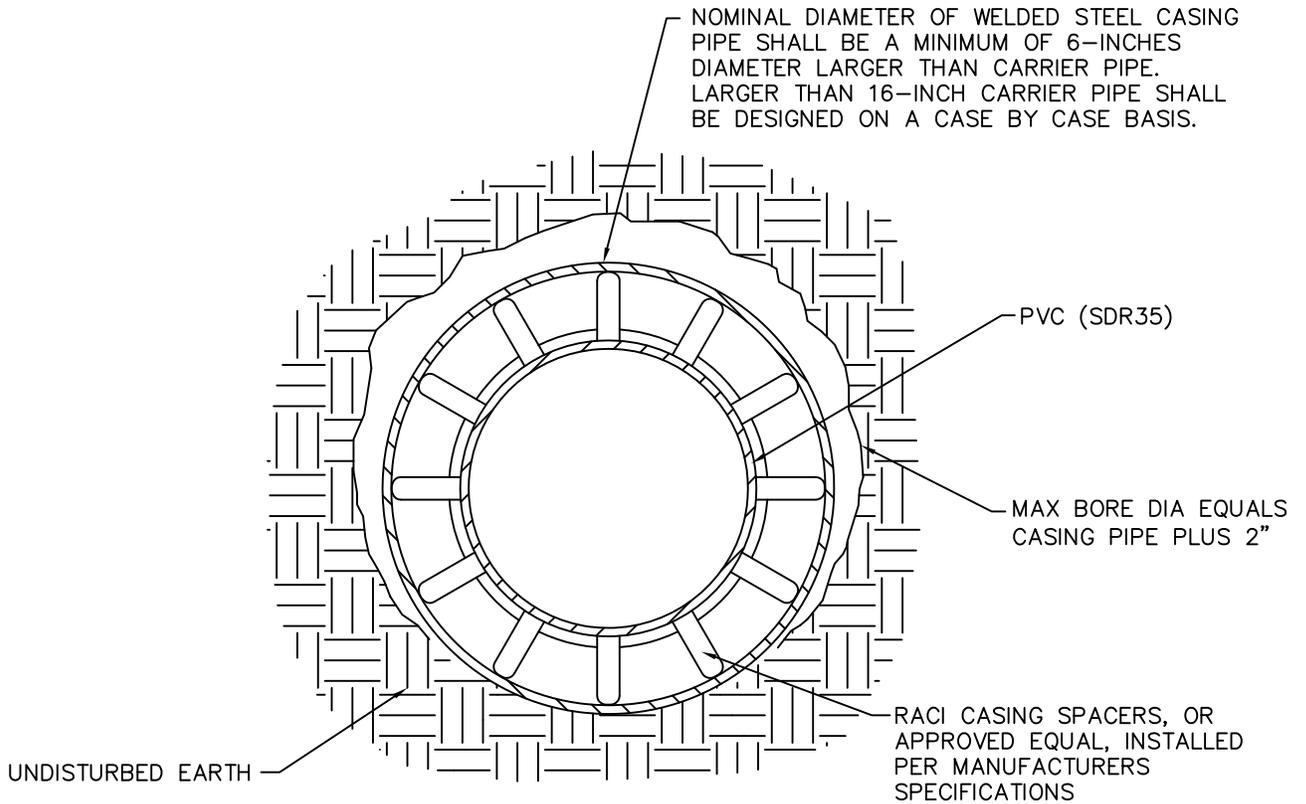
NOTE: LAMPHOLES MAY NOT BE USED WHERE VEHICULAR TRAFFIC IS INVOLVED OR WITHIN RIGHT-OF-WAY.



STANDARD CLEANOUT LAMPHOLE

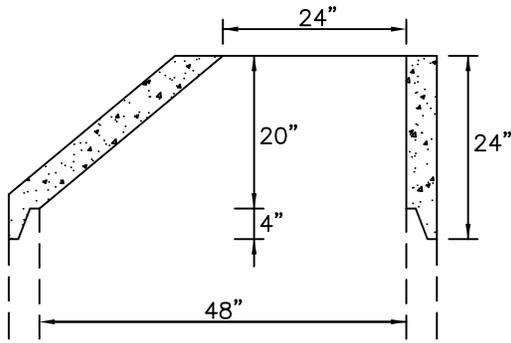
NOTES:

- 1) MINIMUM 1% DESIGN SLOPE ON CASING AND CARRIER PIPES
- 2) IF PVC IS NOT TO BE USED AS CARRIER PIPE, CONTRACTOR SHALL SUBMIT A DESIGN FOR APPROVAL PRIOR TO CONSTRUCTION
- 3) RUBBER END SEAL, WITH STAINLESS STEEL BANDS, TO BE INSTALLED AT BOTH ENDS OF CASING PIPE
- 4) END ELEVATIONS AND SLOPE OF CASING PIPE TO BE FIELD VERIFIED PRIOR TO ACCEPTANCE
- 5) MIN. WALL THICKNESS 0.25"

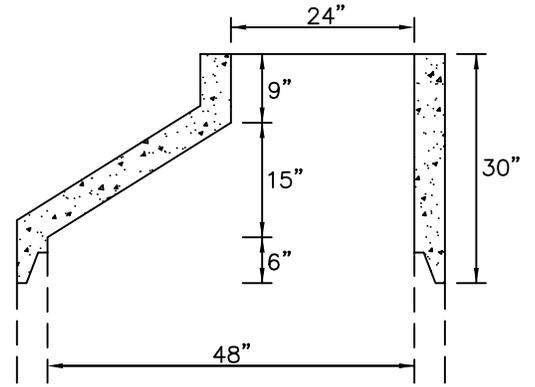


BORING CASING

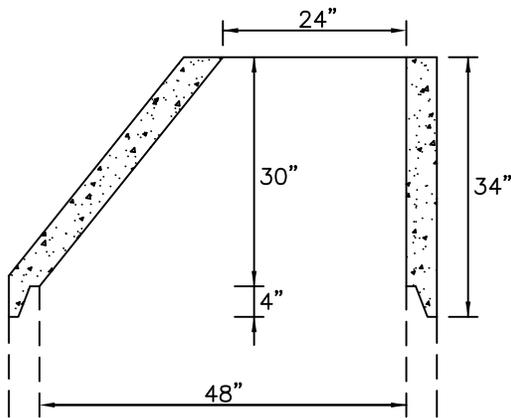
TREATMENT FOR 8" SEWER, OTHER SIZES TO BE SIMILAR, APPROVAL WILL BE REQUIRED.



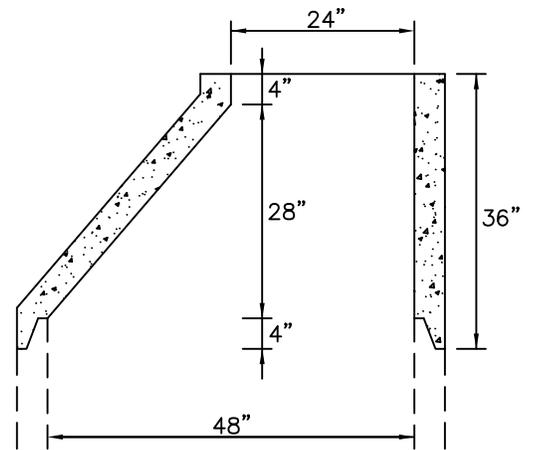
24" CONE



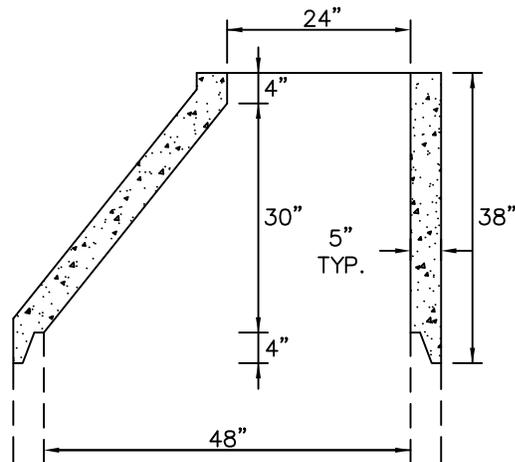
30" CONE



34" CONE

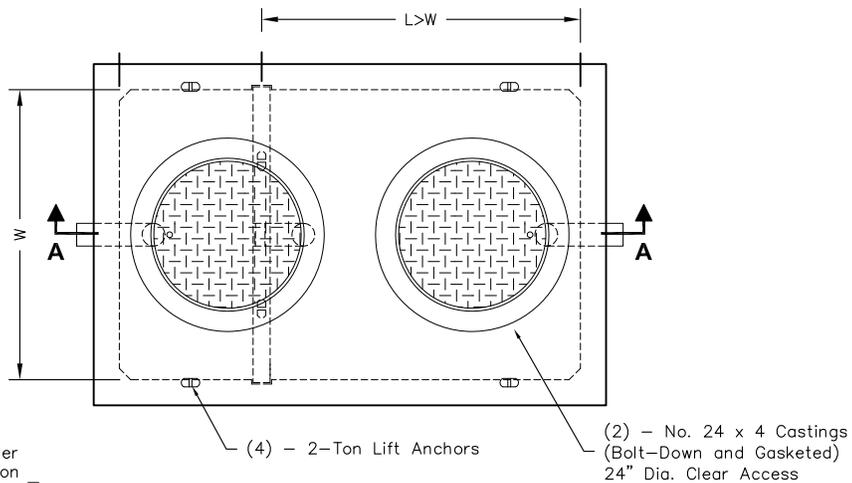


36" CONE



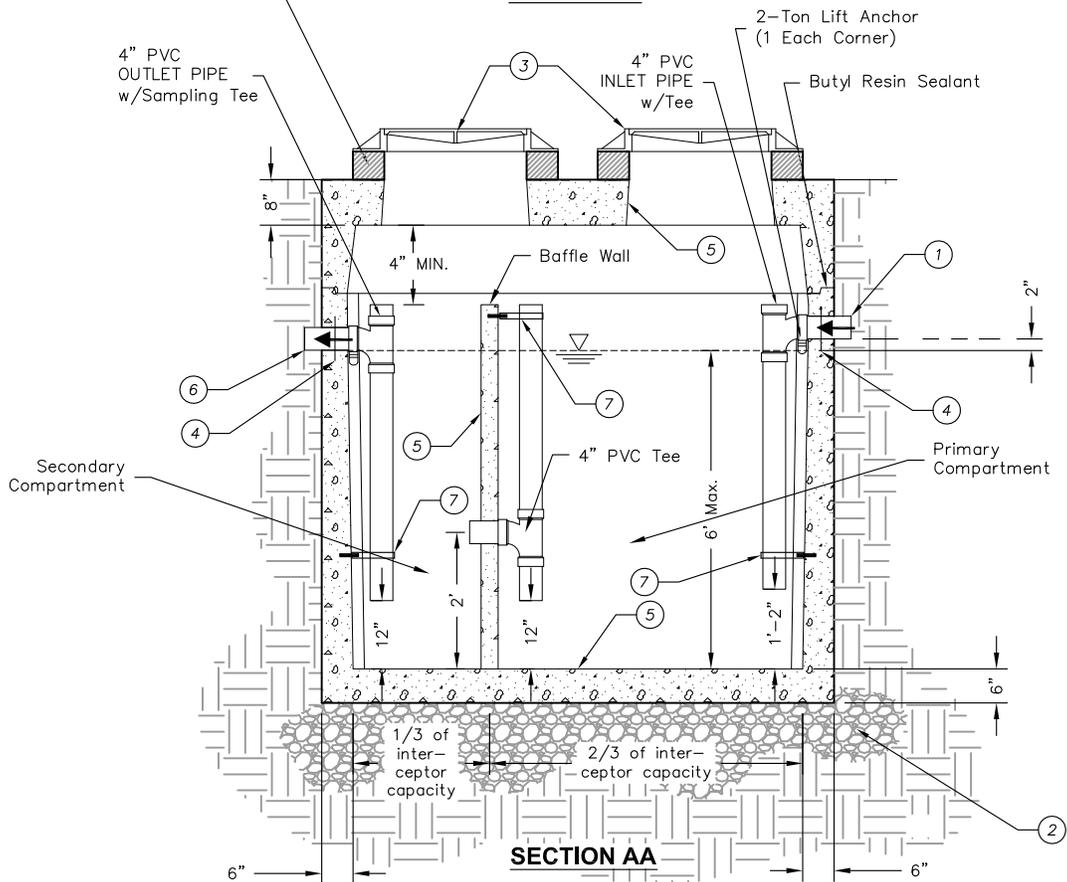
38" CONE

NOTE: WALL THICKNESS 5" TYP.



Adjustment Rings per City construction standard Revision #3, dated August 25, 2005

PLAN VIEW



SECTION AA

Notes:

- To be constructed in accordance with ASTM C 890 for AASHTO HS20-44 vehicle loading.
- Tank & all appurtenances to be fabricated and assembled at plant. Field fabrication not allowed.
- Manufacturer must be city certified and approved bi-annually. Contact Environmental Services at (417)864-1923 for inspection & certification.
- Not maintained by Environmental Services.
- to be sized in accordance with sizing form.

Keynotes

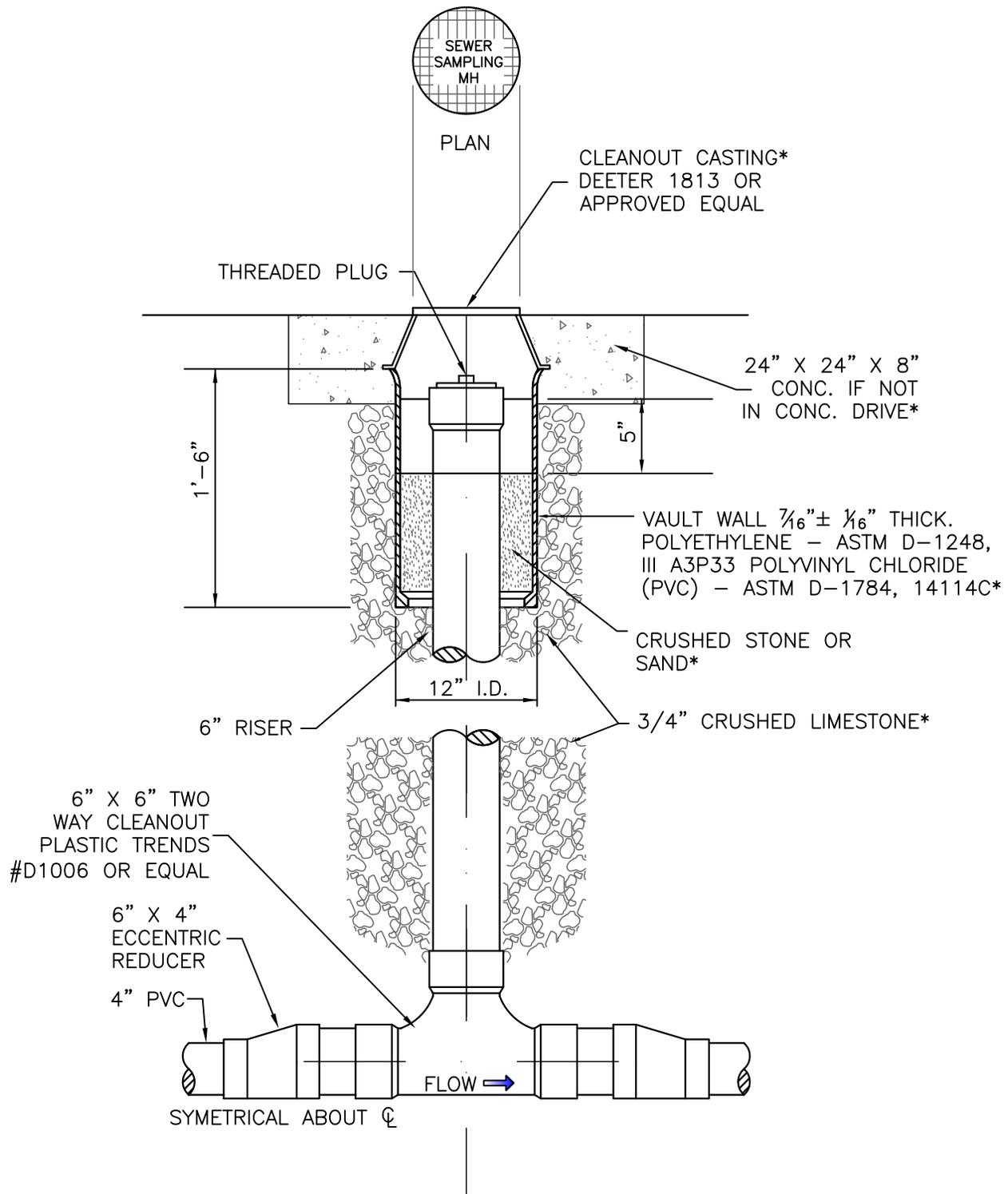
1	4"-6" Inlet Pipe, w/female connection
2	4"-6" Sand or Gravel Backfill
3	Water-tight gasketed Heavy Duty Cast Iron Covering
4	A-LOK water-tight gasket(or equal) - cast in place
5	Sherwin-Williams Tank Clad HS Corrosion resistant epoxy coating(or approved equal)-all interior surfaces
6	4"-6" Outlet Pipe w/female connection
7	Cast-in-place stainless steel all-thread with stainless steel Cooper B3149 pipe hangers or equal.

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

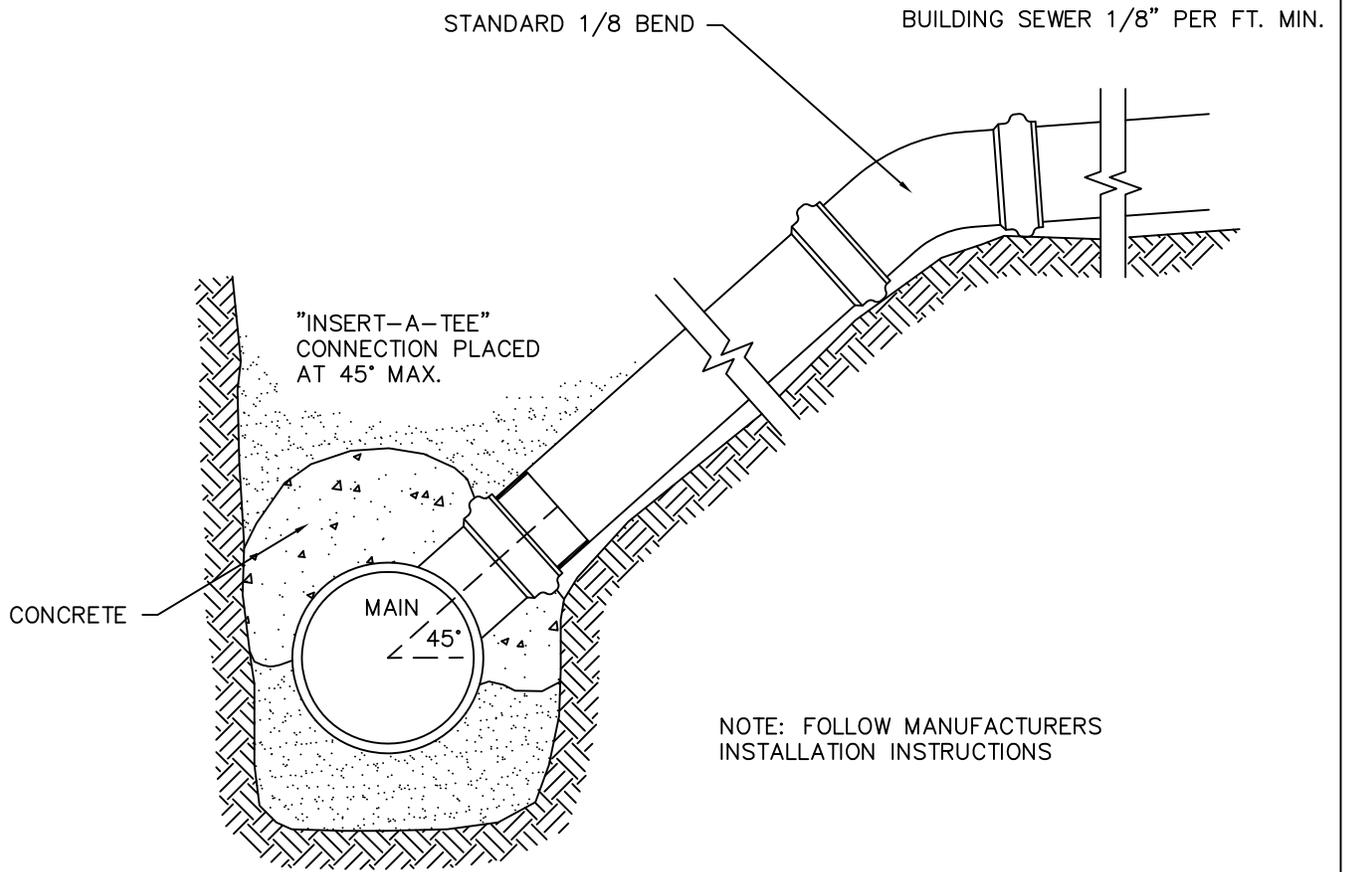
**PRECAST CONCRETE
GREASE INTERCEPTOR**

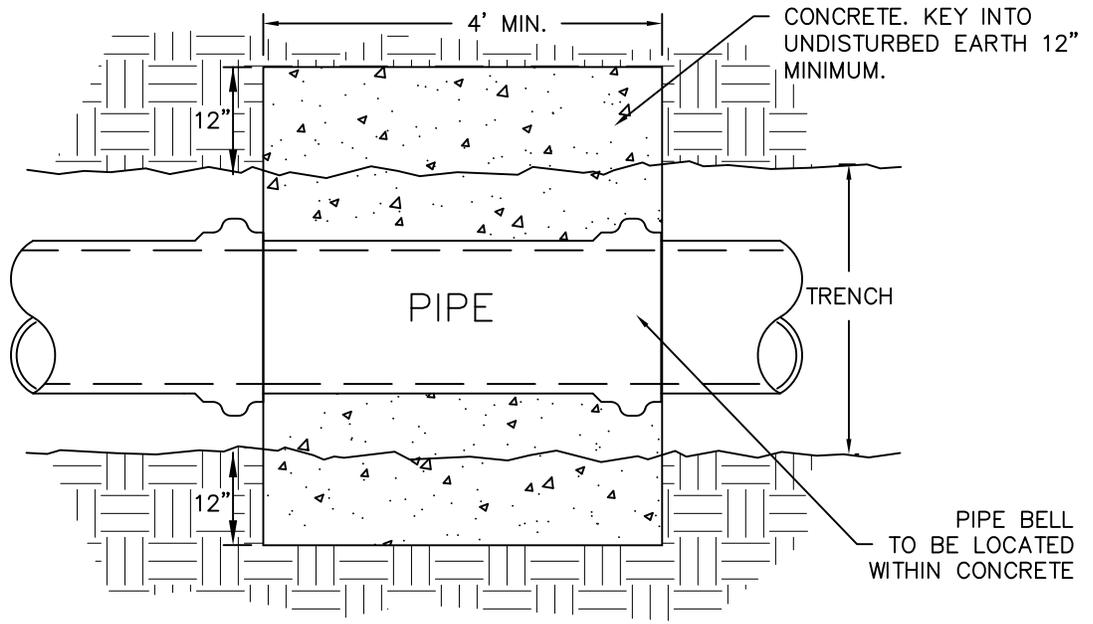
ADOPTED:11-13-2012

SAN-18

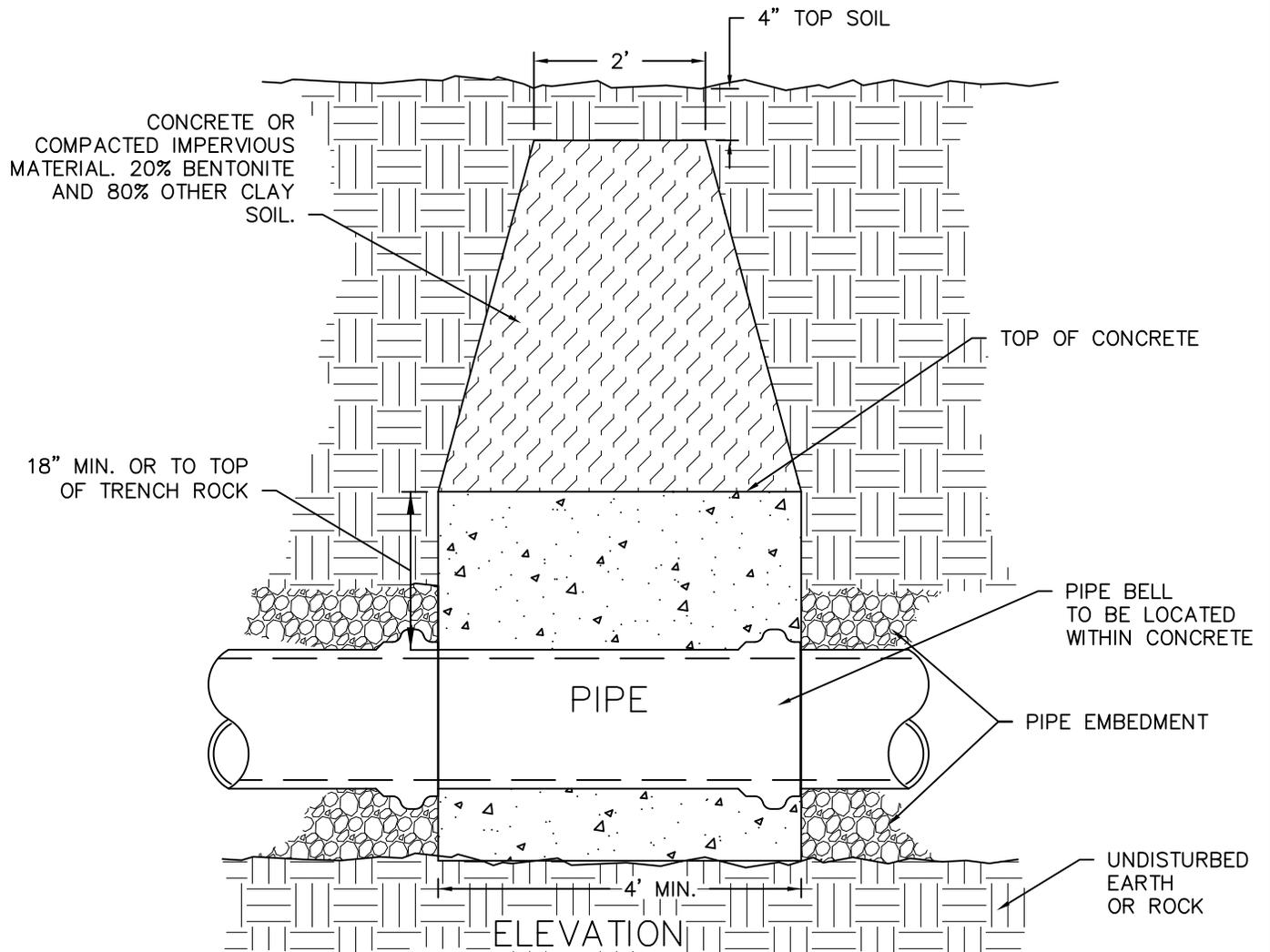


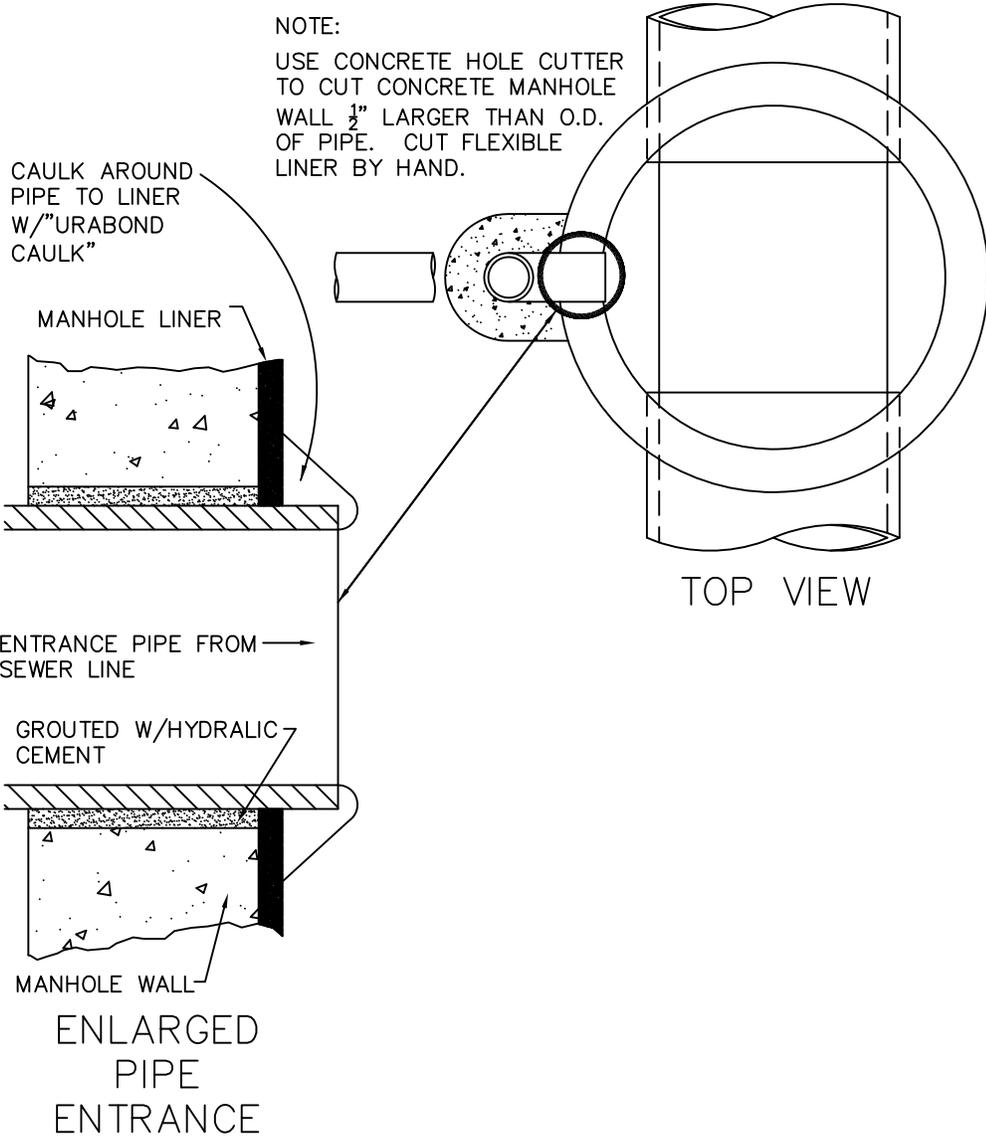
*Not required if located indoors on sites where no outside location is available.
-Not maintained by Environmental Services





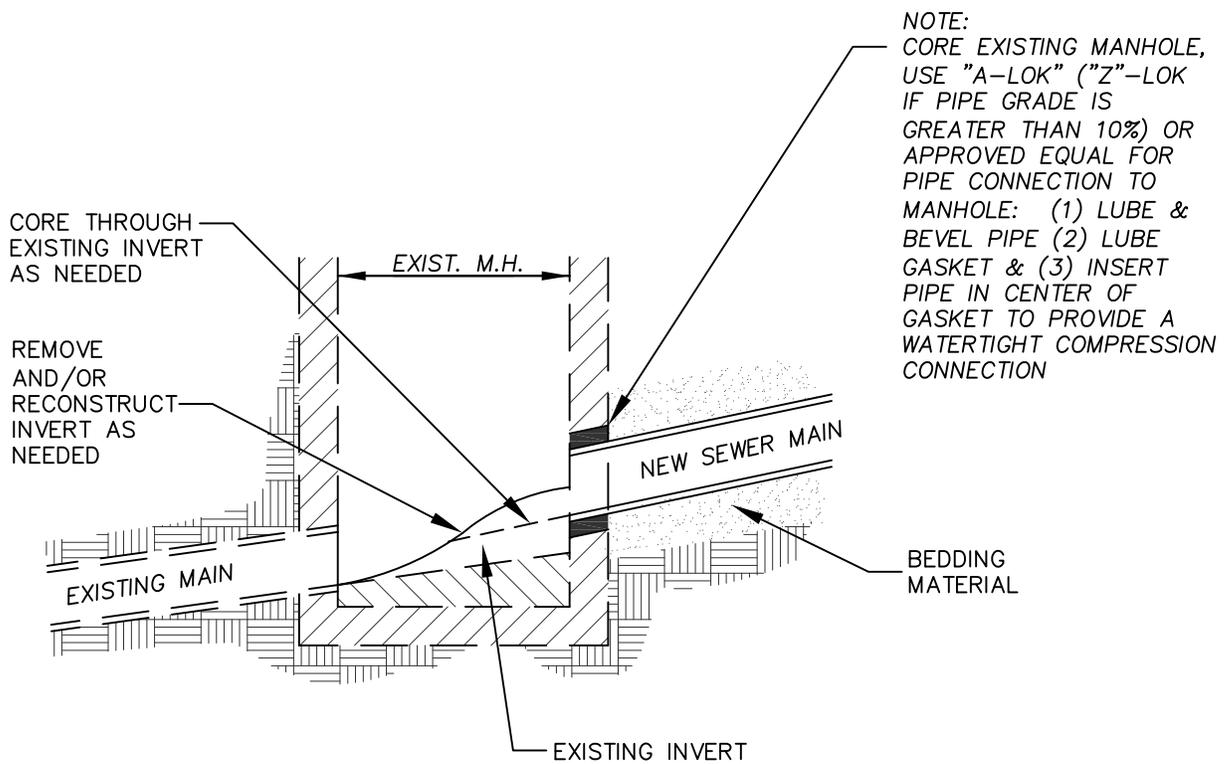
TOP VIEW

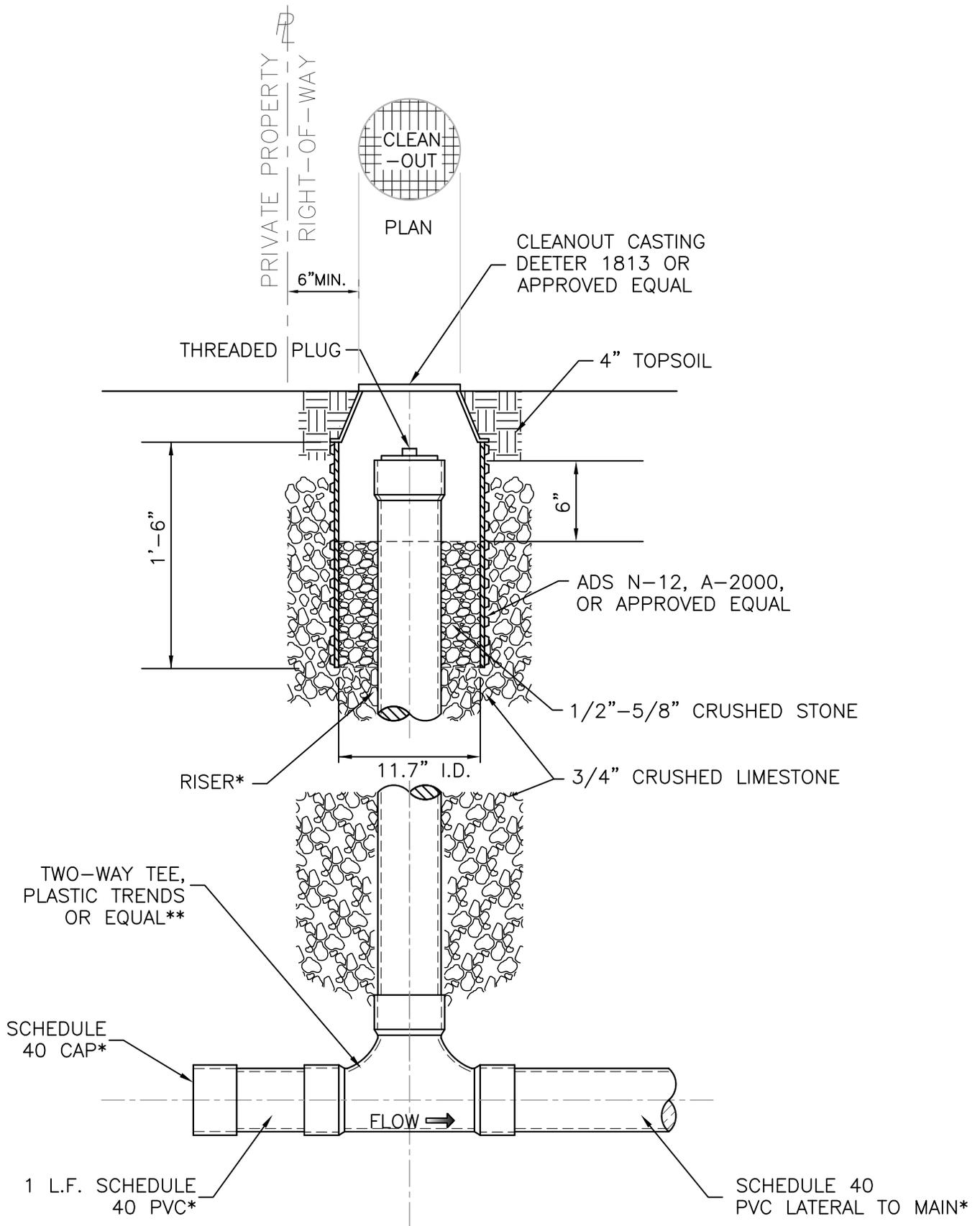




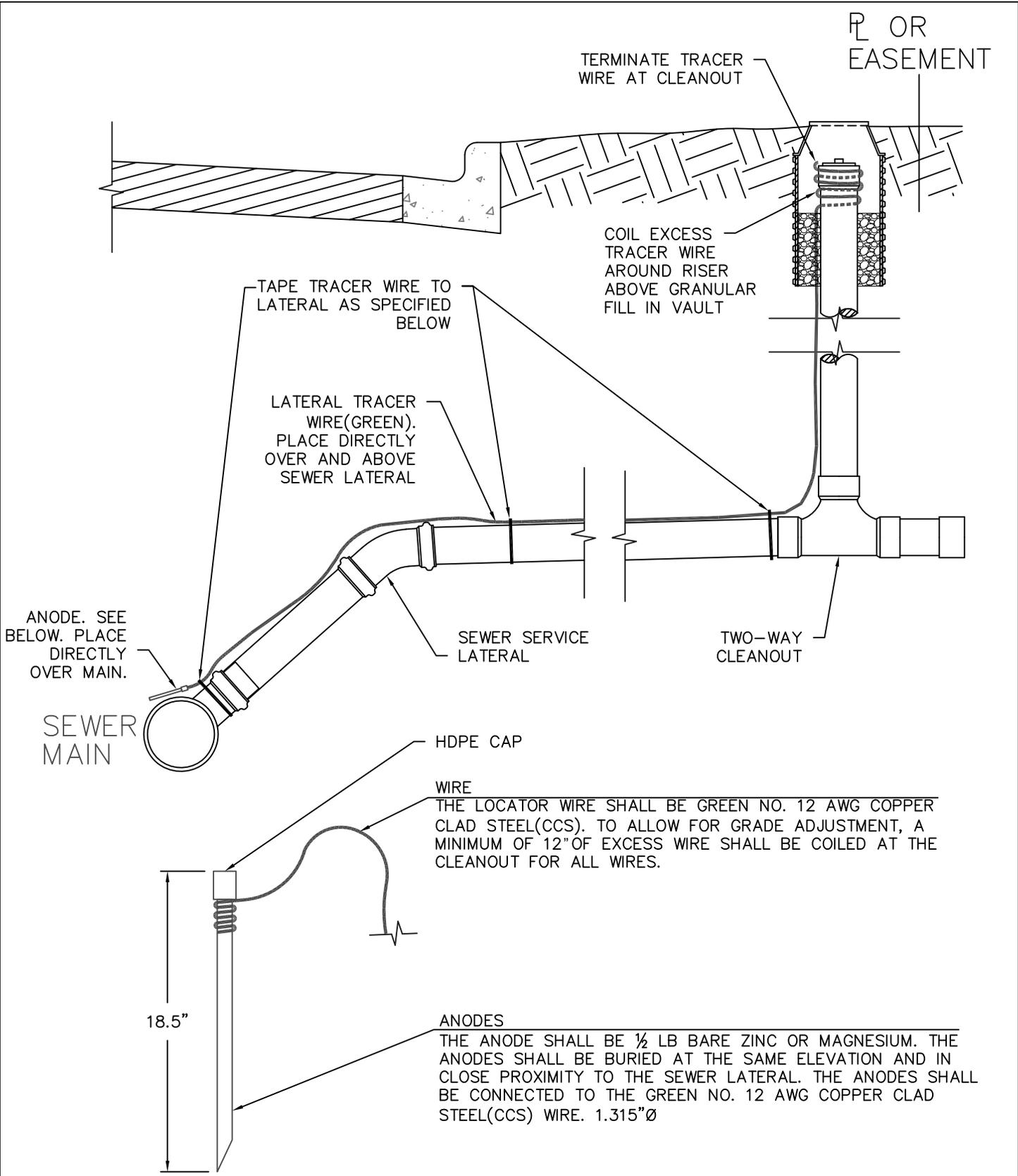
IT SHALL BE THE
CONTRACTOR'S
RESPONSIBILITY TO REPAIR
ANY DAMAGE TO PLASTIC
LINER.

NOTE:
"URABOND CAULK" MFG. BY
POLYRESINS
P.O. BOX 158
SUN VALLEY, CA 91352





- NOTES:
- NOT MAINTAINED BY ENVIRONMENTAL SERVICES.
 - ADJUST LATERAL DEPTH AS NECESSARY TO AVOID UTILITY CONFLICT.
 - RISER TO BE LOCATED A MIN. OF 6" INSIDE RIGHT-OF-WAY.
 - * 4" OR 6" SCHEDULE 40 PVC.
 - ** 4"X4" NO. #D1004; 6"X6" NO. #D1006 BY PLASTIC TRENDS.

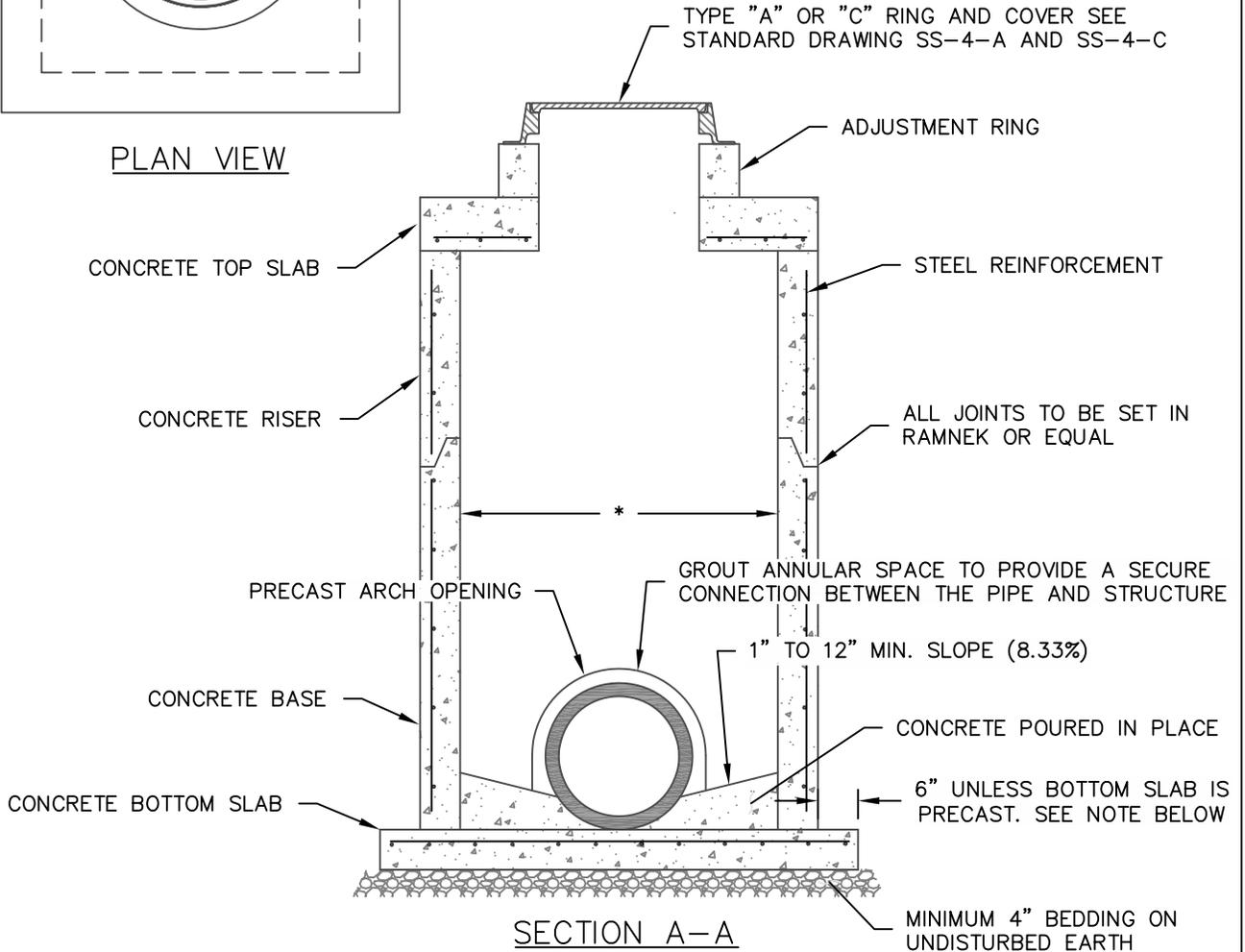


TRACER WIRE DETAIL

CONDUCTIVE TYPE PIPE LOCATOR/TRACER WIRE SHALL BE INSTALLED TO LOCATE ALL SEWER LATERALS. THE WIRE SHALL EXTEND THE ENTIRE LENGTH OF THE PROPOSED LATERAL. THE WIRE SHALL BE INSTALLED DIRECTLY ON TOP THE PIPE AND SECURED TO THE LATERAL BY TAPE AT BASE OF RISER, SEWER MAIN AND EVERY 15'. CORROSION PROOF/FILLED WIRE CONNECTORS SHALL BE USED AT SPLICE LOCATIONS. ELECTRICAL TAPE SHALL BE USED AND NO BARE WIRE SHALL BE EXPOSED. TEST STATIONS SHALL BE INSTALLED INSIDE ALL CLEANOUT VAULTS AND EXISTING WIRES SHALL BE CONNECTED. ZINC OR MAGNESIUM ANODES SHALL BE ATTACHED AT BOTH THE BEGINNING AND THE END OF THE TRACER WIRE. A TYPICAL LAYOUT OF THE LOCATOR WIRE AND CLEANOUT IS PROVIDED IN THE FIGURE ABOVE. CONDUCTIVITY TO BE TESTED BEFORE ACCEPTANCE.



PLAN VIEW



SECTION A-A

NOTES:

1. JUNCTION BOX SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH ASTM C 913.
2. CONCRETE TOP SLAB SHALL BE DESIGNED TO WITHSTAND LOADING BASED ON A COMBINATION OF DEAD LOADS, SNOW LOADS, AND A-16 (HS20-44) TRAFFIC LOADS IN ACCORDANCE WITH ASTM C890.
3. BOTTOM SLAB SHALL BE POURED IN PLACE. IF MANUFACTURER IS CONCERNED ABOUT STRUCTURAL INTEGRITY OF BASE DURING TRANSPORTATION THEN THE BOTTOM SLAB MAY BE PRECAST WITH RISER.
4. PIPE TO BE ON GRADE BEFORE BOTTOM SLAB IS CONSTRUCTED UNLESS BOTTOM IS PRECAST WITH BASE.
5. ALL PIPES SHALL FIT FLUSH WITH INSIDE FACE OF JUNCTION BOX.
6. BOTTOM OF JUNCTION BOX TO BE FILLED WITH CONCRETE FORMING CHANNELS TOWARD OUTLET PIPE FROM ALL INLET PIPES. CONCRETE SHALL BE FLUSH WITH INVERT OF OUTLET PIPE.
7. NO MORE THAN 2 ADJUSTMENT RINGS MAY BE USED BUT SHALL NOT EXCEED 18 INCHES.
8. CONCRETE TOP SLAB SHALL BE PINNED TO STRUCTURE AT THE CORNERS USING ONE #4 DEFORMED BAR IN EACH CORNER. BAR SHALL EXTEND A MINIMUM OF 6 INCHES INTO RISER BELOW.

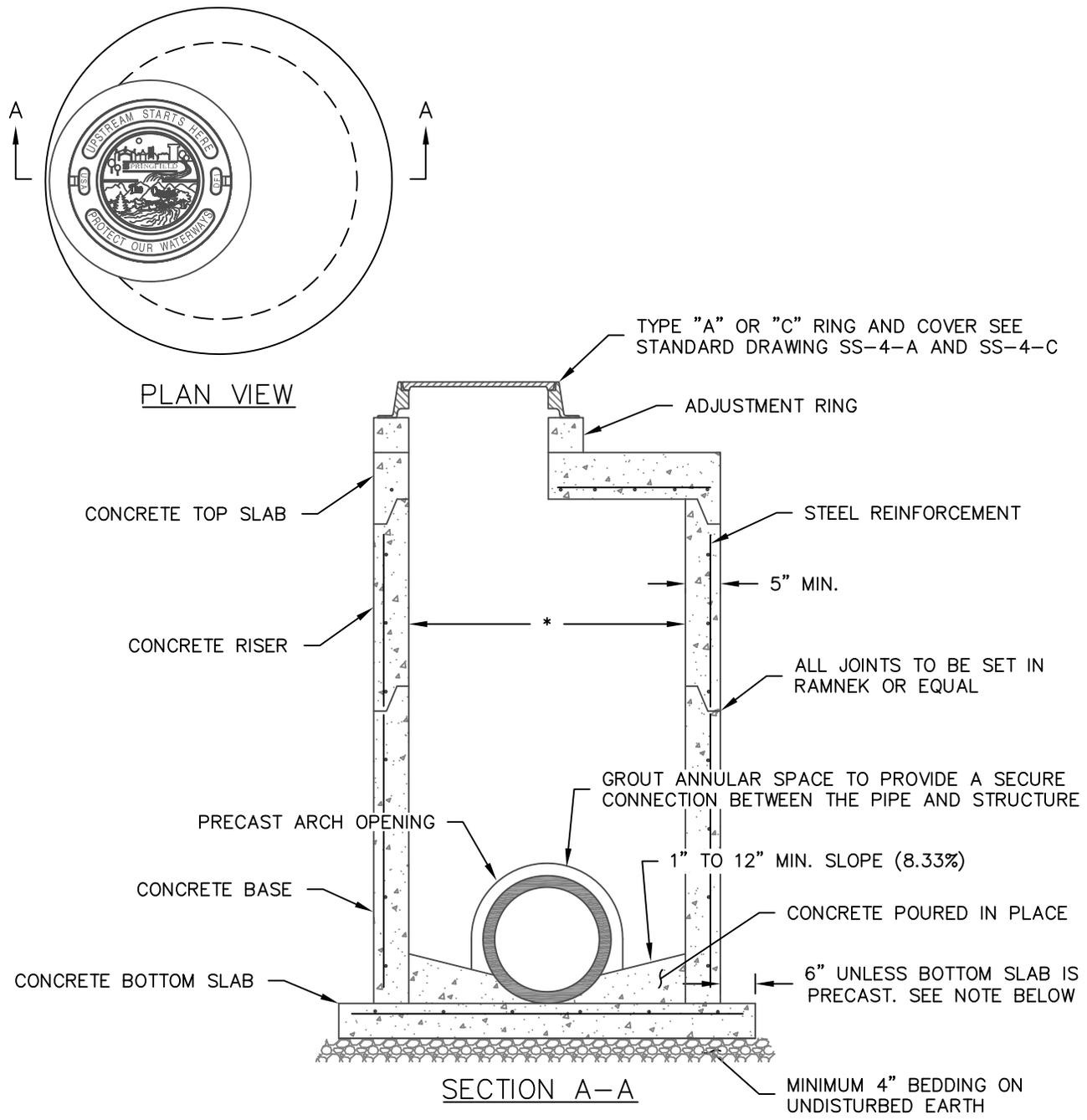
PIPE DIAMETER	*MINIMUM INSIDE DIMENSION OF STRUCTURE
15" - 24"	THREE FEET (3')
27" - 30"	FOUR FEET (4')
36" - 42"	FIVE FEET (5')
48" - 54"	SIX FEET (6')

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

JUNCTION BOX

ADOPTED: 7-1-15

SS-1

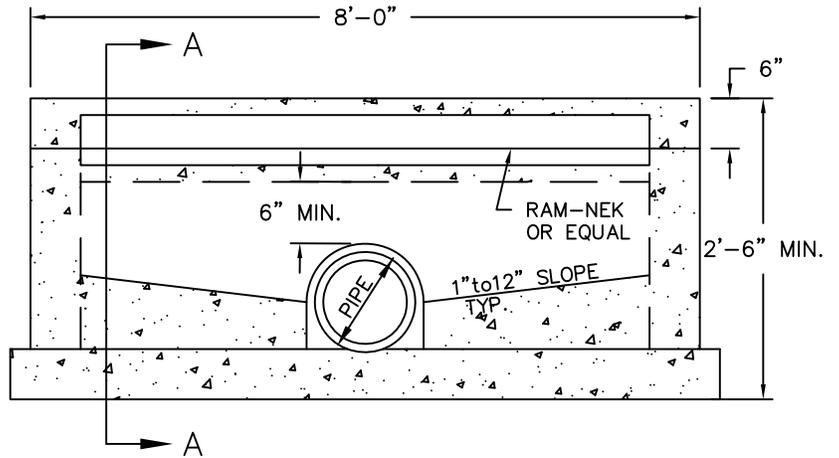
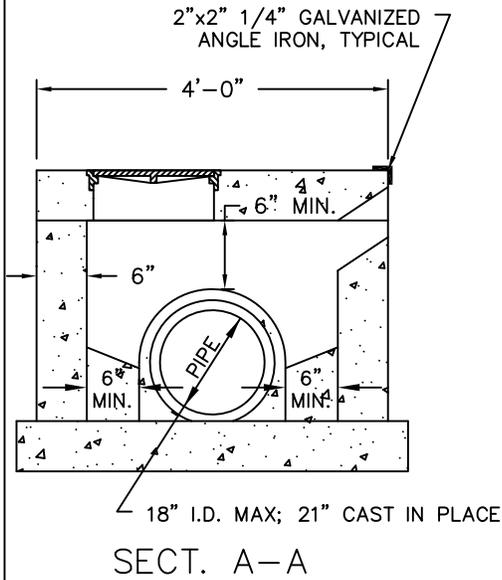


- NOTES:
1. MANHOLE SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH ASTM C 478.
 2. BOTTOM SLAB SHALL BE POURED IN PLACE. IF MANUFACTURER IS CONCERNED ABOUT STRUCTURAL INTEGRITY OF CONCRETE BASE DURING TRANSPORTATION THEN THE BOTTOM SLAB MAY BE PRECAST WITH CONCRETE BASE.
 3. PIPE TO BE ON GRADE BEFORE BOTTOM SLAB IS CONSTRUCTED.
 4. ALL PIPES SHALL FIT FLUSH AT SPRINGLINE WITH INSIDE FACE OF MANHOLE.
 5. BOTTOM OF MANHOLE TO BE FILLED WITH CONCRETE FORMING CHANNELS TOWARD OUTLET PIPE FROM ALL INLET PIPES. CONCRETE SHALL BE FLUSH WITH INVERT OF OUTLET PIPE.
 6. NO MORE THAN 2 ADJUSTMENT RINGS MAY BE USED AND SHALL NOT EXCEED 18 INCHES.
 7. A MINIMUM CLEARANCE OF TWO FEET, MEASURED AT THE INSIDE FACE OF THE MANHOLE SHALL BE MAINTAINED BETWEEN THE OUTSIDE EDGE OF STORM SEWER PIPES..

PIPE DIAMETER	*MINIMUM INSIDE DIAMETER OF MANHOLE (SEE NOTE 7)
15" - 24"	FOUR FEET (4')
27" - 42"	FIVE FEET (5')
48"	SIX FEET (6')
54" - 66"	EIGHT FEET (8')

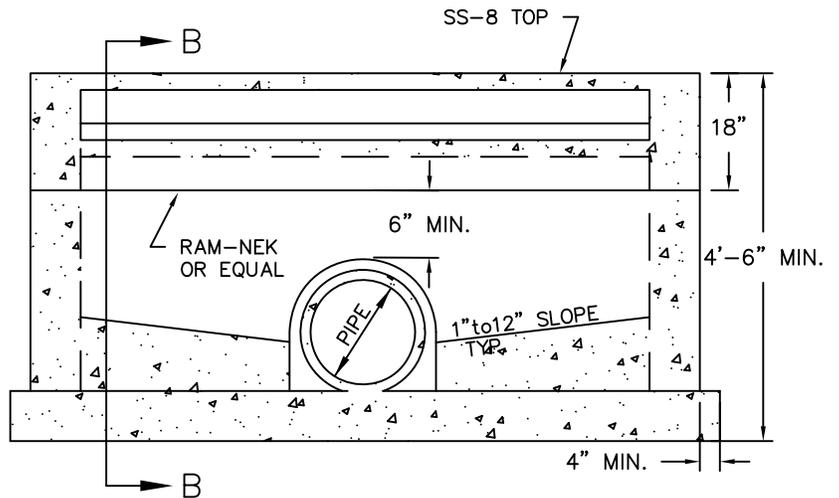
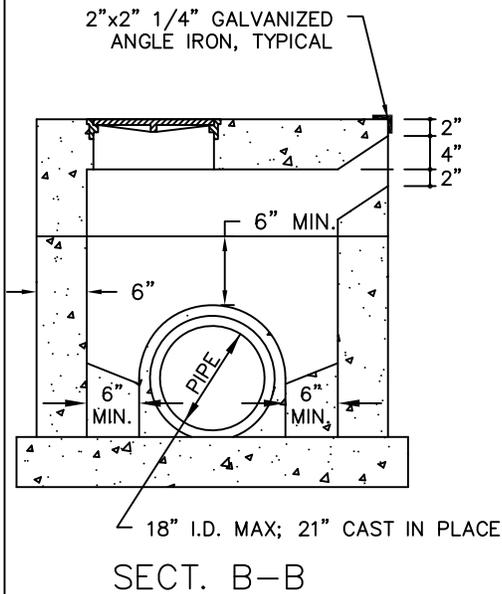
PRECAST TOPS

REQUIRED DIMENSIONS



FOR 6" PRECAST TOP

NOTE: #4Ø AT 10" O.C. (ALL WALLS, VERT. & HORZ.)
SEE SS-8 FOR TOP SLAB REINFORCEMENT.



FOR SS-8 TOP (18" PRECAST TOP)

NOTES:

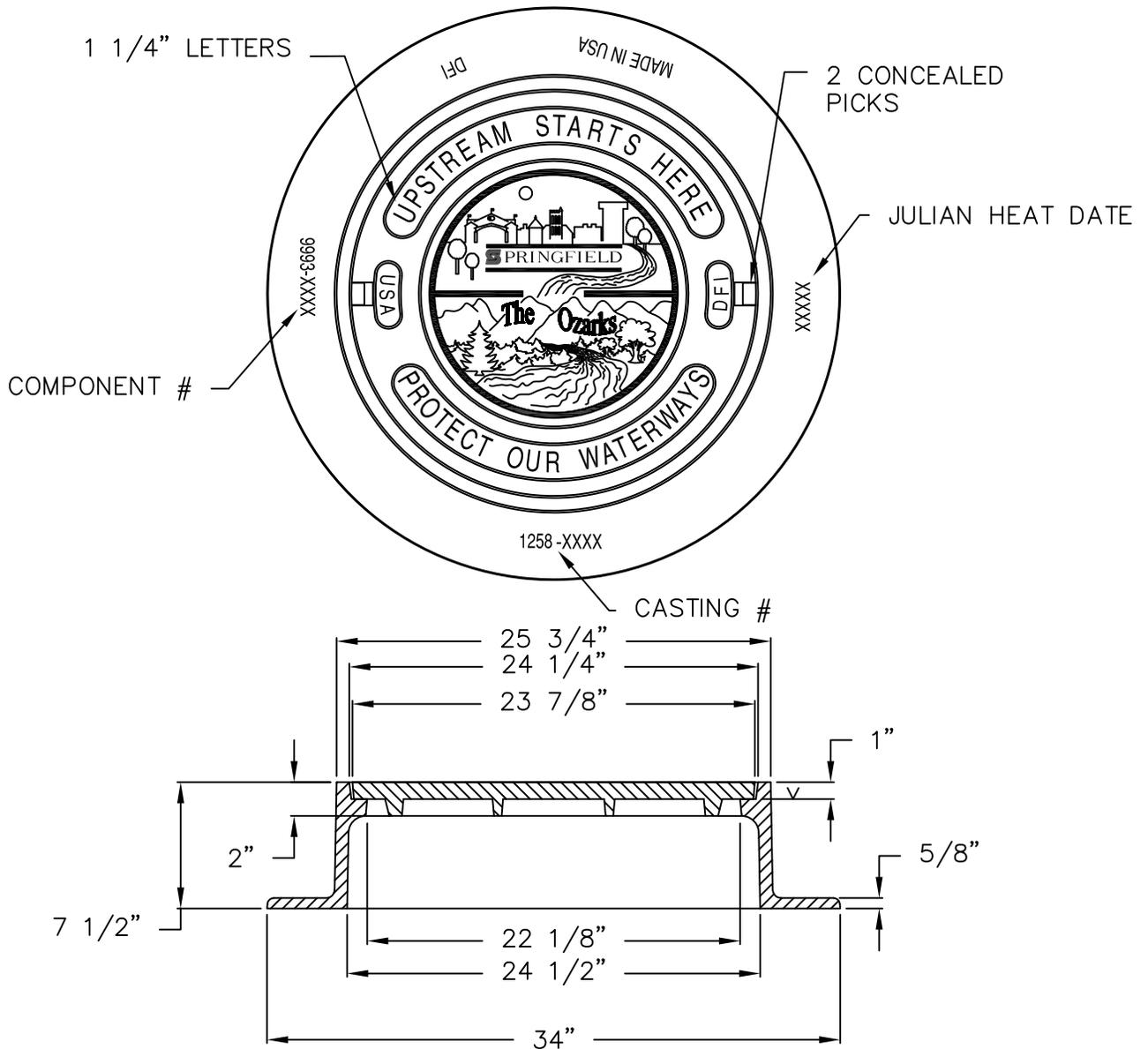
1. BOTTOM TO BE POURED IN PLACE
2. PIPE TO BE ON GRADE BEFORE BOTTOM IS CONSTRUCTED.
3. FOR 6" TOP, USE 4 - #4Ø DOWELS: ONE IN EACH CORNER WITH RAM-NEK OR EQUAL.
4. RAM-NEK ALL JOINTS (OR EQUAL).
5. 6" INVERT REQUIRED TO PREVENT SEDIMENTATION.
6. THERE MUST BE A 6" MIN. CONCRETE SEGMENT ABOVE PRECAST OPENING.
7. IF CLEARANCE CAN'T BE PROVIDED FROM TOP AND SIDES OF PIPE, A MODIFIED INLET MUST BE USED.

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

NON-RECESSED
CURB INLET

ADOPTED: 7-1-15
SS-3

RING & COVER DETAILS

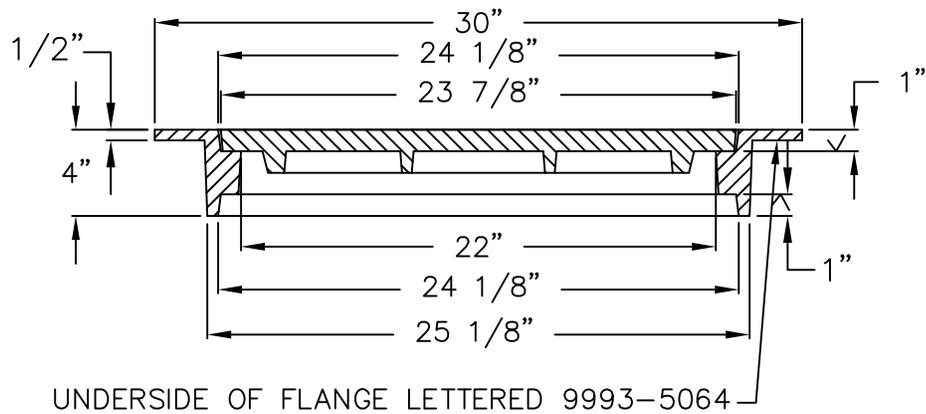


NOTE:
 1. FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACES.

TYPE "A" RING & COVER

DEETER # 1258 RING & COVER, EAST JORDAN IRON WORKS #2420Z
 RING W/2408A COVER, SS-4-C INSTALLED FLANGE DOWN OR EQUAL

RING & COVER DETAILS

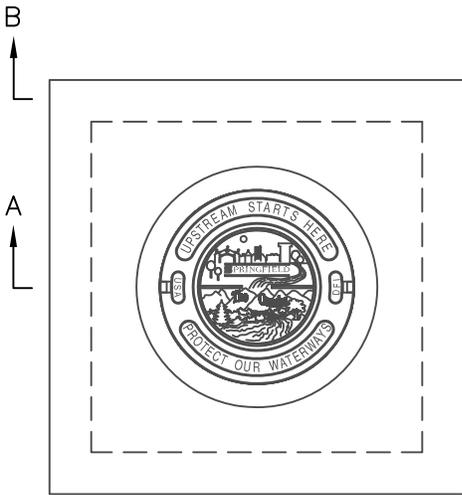


NOTE:

1. FURNISHED WITH MACHINED HORIZONTAL BEARING SURFACE.
2. RING IS REVERSIBLE AND CAN BE INSTALLED WITH FLANGE UP OR DOWN.

TYPE "C" RING & COVER FOR STORM SEWERS

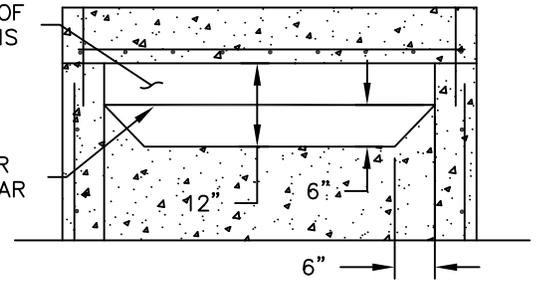
DEETER # 1157 RING W/ #2018-A COVER, EAST JORDAN
IRON WORKS #2425Z RING W/2408A COVER OR EQUAL



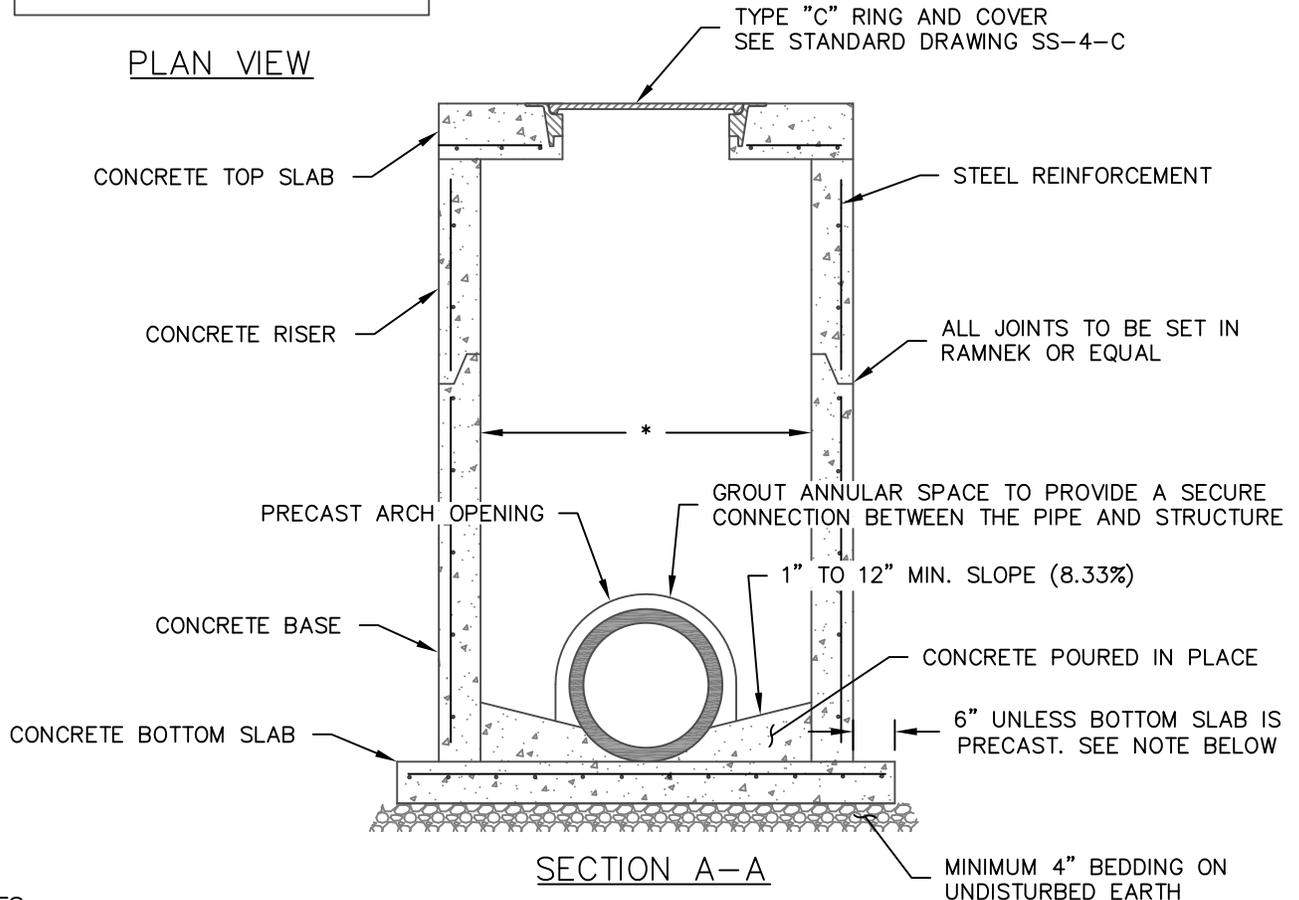
PLAN VIEW

SPECIFY NUMBER OF OPENINGS IN PLANS

#6 EPOXY COATED OR GALVANIZED STEEL BAR



SECTION B-B



SECTION A-A

NOTES:

1. AREA INLET SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH ASTM C 913.
2. CONCRETE TOP SLAB SHALL BE DESIGNED TO WITHSTAND LOADING BASED ON A COMBINATION OF DEAD LOADS, SNOW LOADS, AND A-16 (HS20-44) TRAFFIC LOADS IN ACCORDANCE WITH ASTM C890.
3. BOTTOM SLAB SHALL BE POURED IN PLACE. IF MANUFACTURER IS CONCERNED ABOUT STRUCTURAL INTEGRITY OF CONCRETE BASE DURING TRANSPORTATION THEN THE BOTTOM SLAB MAY BE PRECAST WITH CONCRETE BASE.
4. PIPE TO BE ON GRADE BEFORE BOTTOM SLAB IS CONSTRUCTED UNLESS BOTTOM IS PRECAST WITH BASE.
5. ALL PIPES SHALL FIT FLUSH WITH INSIDE FACE OF INLET.
6. BOTTOM OF INLET TO BE FILLED WITH CONCRETE FORMING CHANNELS TOWARD OUTLET PIPE FROM ALL INLET PIPES. CONCRETE SHALL BE FLUSH WITH INVERT OF OUTLET PIPE.
7. CONCRETE TOP SLAB SHALL BE PINNED TO STRUCTURE AT THE CORNERS USING ONE #4 DEFORMED BAR IN EACH CORNER. BAR SHALL EXTEND A MINIMUM OF 6 INCHES INTO RISER BELOW.

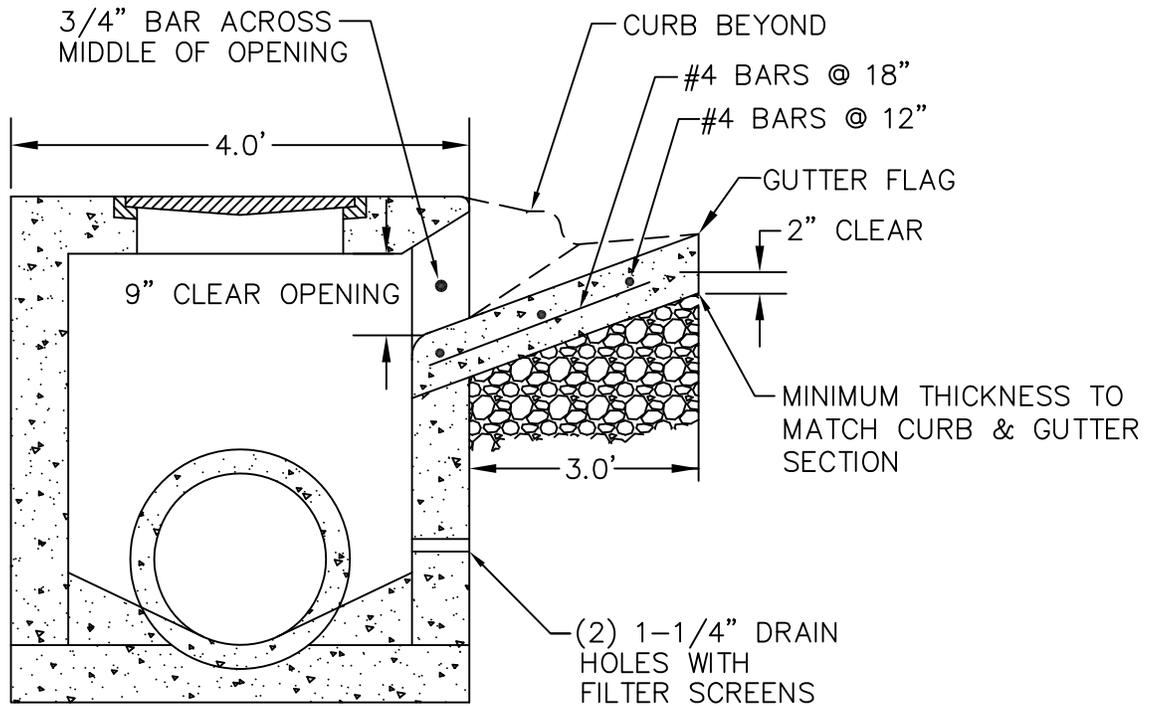
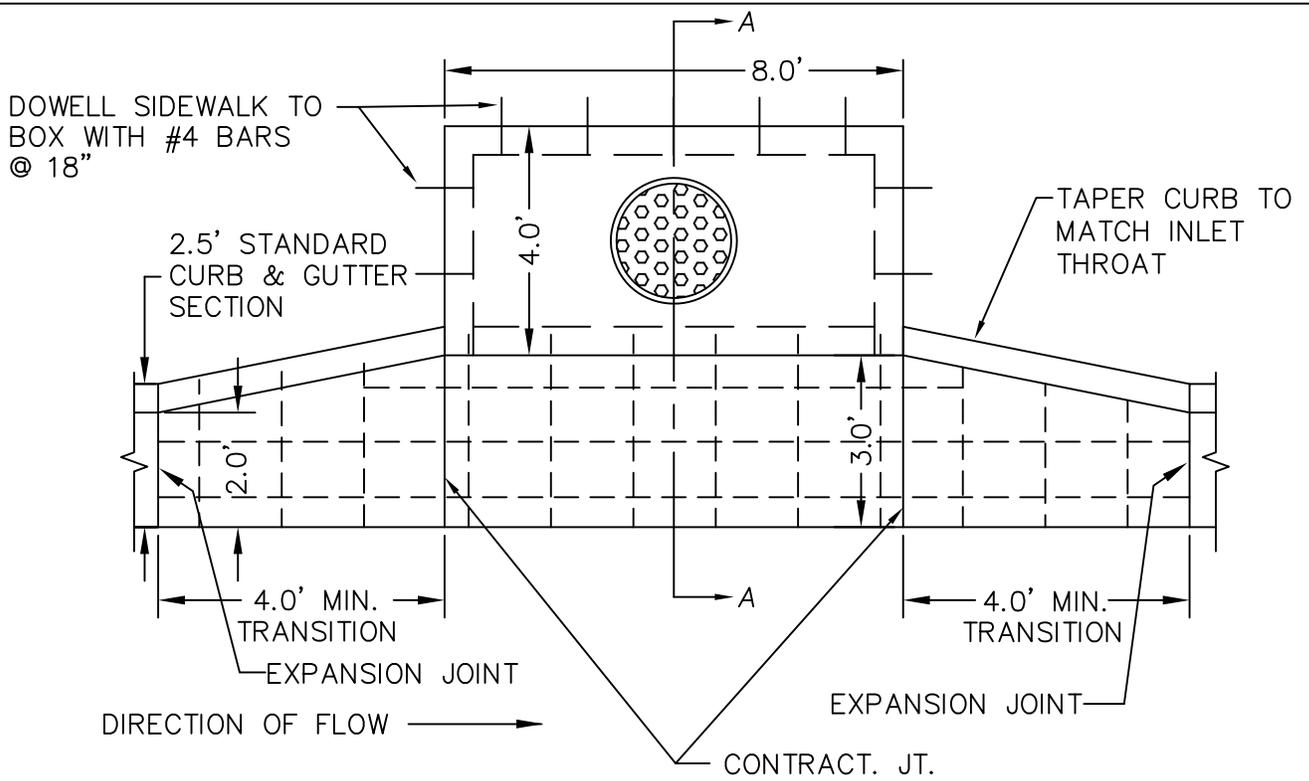
PIPE DIAMETER	*MINIMUM INSIDE DIMENSION OF STRUCTURE
15" - 24"	THREE FEET (3')
27" - 30"	FOUR FEET (4')
36" - 42"	FIVE FEET (5')
48" - 54"	SIX FEET (6')

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

AREA INLET

ADOPTED: 1-1-15

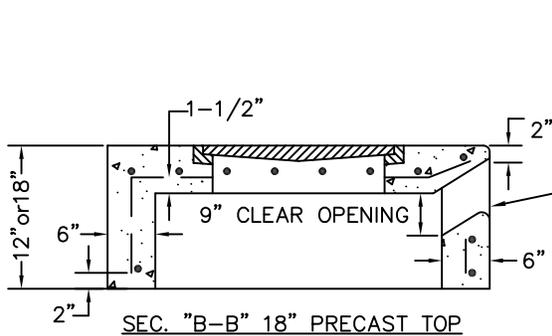
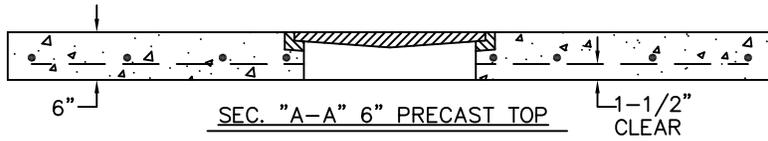
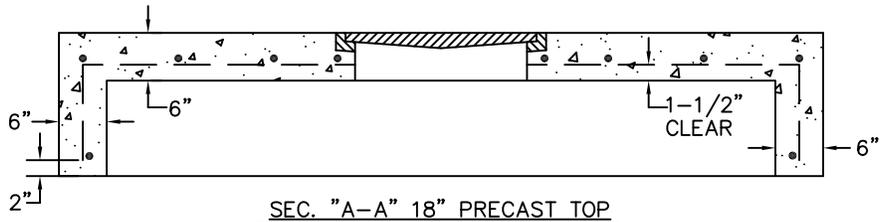
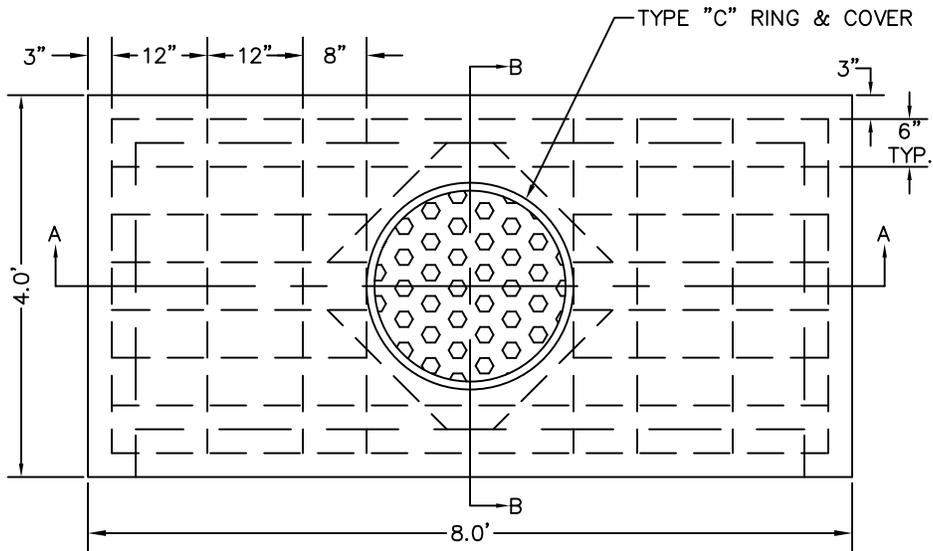
SS-5



SECTION "A-A"

NOTE:

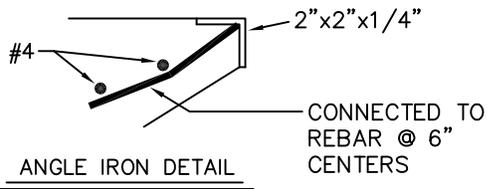
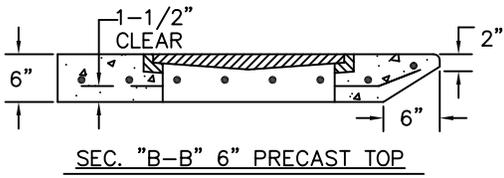
1. #4 BARS @ 10" O.C.(ALL WALLS, VERT. & HORIZ.)
2. IF CLEARANCE CAN'T BE PROVIDED FROM TOP AND SIDES OF PIPE, A MODIFIED INLET MUST BE USED.
3. 6", 12" OR 18" PRECAST LIDS MAY BE USED.
4. IF INLET IS NOT RECESSED, THROAT OPENING IS 7 INCHES.

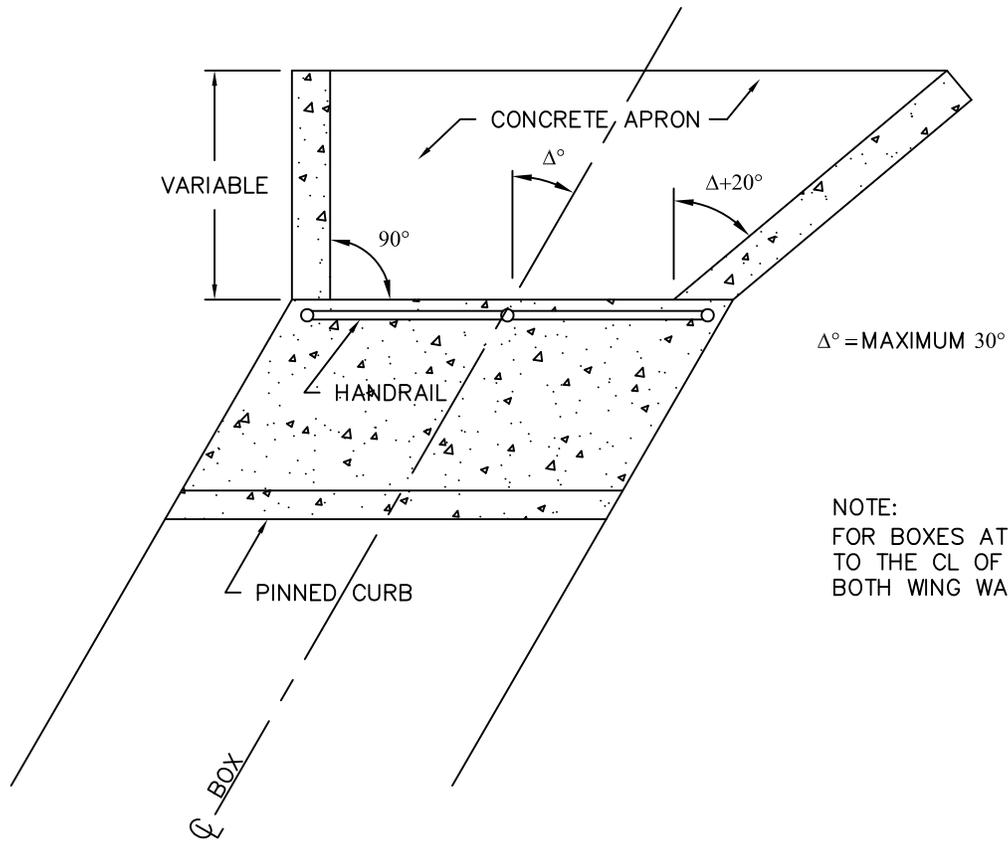


CHANGE THROAT DEPTH TO 7" IF NON RECESSED INLET IS USED.

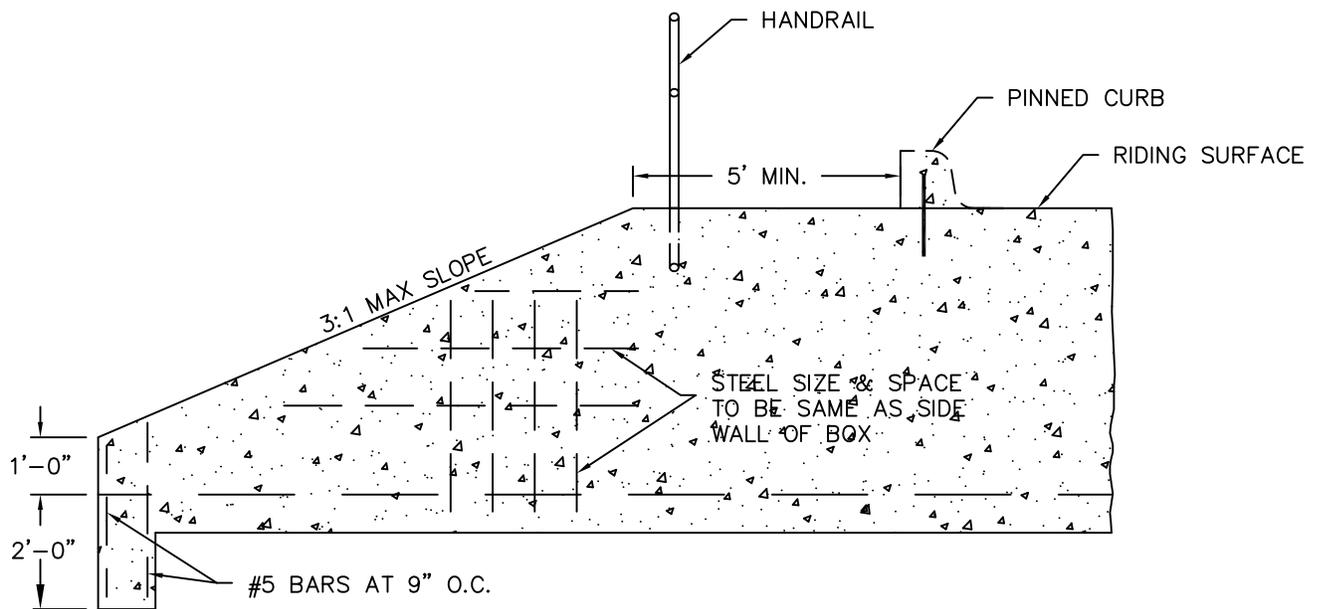
NOTES:

1. REINFORCEMENT IS THE SAME IN THE TOP SLAB OF THE 6" AND THE 18" PRECAST TOP.
2. USE NO. 4 BAR THROUGHOUT.
3. 6" & 12" PRECAST TOPS TO BE PINNED AT 4 CORNERS.
4. IF INLET IS NOT RECESSED THAN A PROTECTIVE 2" x 2" x 1/4" GALVANIZED ANGLE IRON IS REQUIRED AS SHOWN.



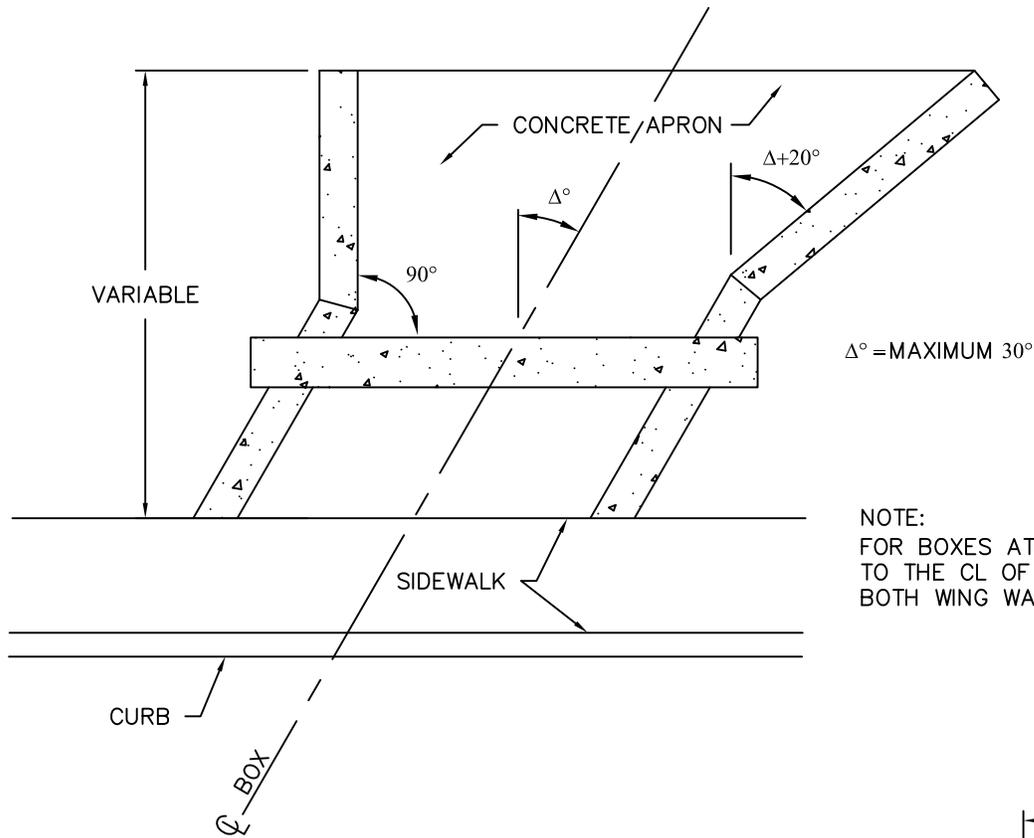


PLAN

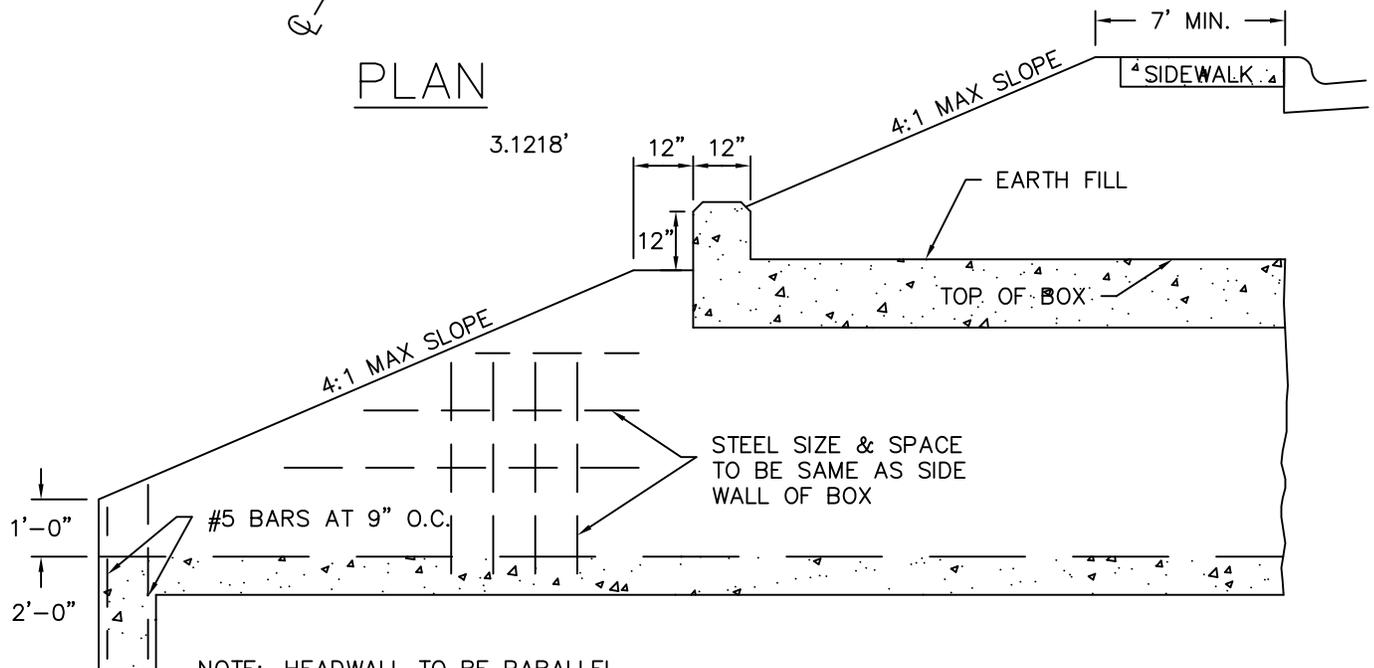


(TOE WALL REQUIRED ON BOTH ENDS OF BOX)

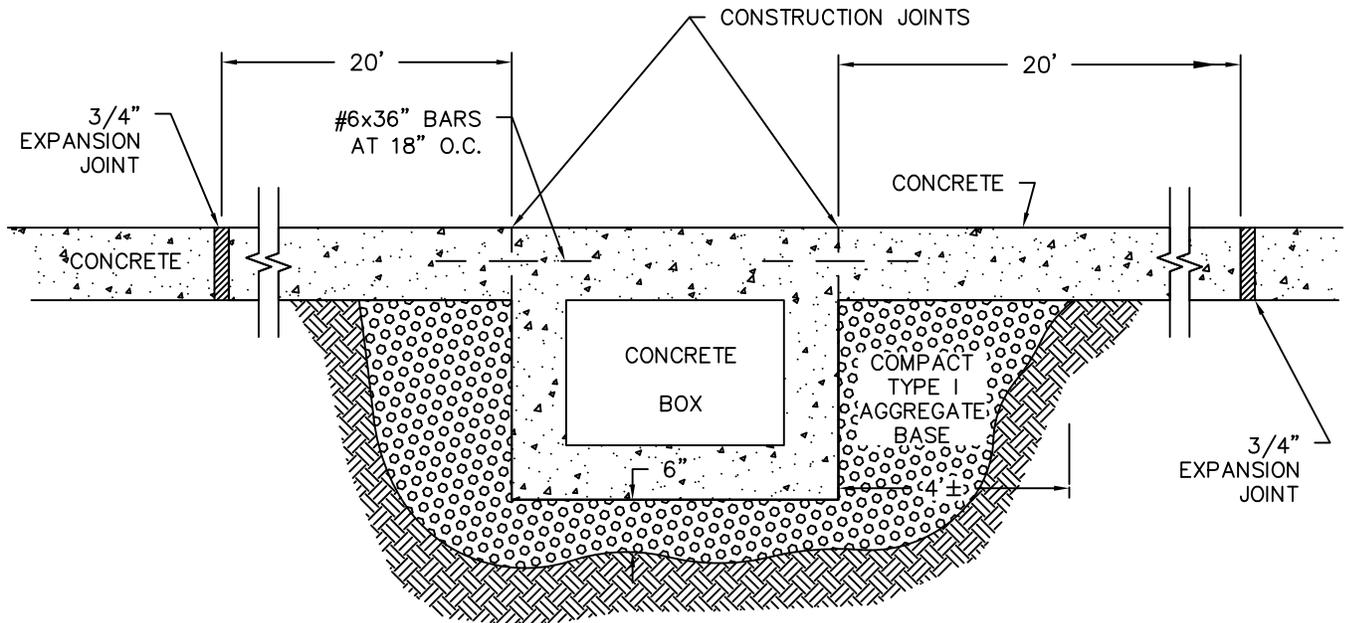
ELEVATION



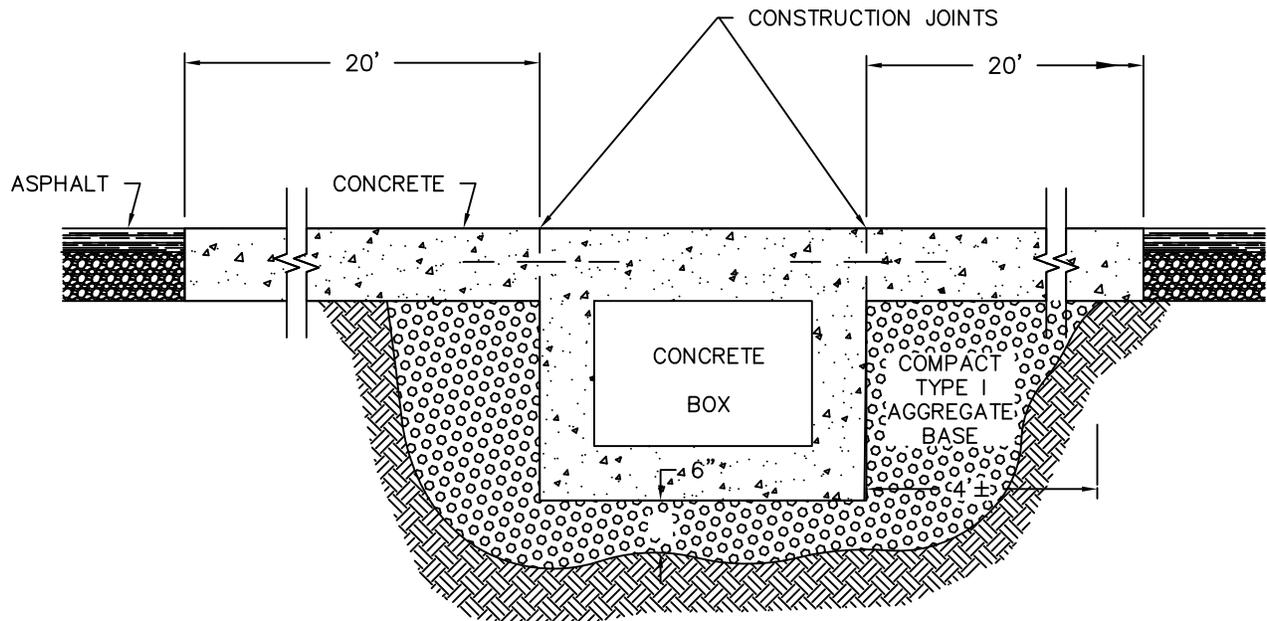
PLAN



ELEVATION

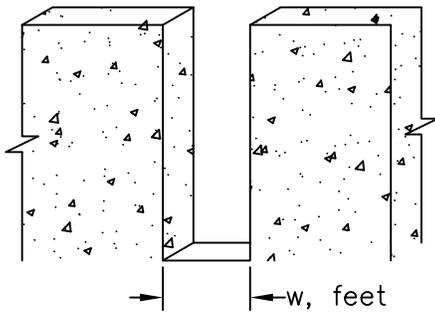


APPROACH TO CULVERT
CONCRETE PAVING

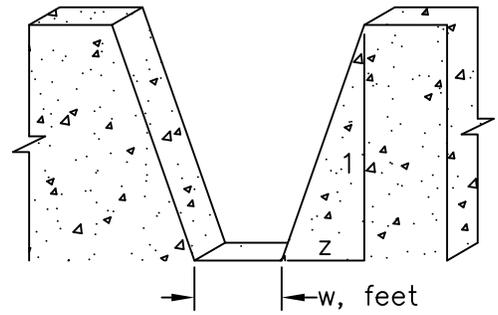


APPROACH TO CULVERT
ASPHALT PAVING

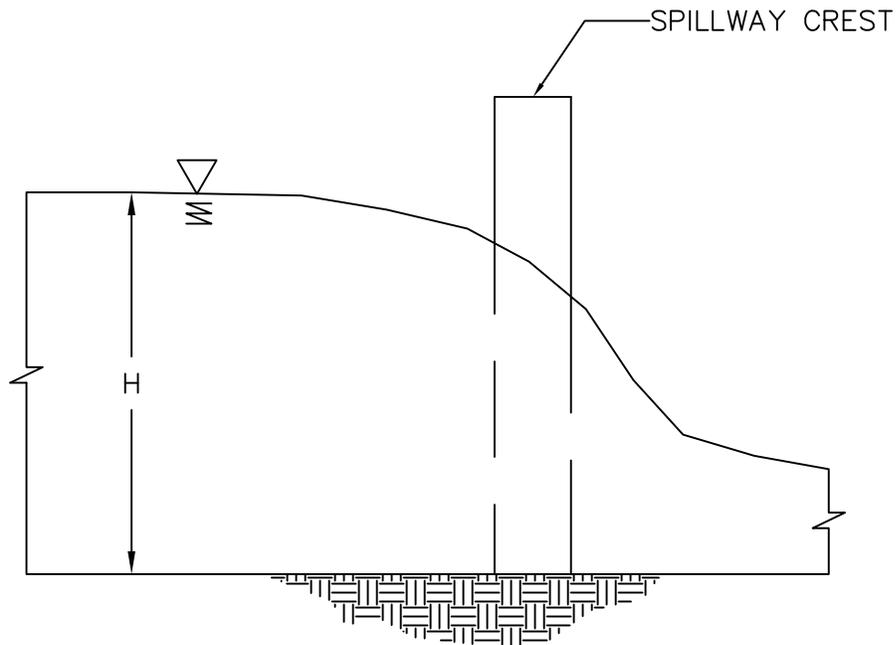
NOTE: PLACE 4' CLAY CAP ON STREET SIDE SLOPES AT EDGES OF CULVERT.



VERTICAL SLOT OUTLET



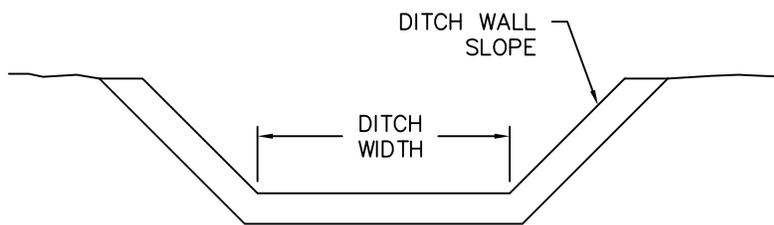
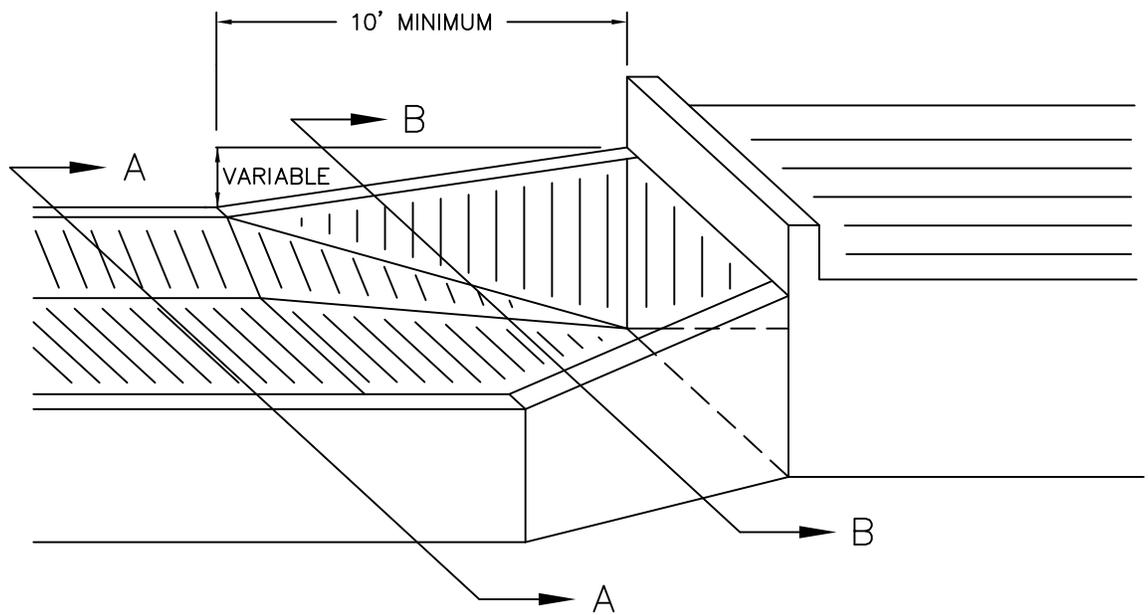
SLOPING SLOT OUTLET



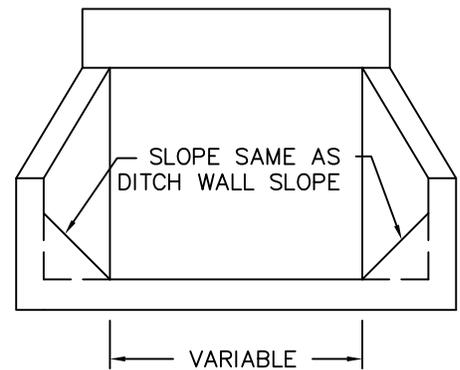
$$Q = 0.86H + (3.65w + 5.82z)H^{3/2}$$

WHERE :

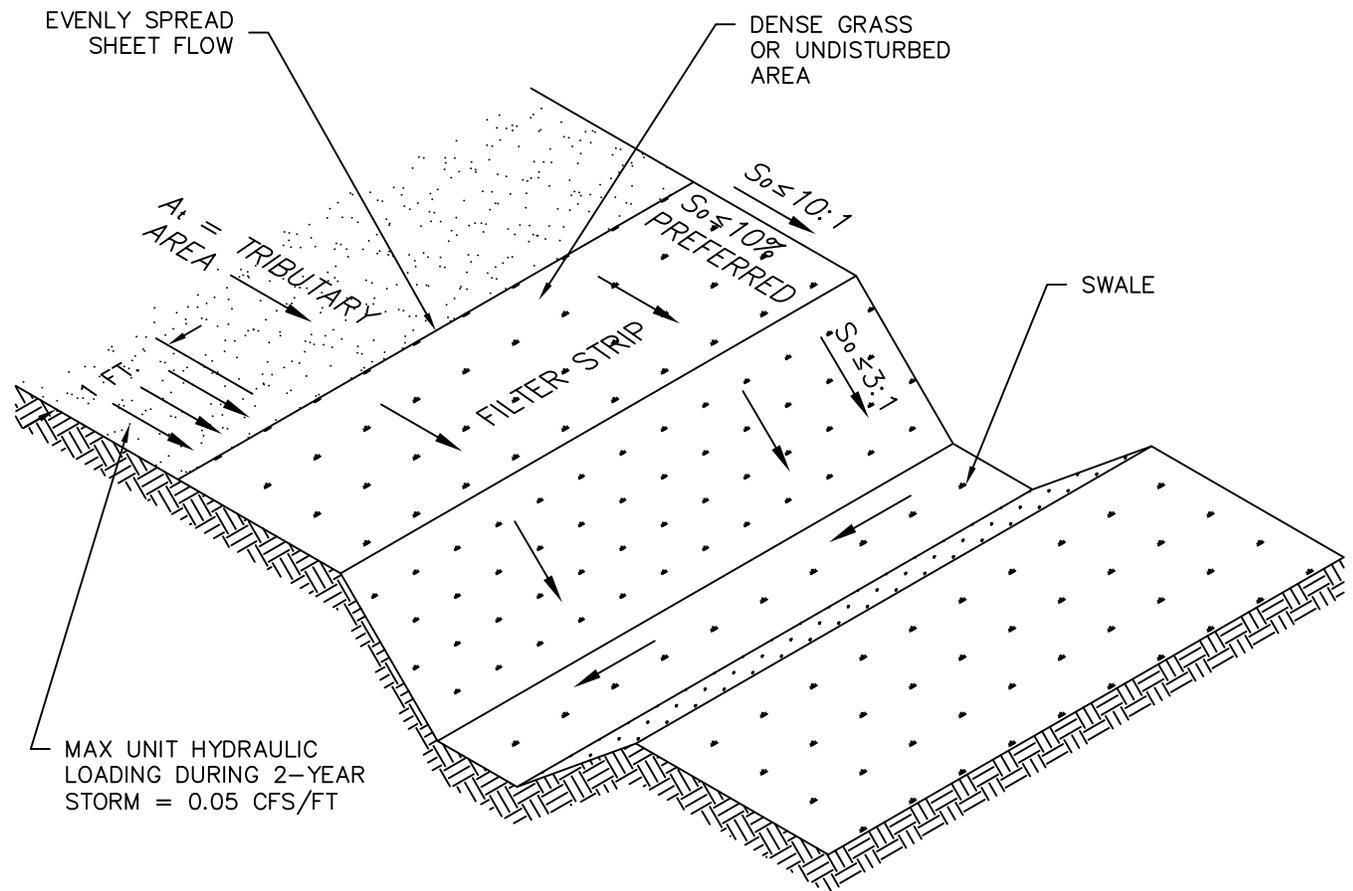
- Q = FLOWRATE IN CUBIC FEET PER SECOND.
- H = UPSTREAM HEAD (PONDED DEPTH ABOVE SLOT INVERT PLUS ANY VELOCITY HEAD) IN FEET.
- HEAD IS LIMITED TO A MAXIMUM OF SIX FEET.
- w = SLOT INVERT WIDTH PERPENDICULAR TO FLOW IN FEET.
- MINIMUM WIDTH OF 0.333 FEET AND MAXIMUM WIDTH OF 2.0 FEET.
- z = SLOPE OF SLOT SIDES EXPRESSED IN TERMS z HORIZONTAL:1 VERTICAL.
- MINIMUM z = 0.0 FEET MAXIMUM z OF 0.6.



SECTION A-A

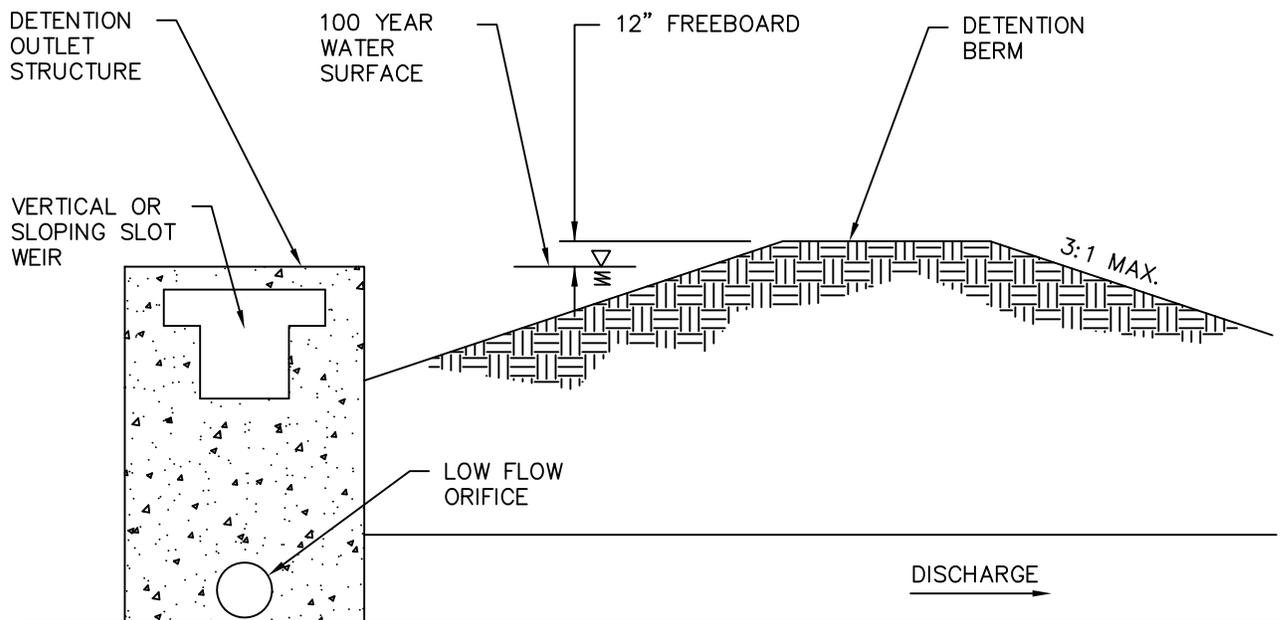


SECTION B-B



REFER TO SPRINGFIELD WATER QUALITY PROTECTION
POLICY FOR FURTHER DESIGN CRITERIA

ADAPTED FROM DENVER URBAN DRAINAGE & FLOOD
CONTROL DISTRICT – DRAINAGE CRITERIA MANUAL



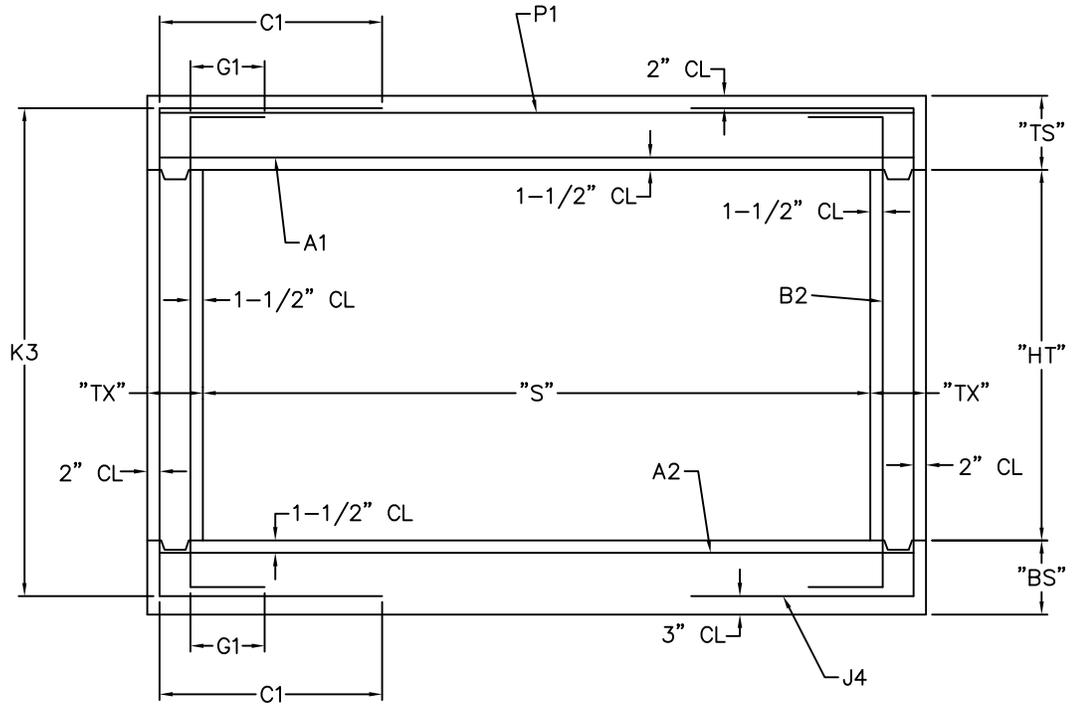
REFER TO SPRINGFIELD WATER QUALITY PROTECTION
POLICY FOR FURTHER DESIGN CRITERIA

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

VERTICAL BOX
DETENTION OUTLET

ADOPTED:

SS-14-D



TYPICAL SECTION TO BE COMPLETED AND SHOWN ON PLANS ALONG WITH LOCATION OF F BARS.

GENERAL NOTES:

1. ALL CULVERTS SHALL BE DESIGNED FOR HS20 LOADINGS USING CONCRETE, $f'_c = 4,000$ psi OR GREATER, REINFORCING STEEL (GRADE 60), $f_y = 60,000$ psi
2. LAP ALL LONGITUDINAL BARS A MINIMUM OF 23" AT SPLICES
3. ALL DIMENSIONS ARE TO BE SHOWN IN INCHES.
4. MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 1-1/2 INCHES UNLESS OTHERWISE SHOWN.
5. F BARS ARE TO BE A MINIMUM #4 WITH SPACING LABELED ON SECTION VIEW.
6. A FILTER CLOTH 3 FEET IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE TOP SLAB AND SIDEWALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SHALL BE SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER AND HAVING A GRAB TENSILE STRENGTH OF 180 LBS. (ASTM D-4632) AND AN APPARENT OF 50 TO 100 (ASTM D-4751). COST OF FURNISHING AND INSTALLING THE FILTER CLOTH WILL BE CONSIDERED COMPLETELY COVERED BY THE CONTRACT UNIT PRICE FOR OTHER ITEMS.
7. THE DESIGN SHALL SHOW AS A MINIMUM; THE DESIGN LOAD, DESIGN FILL HEIGHT, CONCRETE AND STEEL STRESS USED, AND THE FOLLOWING INFORMATION.

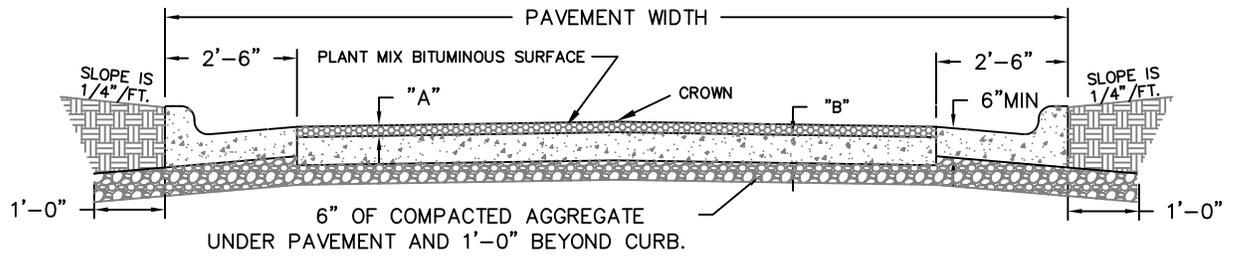
TABLE TO BE COMPLETED BY DESIGNER

BAR	SIZE	C to C	LENGTH
A1			
A2			
B2			
J4			
P1			
F			

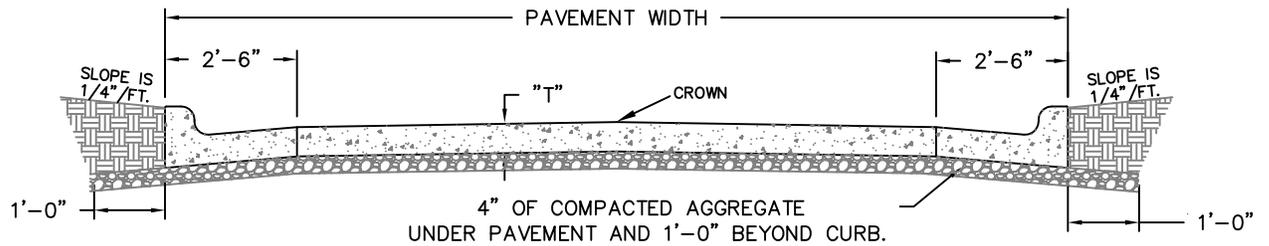
DESIGN LOAD _____

f'_c _____

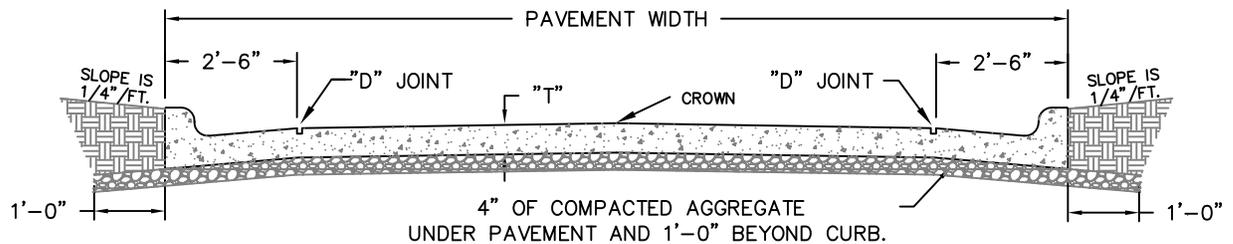
f_y _____



BITUMINOUS PAVEMENT WITH CONCRETE CURB & GUTTER



PORTLAND CEMENT CONCRETE PAVEMENT AND CONCRETE CURB & GUTTER



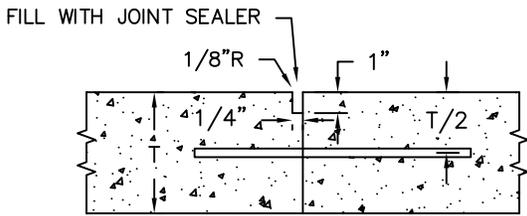
PORTLAND CEMENT CONCRETE PAVEMENT WITH INTEGRAL CURB

STANDARD PAVEMENT WIDTH AND THICKNESS			
STREET TYPE	"T"	"A"	"B"
ALLEY/LOCAL	6"	2"	5"
COLLECTOR	6"	2"	6"
SECONDARY ARTERIAL	7"	2"	8"
PRIMARY ARTERIAL	8"	2"	9"

NOTES: CROSS SLOPE SHALL BE 1/4"/FT. ON ALL PAVEMENTS EXCEPT ALLEYS, SEE STANDARD DRAWING ST-4.

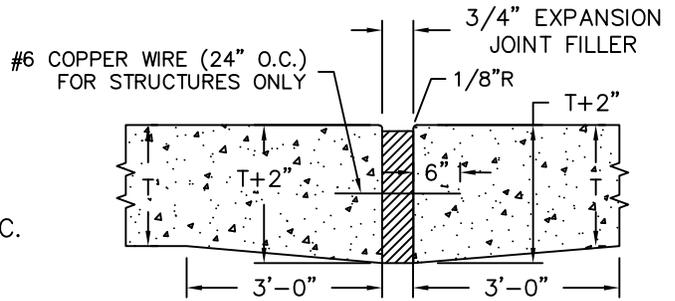
WIDTH OF PAVEMENT IS SUBJECT TO REQUIREMENTS OF THE PLANNING DEPARTMENT AND MAY VARY FROM THE STANDARDS.

TO CREATE A GUTTER SECTION THE CONTRACTOR SHALL FORM A 2" RISE 2' FROM THE INSIDE OF THE CURB. PAVEMENT WIDTH WILL BE MEASURED FROM BACK OF CURBS ON IMPROVED STREETS. PAVEMENT CROWN SHOULD BE CENTERED IN RIGHT OF WAY.

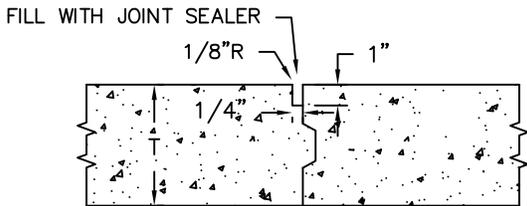


DOWELED LONGITUDINAL JOINT WITH 24" No.6 DEFORMED BAR AT 24" O.C.

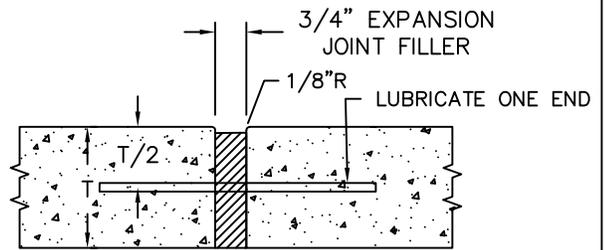
TYPE "A"



EXPANSION JOINT TYPE "E"

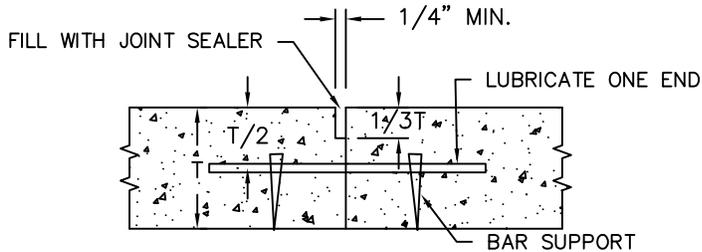


KEYED LONGITUDINAL JOINT TYPE "B"



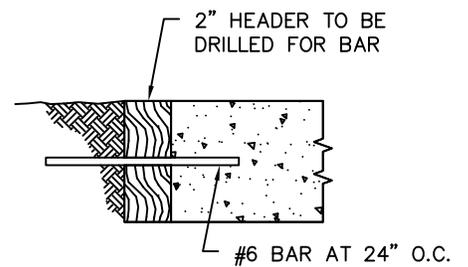
DOWELED EXPANSION JOINT 3/4" x 15" DOWEL BAR AT 24" O.C.

TYPE "F"

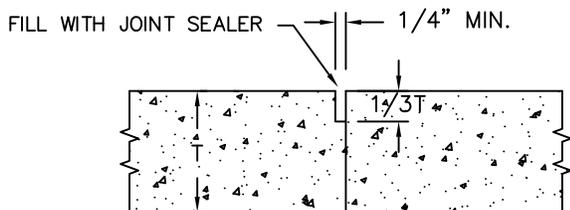


SAWED CONTRACTION JOINT WITH 1" x 18" DOWEL BAR AT 24" O.C.

TYPE "C"

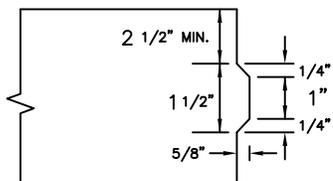


CONSTRUCTION HEADER CONCRETE



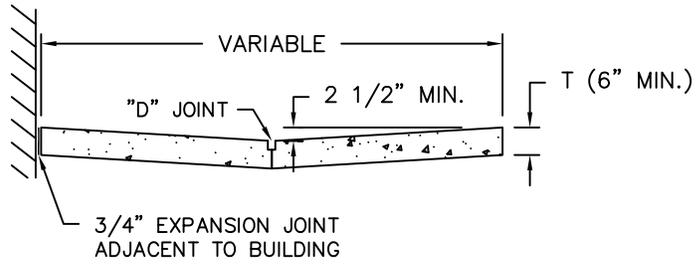
SAWED CONTRACTION JOINT TYPE "D"

DEPTH OF SAW JOINT: 1/3 OF PAVEMENT THICKNESS

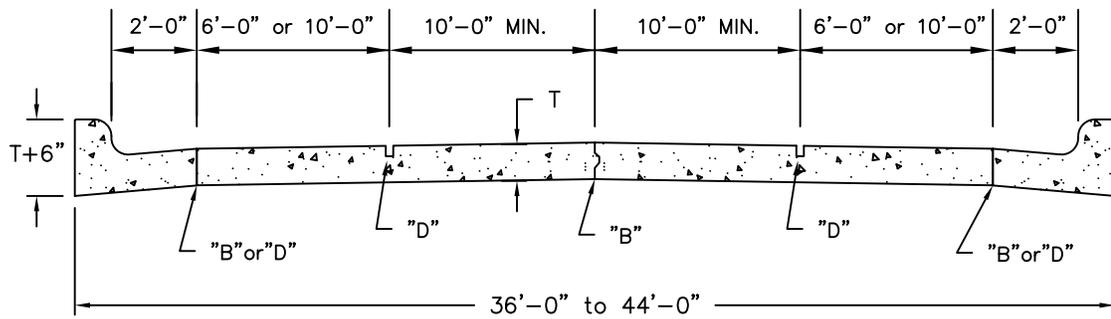
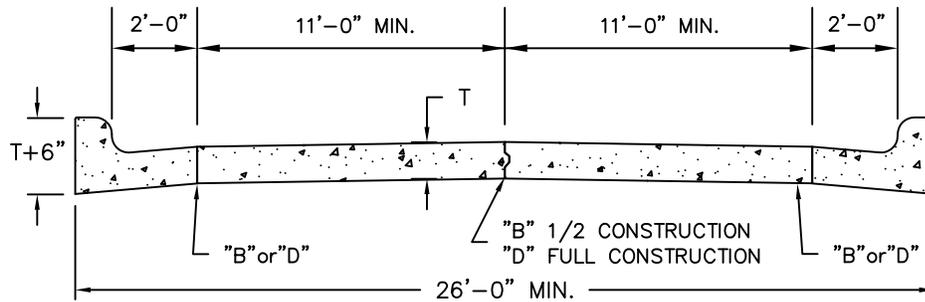


DETAIL KEY

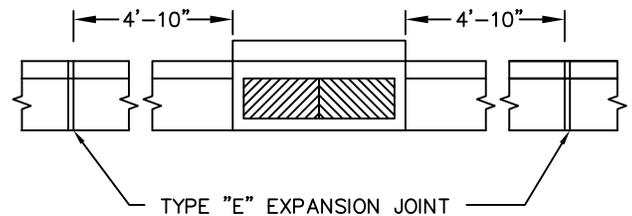
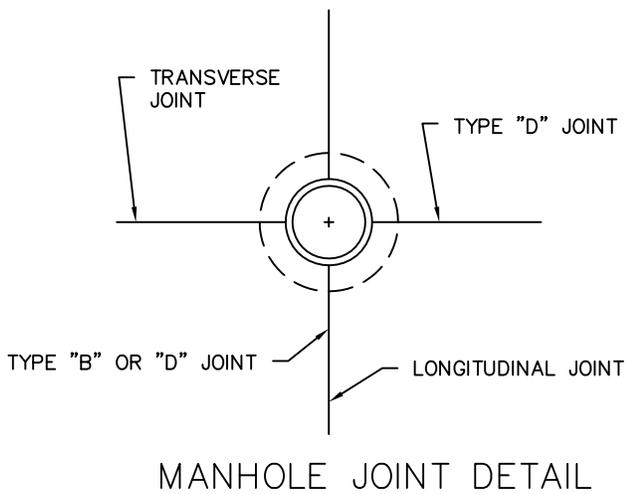
KEYWAY FORMED BY FASTENING KEY TO FORM



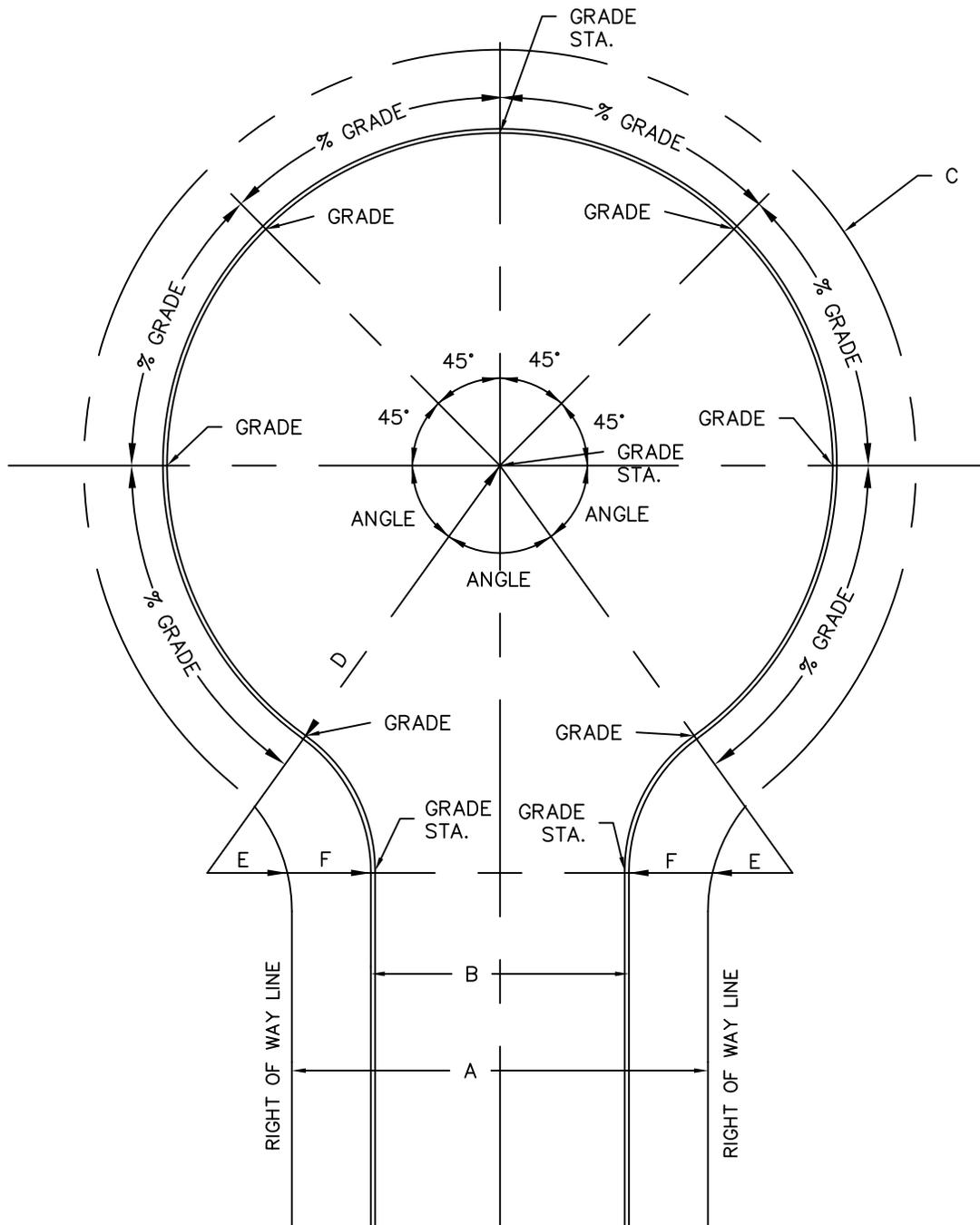
TYPICAL ALLEY SECTION



CONCRETE PAVEMENT – JOINT LOCATIONS



JOINT LOCATION AT INLETS



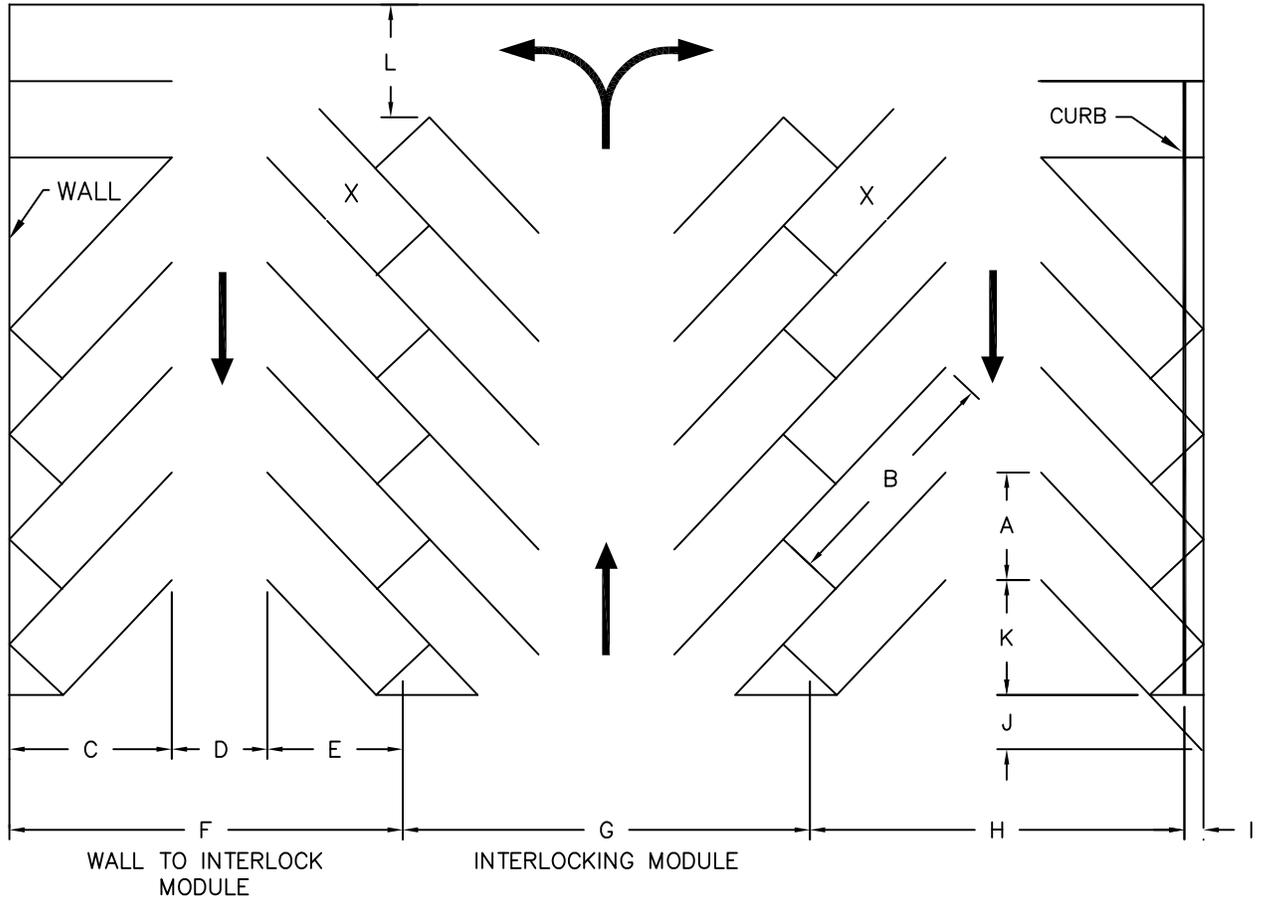
MINIMUM DIMENSIONS (FEET)

DESCRIPTION	KEY	STANDARD	INDUSTRIAL
STREET RIGHT-OF-WAY WIDTH	A	50	60
STREET PAVEMENT WIDTH TO BACK OF CURB	B	27	37
CUL-DE-SAC RIGHT-OF-WAY RADIUS	C	60	75
CUL-DE-SAC PAVEMENT RADIUS TO BACK OF CURB	D	48.5	63.5
INTERNAL CURVE, RIGHT-OF-WAY RADIUS	E	20	20
INTERNAL CURVE, BACK OF CURB RADIUS	F	31.5	31.5

NOTE: MAXIMUM LENGTH OF CUL-DE-SAC SHALL BE 800 FEET.

MINIMUM REQUIREMENTS FOR LAYOUT ELEMENTS

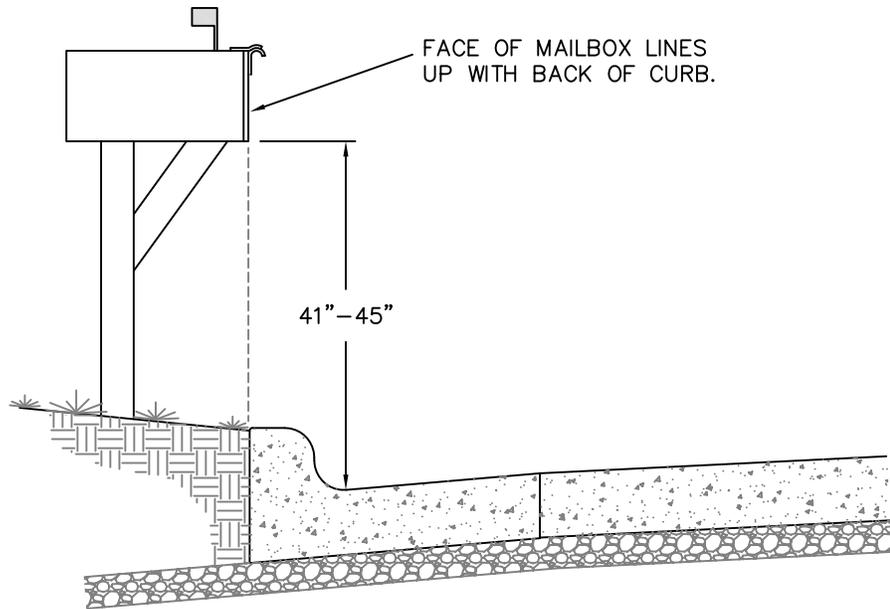
X DENOTES THAT STALL NOT ACCESSIBLE IN CERTAIN LAYOUTS



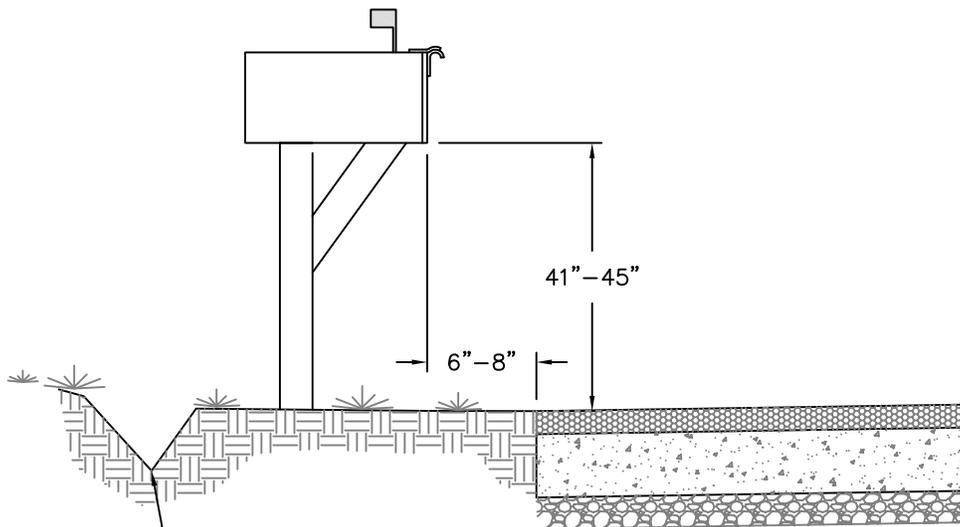
PARKING LAYOUT DIMENSIONS (IN FEET) FOR 9 FT. STALLS AT VARIOUS ANGLES

DIMENSION	SYMBOL	90°	75°	60°	45°	30°
STALL WIDTH, PARALLEL TO AISLE	A	9.0	9.3	10.4	12.7	18.0
STALL LENGTH OF LINE	B	18.5	20.0	22.0	25.0	34.1
STALL DEPTH TO WALL	C	18.5	19.5	19.0	17.5	17.1
AISLE WIDTH BETWEEN STALL LINES	D	26.0	23.0	16.0	12.0	10.0
STALL DEPTH, INTERLOCK	E	18.5	18.8	17.5	15.3	13.2
MODULE, WALL TO INTERLOCK	F	63.0	61.3	52.5	44.8	40.3
MODULE, INTERLOCKING	G	63.0	61.0	51.0	42.6	36.4
MODULE, INTERLOCK TO CURB FACE	H	60.5	58.8	50.2	42.8	38.8
BUMPER OVERHANG (TYPICAL)	I	2.5	2.5	2.3	2.0	1.5
OFFSET	J	0.0	0.5	2.7	6.3	13.5
SETBACK	K	0.0	5.0	8.3	11.0	16.0
CROSS AISLE, ONE-WAY	L	14.0	14.0	14.0	14.0	14.0
CROSS AISLE, TWO-WAY	-	24.0	24.0	24.0	24.0	24.0

NOTE: ANY PARKING LAYOUT OTHER THAN SHOWN MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER.

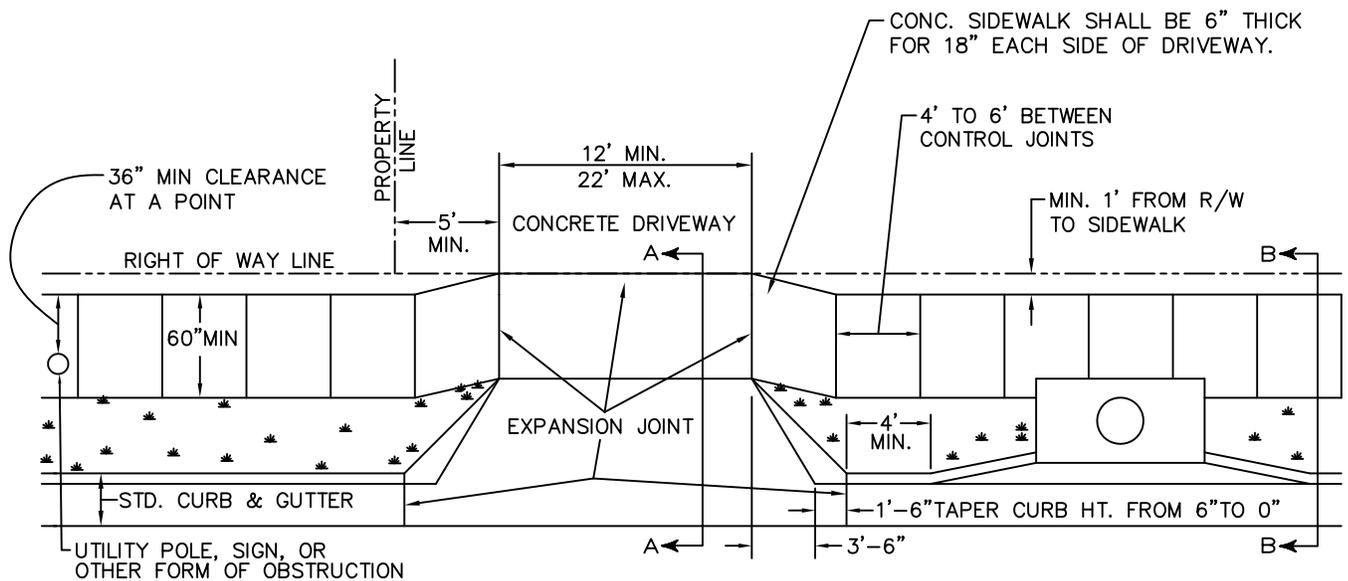


IMPROVED STREETS



UNIMPROVED STREETS

NOTE:
DITCH SECTION BEHIND MAILBOX
WITH A PEDESTRIAN CROSSING.

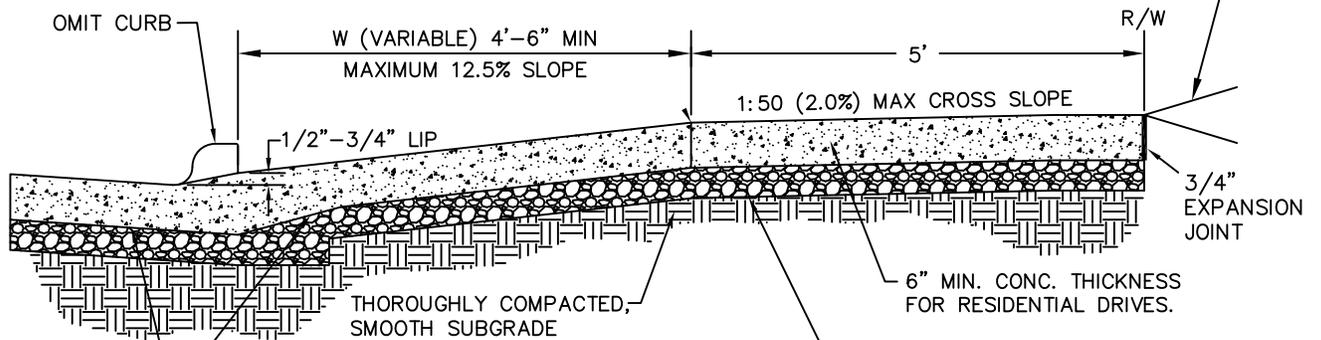


TYPICAL DRIVEWAY PLAN VIEW

NOTE:

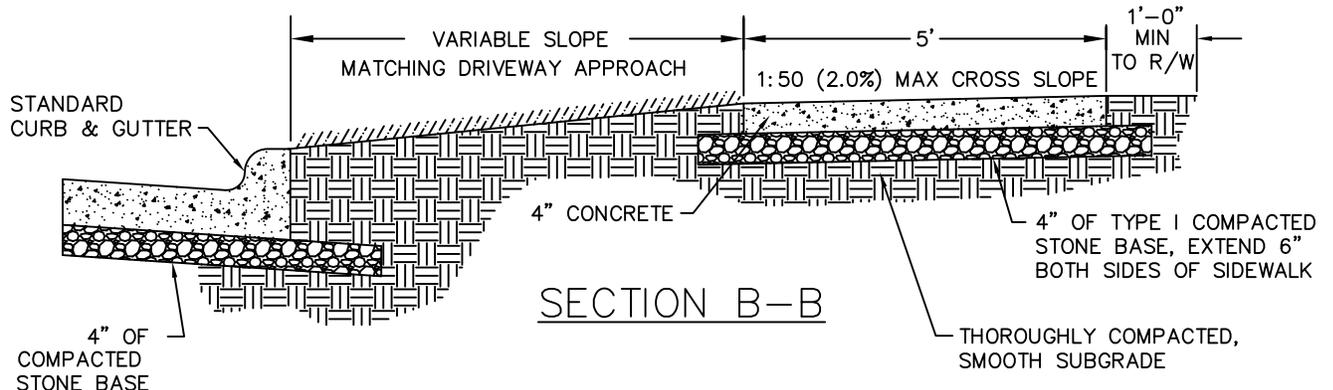
ANY PART OF AN ACCESSIBLE ROUTE WITH A RUNNING SLOPE GREATER THAN 1:20 SHALL BE CONSIDERED A RAMP AND SHALL COMPLY WITH THOSE REGULATIONS.

SLOPE VARIES -3% TO 12% WITHIN 10' OF RIGHT OF WAY. THE ELEVATION AT THE RIGHT OF WAY LINE SHALL BE A MINIMUM OF 6" ABOVE THE FLOWLINE OF THE GUTTER

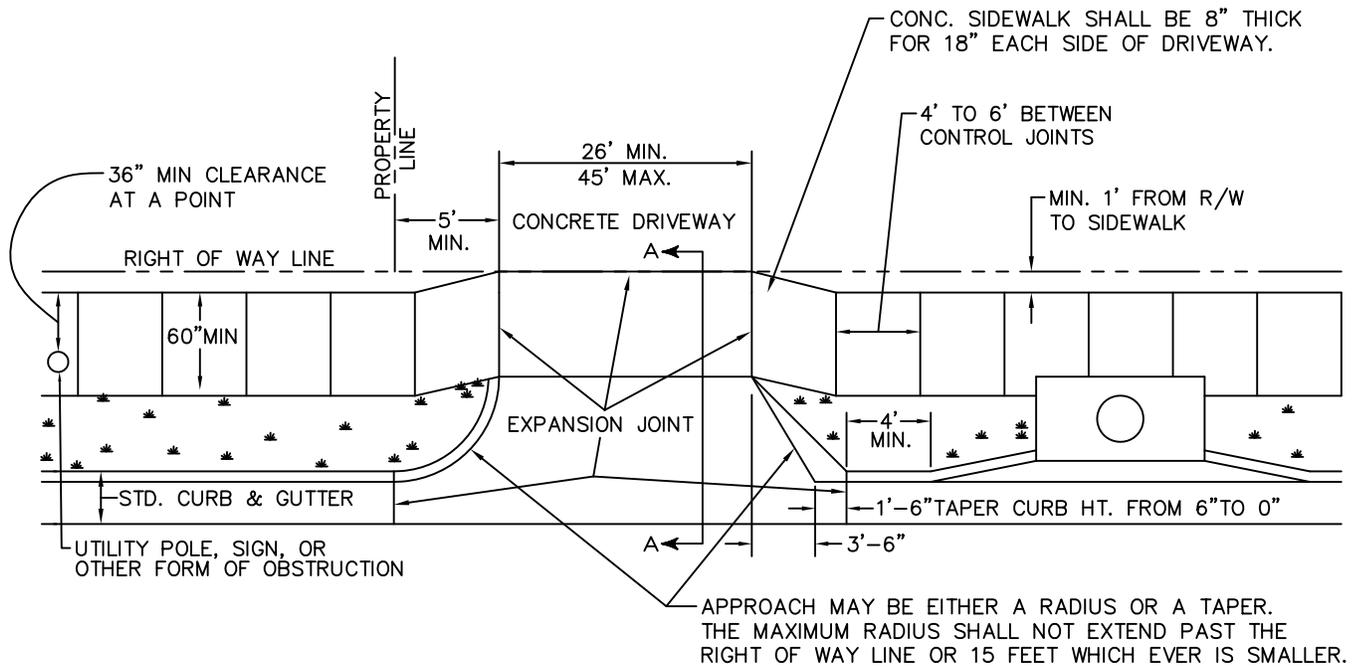


SECTION A-A

NOTE:
GUTTER SECTION AND DRIVEWAY TO BE BE POURED MONOLITHIC.



SECTION B-B

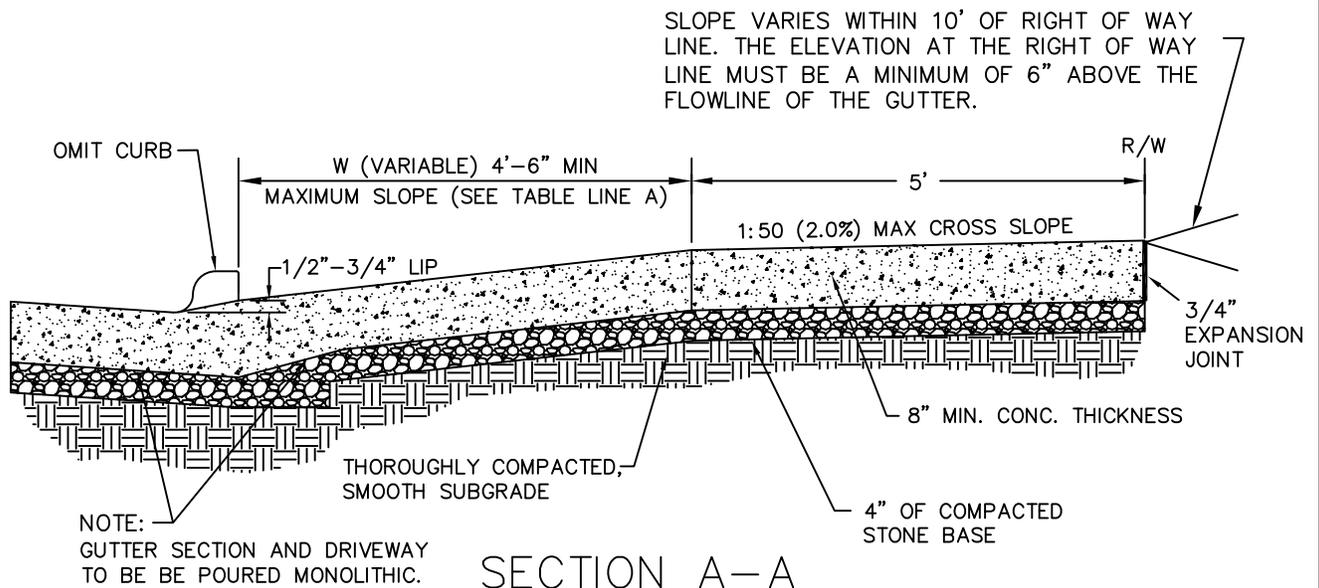


TYPICAL DRIVEWAY PLAN VIEW

NOTE:

ANY PART OF AN ACCESSIBLE ROUTE WITH A RUNNING SLOPE GREATER THAN 1:20 SHALL BE CONSIDERED A RAMP AND SHALL COMPLY WITH THOSE REGULATIONS.

	REQUIRED DRIVEWAY GRADES			
	MAJOR ARTERIAL	SECONDARY ARTERIAL	COLLECTOR	NON-RESIDENTIAL LOCAL
A. DRIVEWAY APPROACH GRADE	1/4in/ft to 1/2in/ft	1/4in/ft to 5/8in/ft	1/4in/ft to 3/4in/ft	1/4in/ft to 1in/ft
B. MAXIMUM CHANGE OF GRADE AT BACK OF SIDEWALK	4%	5%	6%	8%
C. SLOPE WITHIN 10 FEET OF RIGHT-OF-WAY LINE	-2% to 6% 1/4in/ft to 3/4in/ft	-3% to 7% -3/8in/ft to 7/8in/ft	-4% to 8% -1/2in/ft to 1in/ft	-6% to 10% -3/4in/ft to 1-1/4in/ft

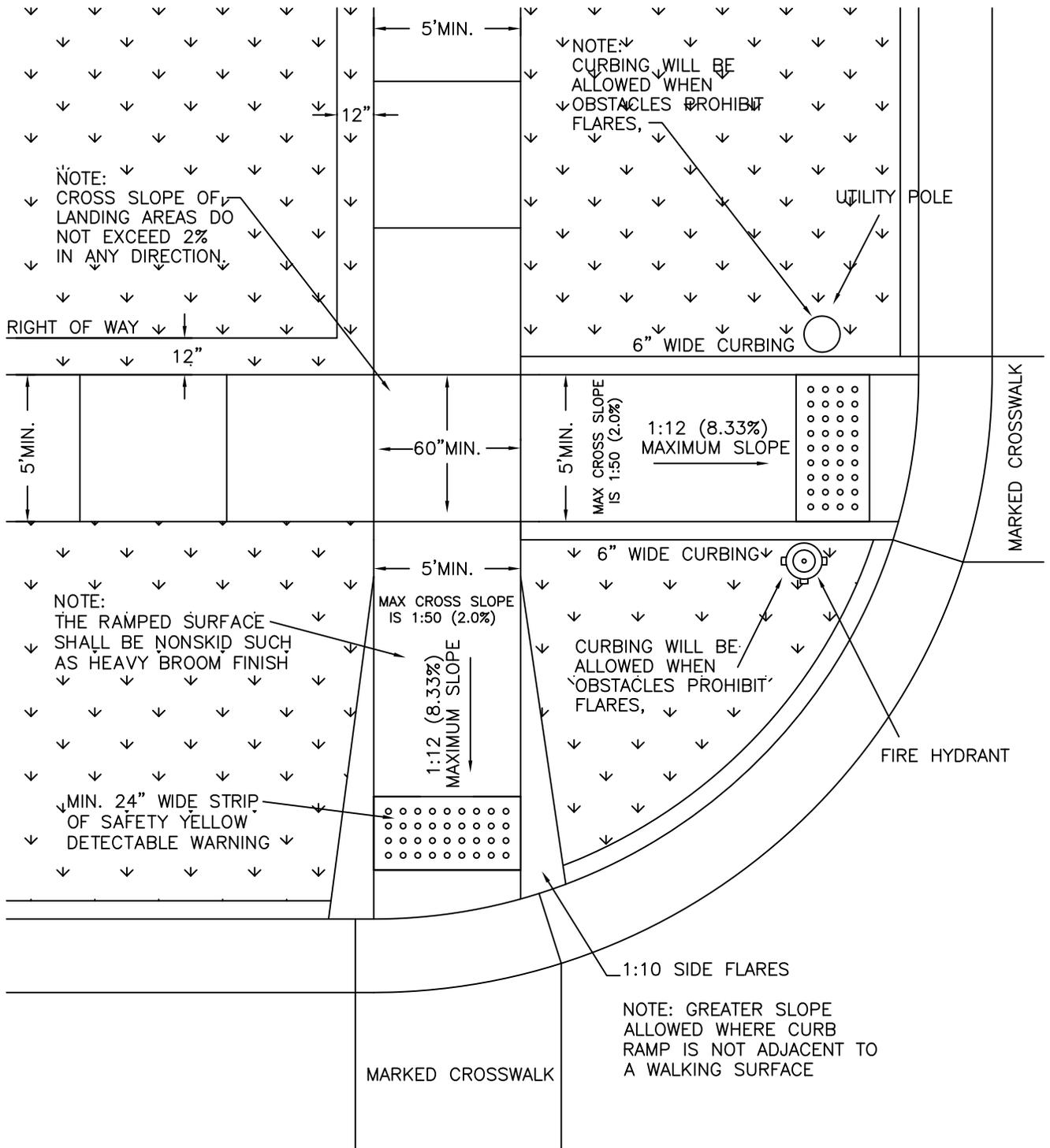


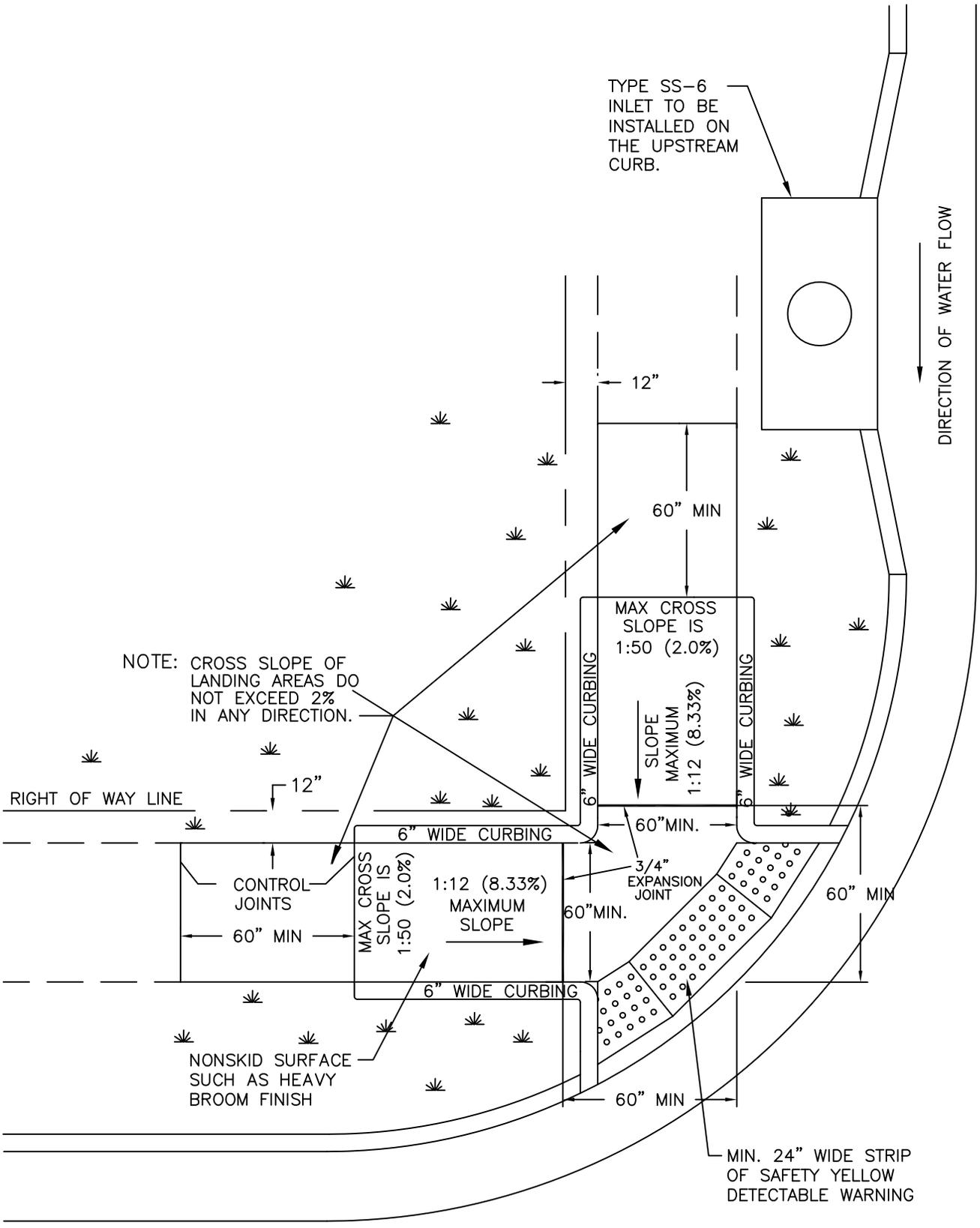
REVISED: 10-17-05; REMOVED REINFORCEMENT REQUIREMENTS.

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

TYPICAL COMMERCIAL
DRIVEWAY & SIDEWALK

REVISED: 7/1/2013
ST-9



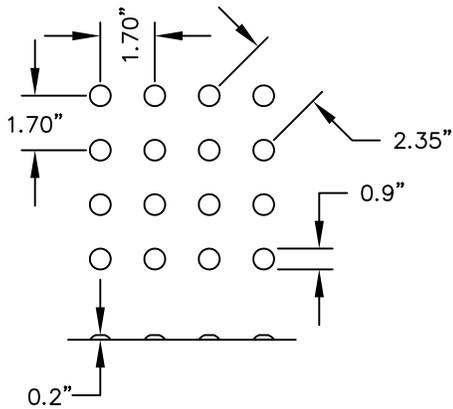
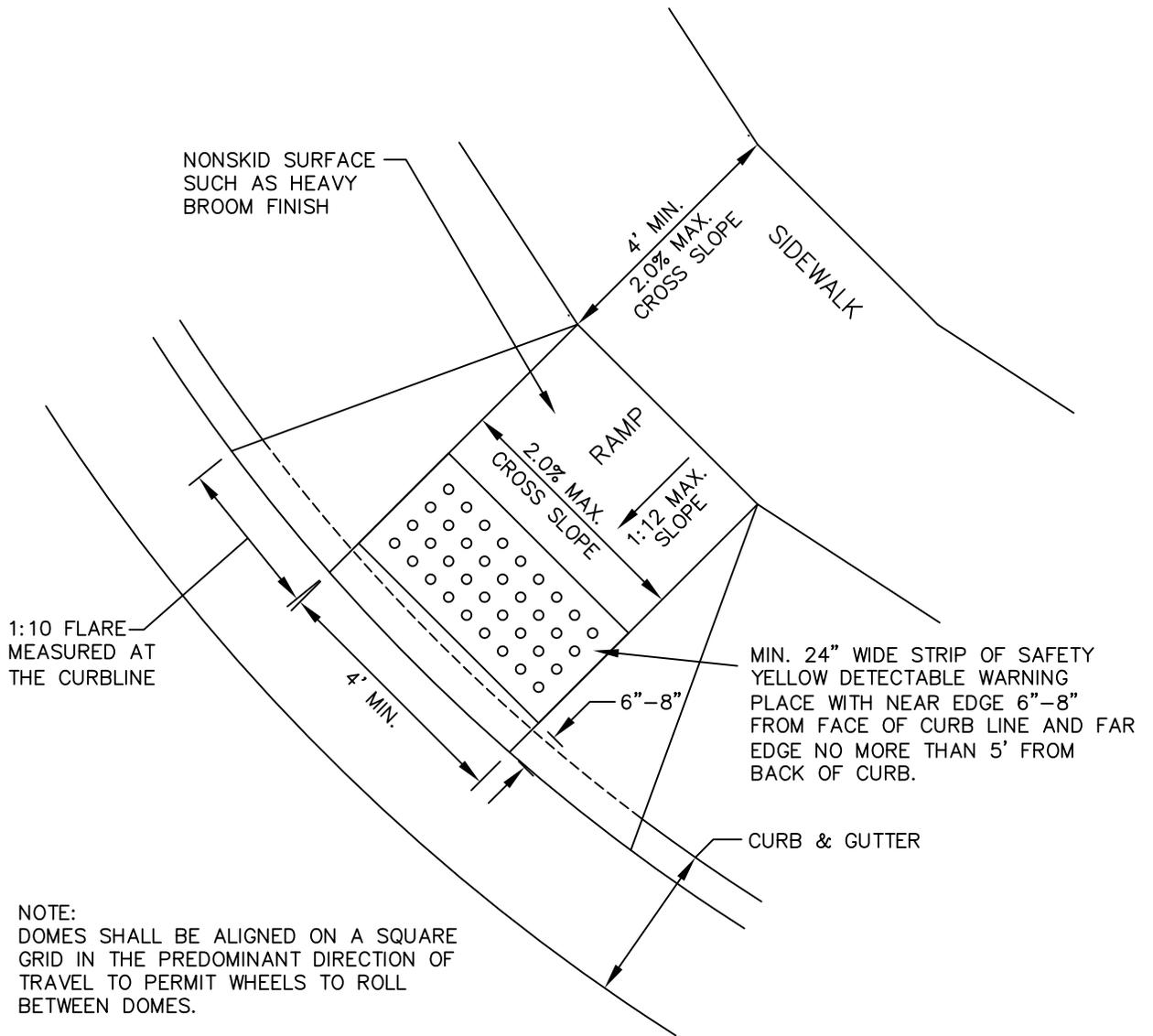


NOTE: CROSS SLOPE OF LANDING AREAS DO NOT EXCEED 2% IN ANY DIRECTION.

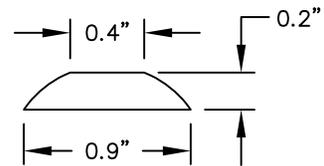
RIGHT OF WAY LINE

NONSKID SURFACE SUCH AS HEAVY BROOM FINISH

NOTE: USE CURB RAMP STYLE II WHEN DISTANCE FROM FACE OF CURB AND THE RIGHT OF WAY LINE IS LESS THAN AN ALLOWABLE DISTANCE TO INSTALL A CURB RAMP TYPE I WITH A 1:12 (8.33%) RUNNING SLOPE.



DOMES SPACING



DOMES SECTION

SAW CUT EDGE AFTER
EXCAVATION AND BACKFILL
ARE COMPLETED

8" CONCRETE

1"x18" DOWEL BAR
AT 24" O.C.

EXISTING PAVEMENT

12" MIN.

UNDISTURBED
EARTH

KEEP TRENCH WIDTH AS
NARROW AS POSSIBLE

THOROUGHLY COMPACTED
GRANULAR BACKFILL

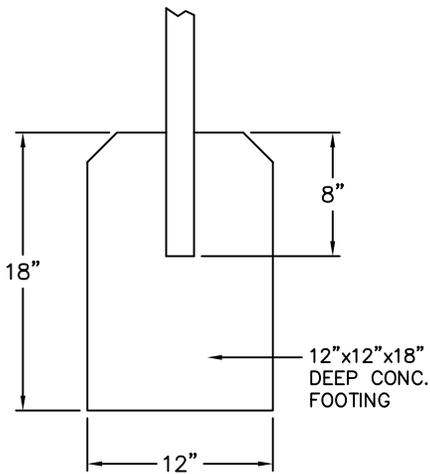
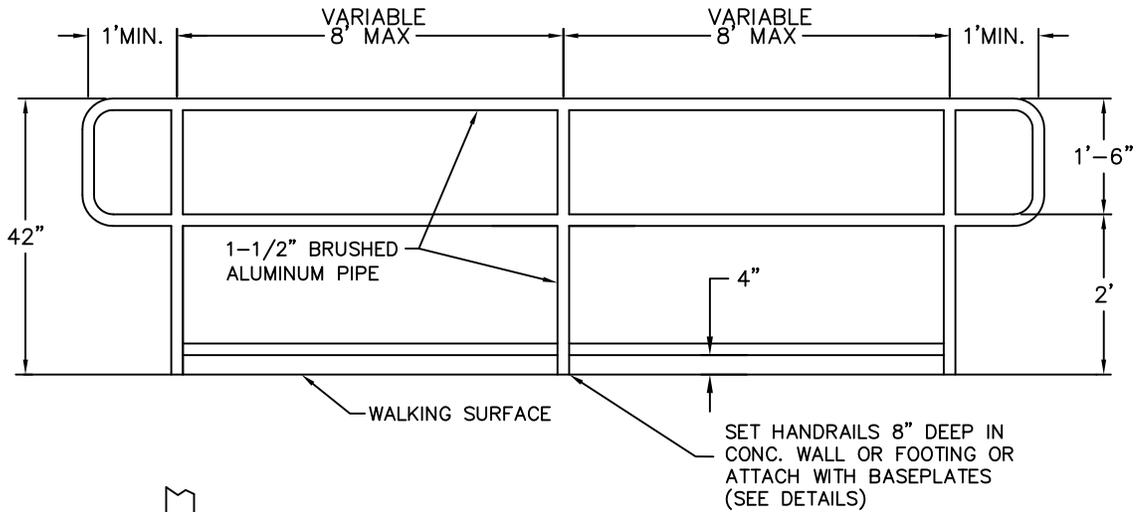
PIPE

SAW CUT FOR
EXCAVATION

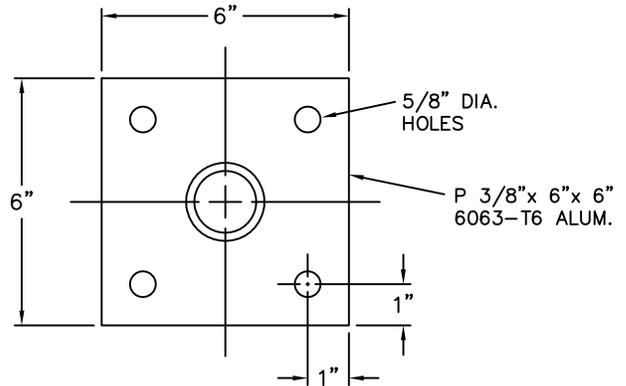
NOTES:

*OMIT DOWEL BARS WHEN REPAIRING ASPHALT PAVEMENT

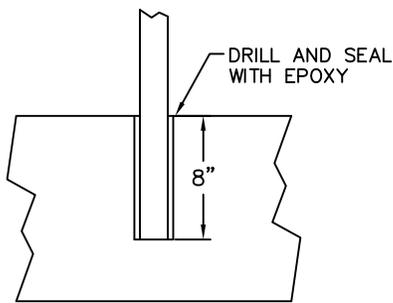
*REPAIR SHALL CONFORM TO ALL CONSTRUCTION JOINT REQUIREMENTS



CONC. FOOTING DETAIL



BASEPLATE DETAIL



HEADWALL DETAIL

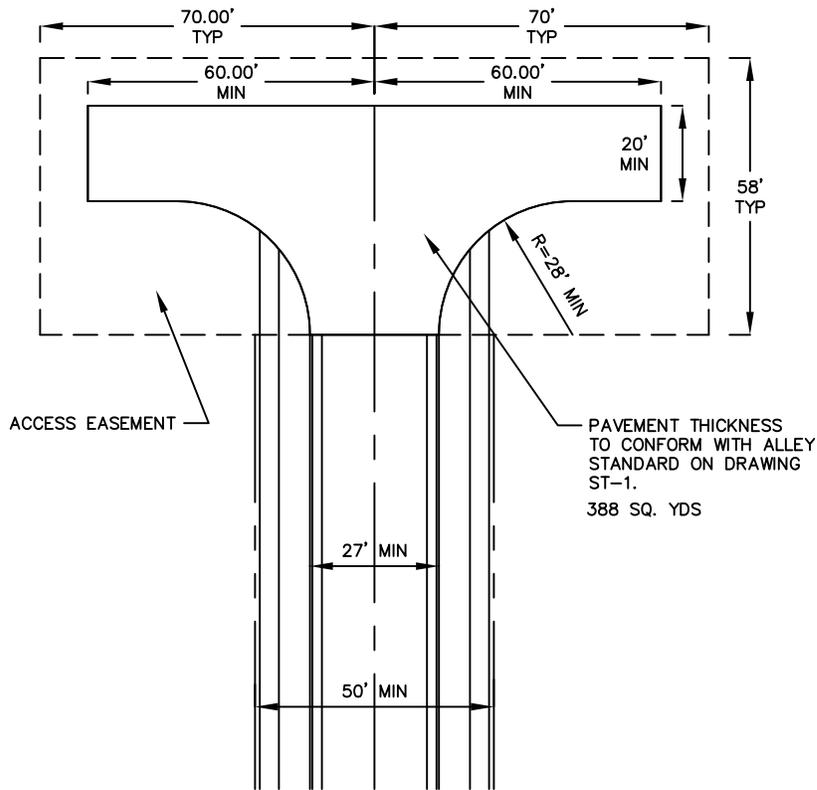
RAILING & POST SPECIFICATIONS		
TYPE	SIZE (DIA.)	WEIGHT (LBS./FT.)
ROUND	1-1/2"	ALUMINUM 0.940

GENERAL NOTES:

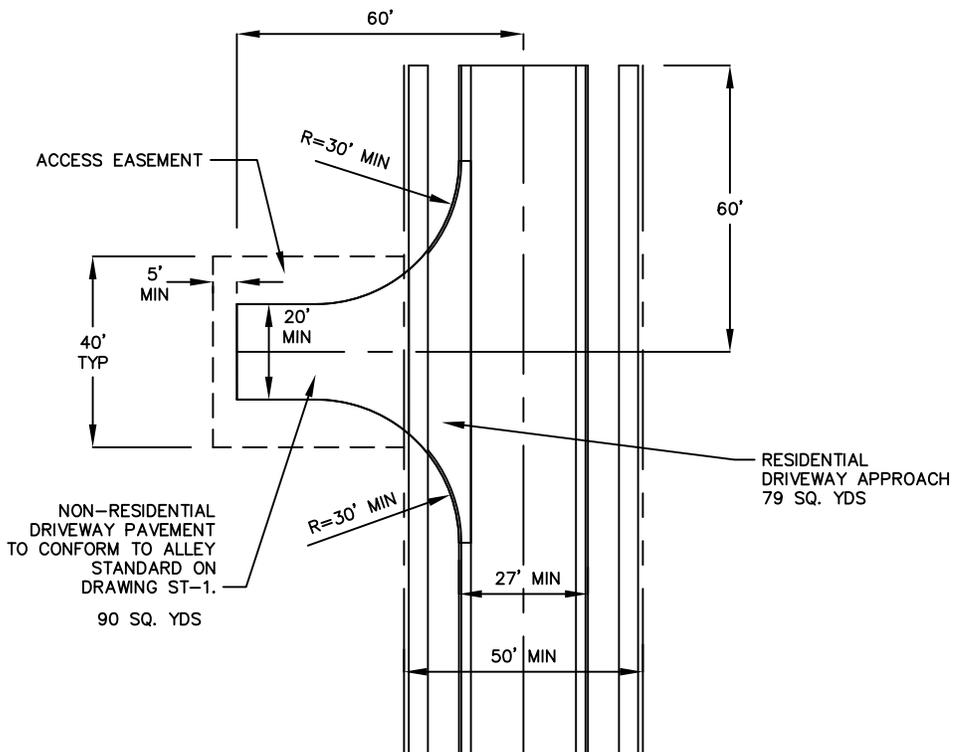
RAILINGS, POSTS, AND BASEPLATES SHALL BE ALUMINUM ALLOY 6061-T6 OR 6063-T6.

IF PRE-MANUFACTURED HANDRAIL COMPONENTS ARE TO BE USED, PRIOR APPROVAL IS REQUIRED.

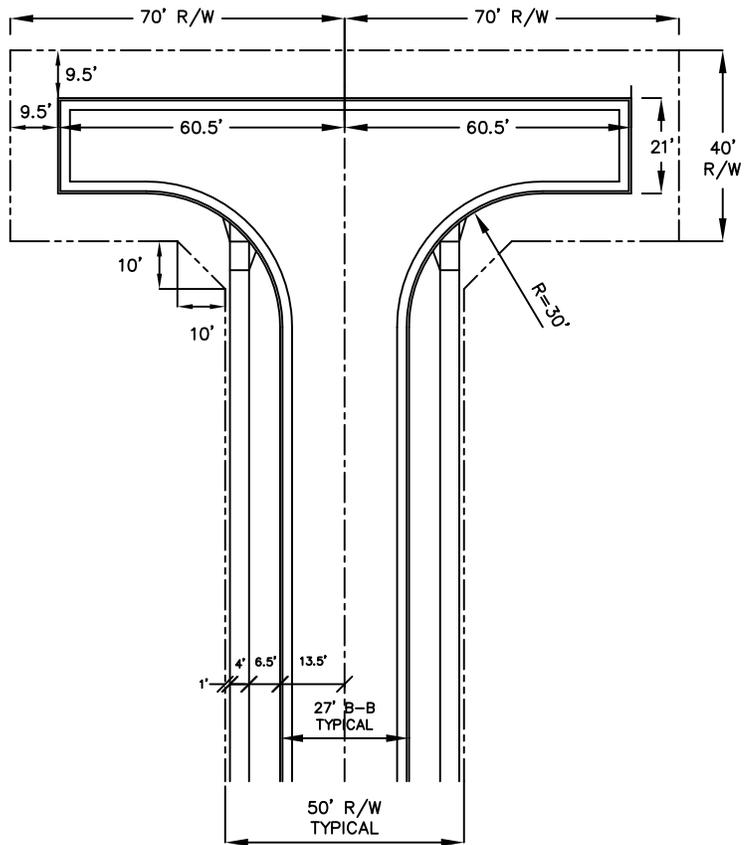
ALL JOINTS SHALL BE CONTINUOUS WELDED.



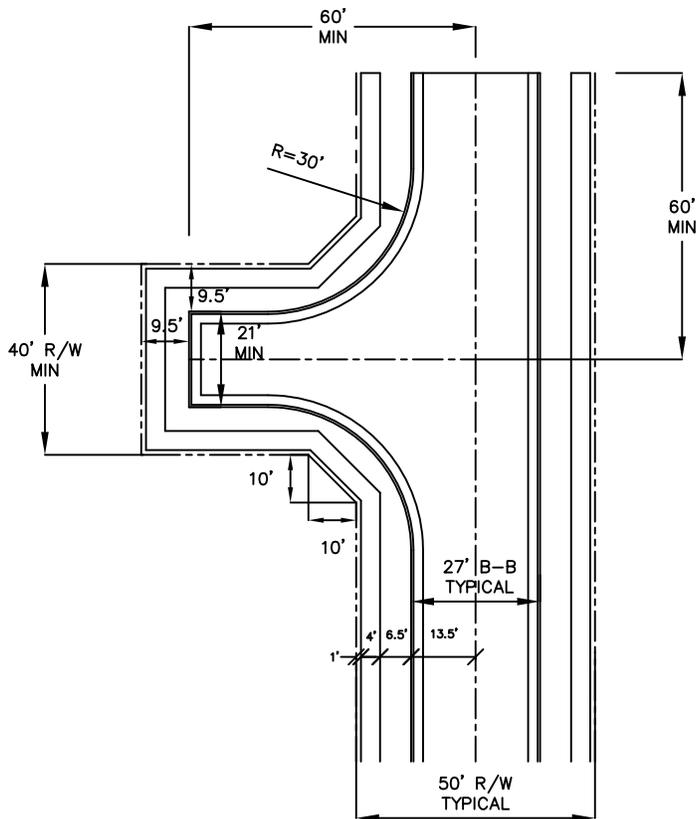
"T" TYPE



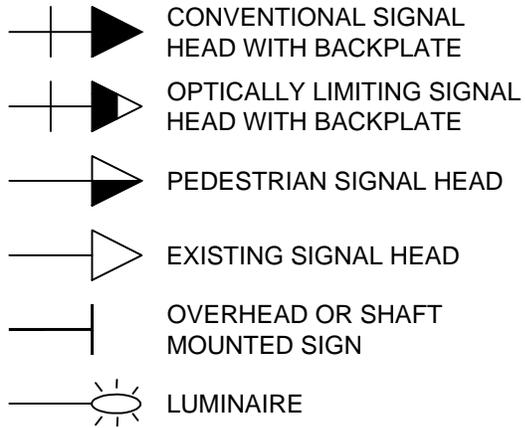
"BRANCH" TYPE



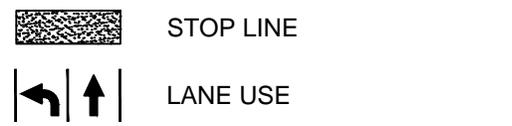
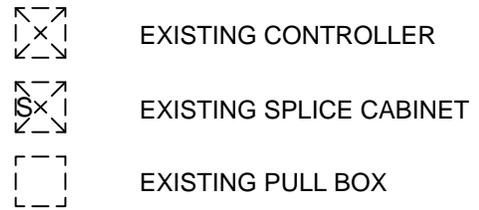
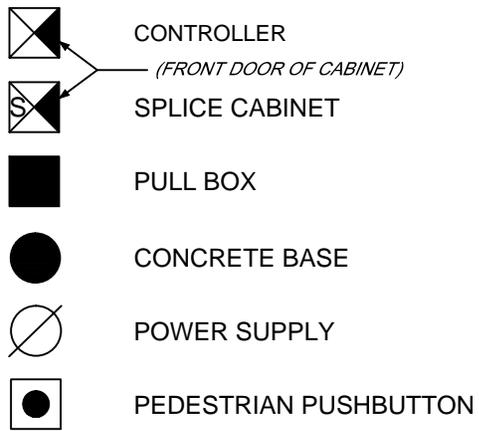
" T " TYPE



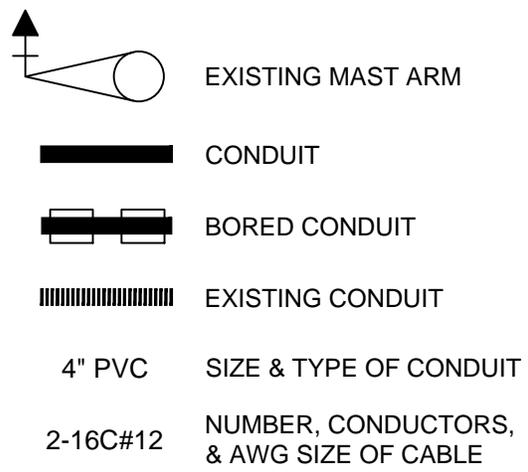
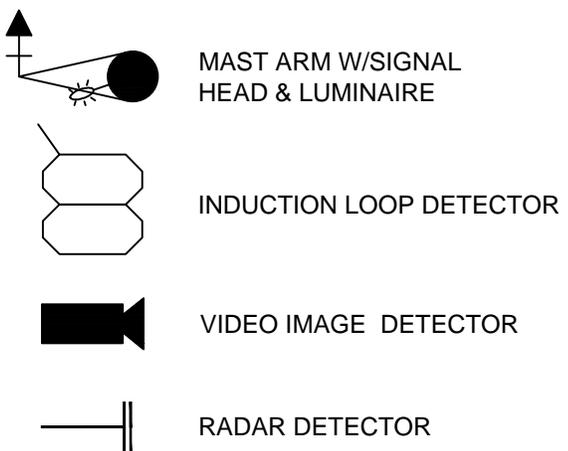
" BRANCH " TYPE



R RED BALL*
 Y YELLOW BALL*
 G GREEN BALL*
 YL YELLOW LEFT ARROW*
 L GREEN LEFT ARROW*
 W WALK (MAN SYMBOL)
 DW DON'T WALK (HAND SYMBOL)



EXISTING CONTROLLER
 EXISTING SPLICE CABINET
 EXISTING PULL BOX
 EXISTING CONCRETE BASE
 21 SIGNAL FACE NUMBER
 2 POST NUMBER
 21 DETECTOR NUMBER
 2 PULL BOX NUMBER



* - ALL 12" LENS WITH TUNNEL VISOR

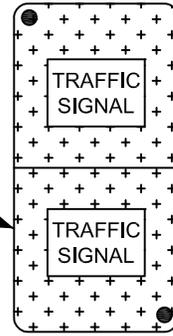
NOT TO SCALE

Stainless steel or brass
Penta-head bolts
(2 required)



Type I & II

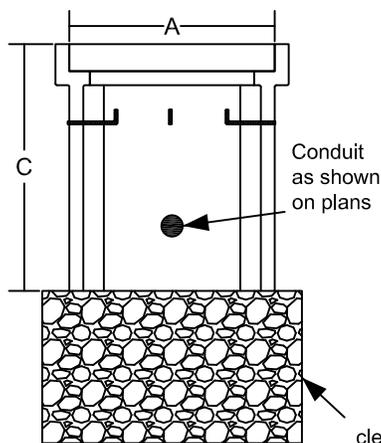
Skid resistant
surface



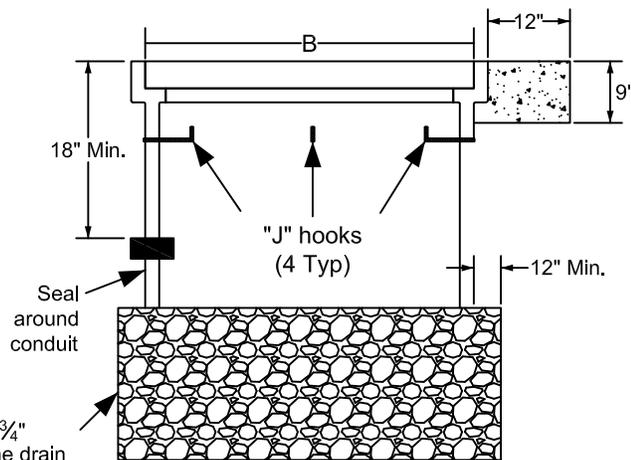
Type III

Two piece
interlocking
cover

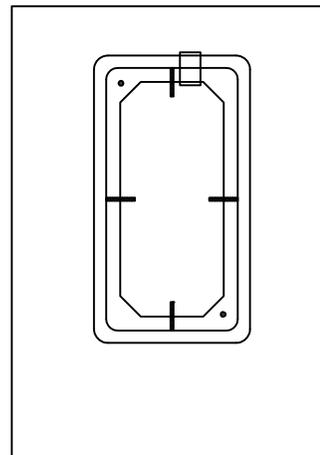
Stainless steel or brass
Penta-head bolts
(2 minimum)



$\frac{1}{2}$ " or $\frac{3}{4}$ "
clean stone drain
18" deep min.



DIMENSIONS			
	TYPE I	TYPE II	TYPE III
A	17"	24"	30"
B	30"	36"	48"
C	24"	24"	36"

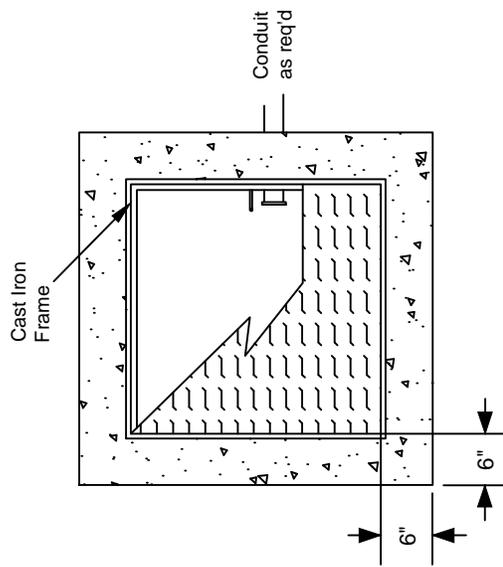
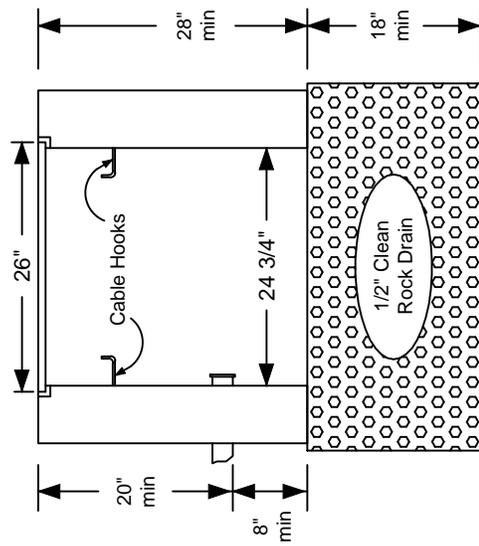
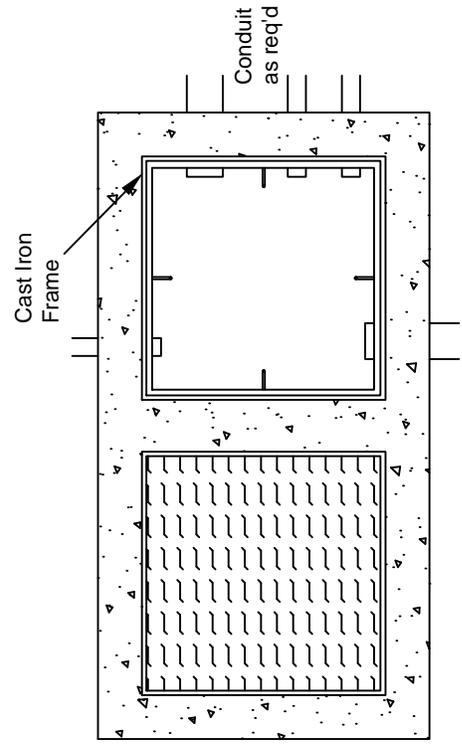
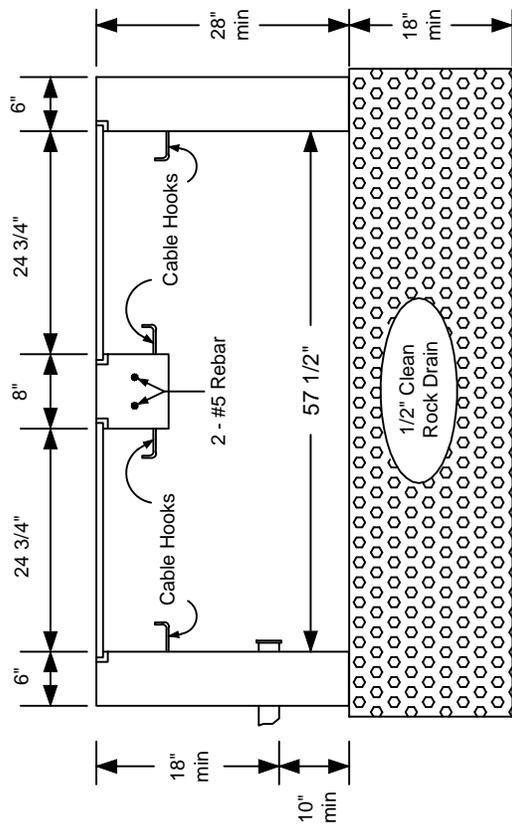
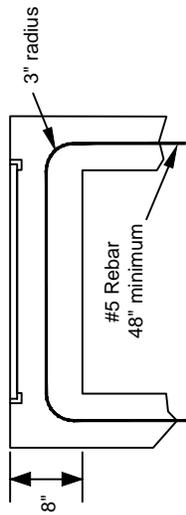


9" Thick concrete
pad 12" all sides

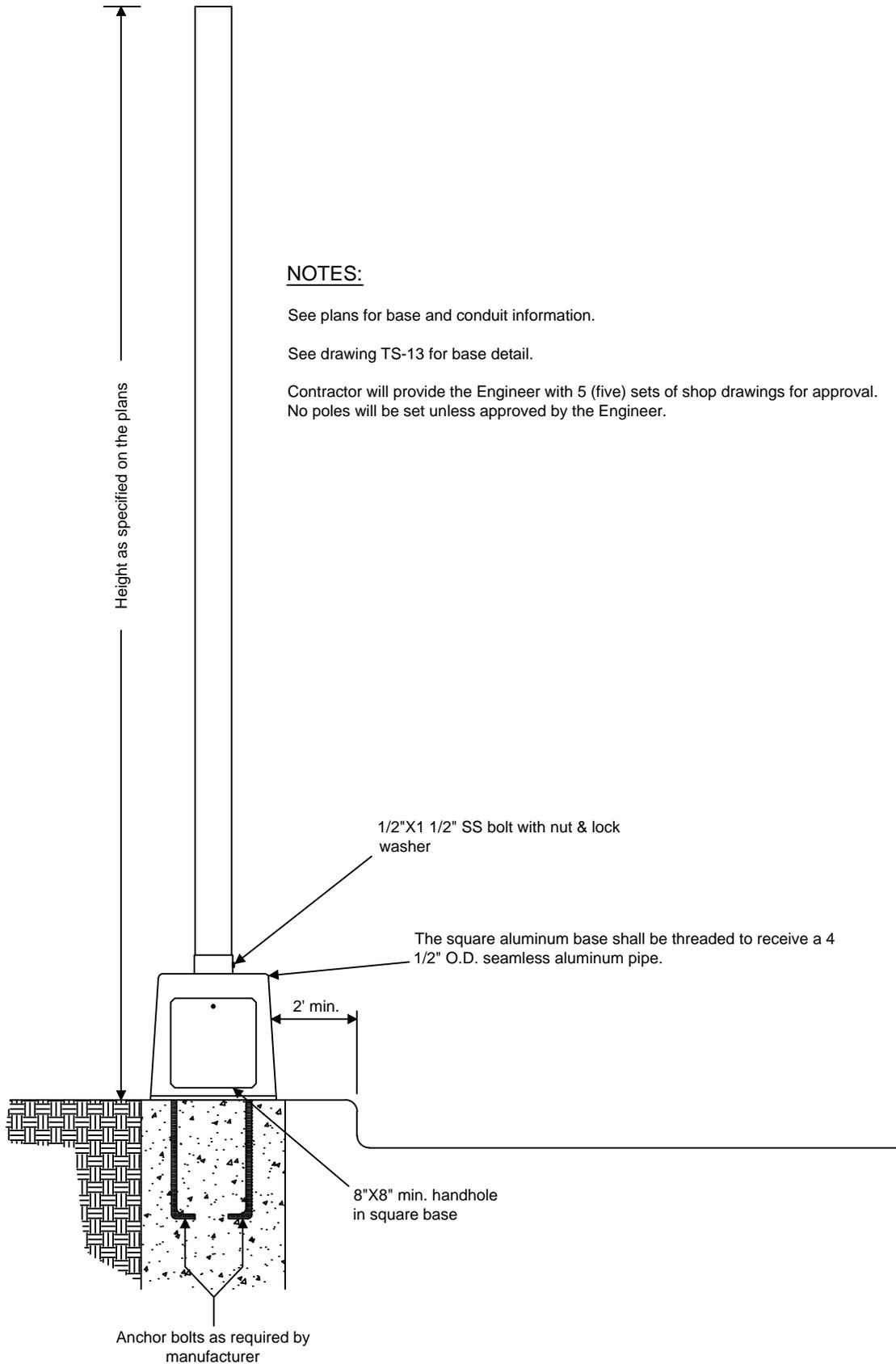
Notes:

1. Preformed pull boxes shall be used unless otherwise specified on the plans.
2. Lift opening is required on all covers.
3. All dimensions are nominal.
4. If extensions are needed, they shall be compatible and from the same manufacturer.

NOT TO SCALE



NOT TO SCALE



NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

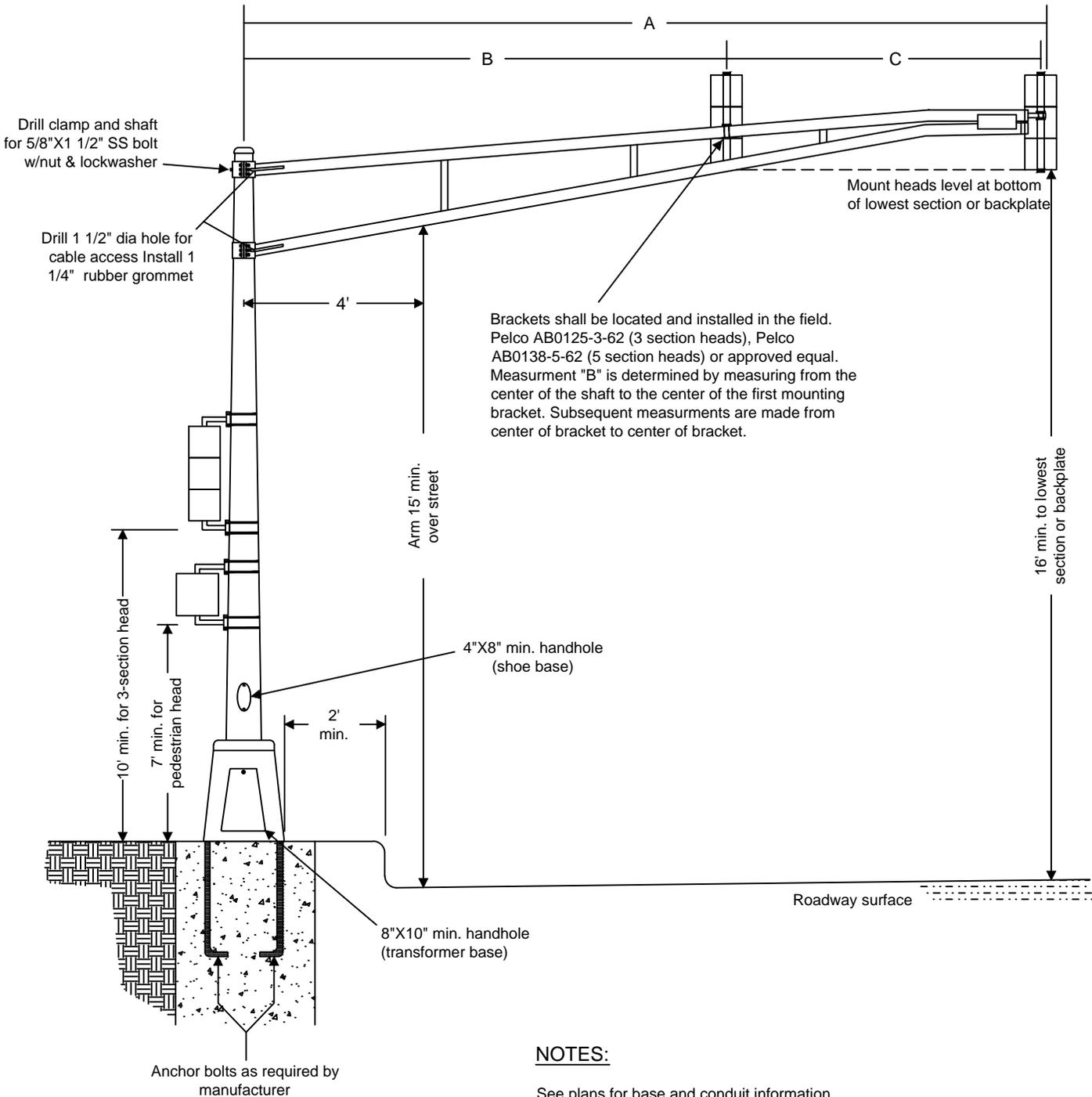
ALUMINUM PEDESTAL

ADOPTED:

TS-4

TYPE A

See plans for arm length and signal spacing details



NOTES:

See plans for base and conduit information.

A transformer base will be provided with Mast Arms 25' or less in length. Mast arms greater than 25' require shafts equipped with a shoe base.

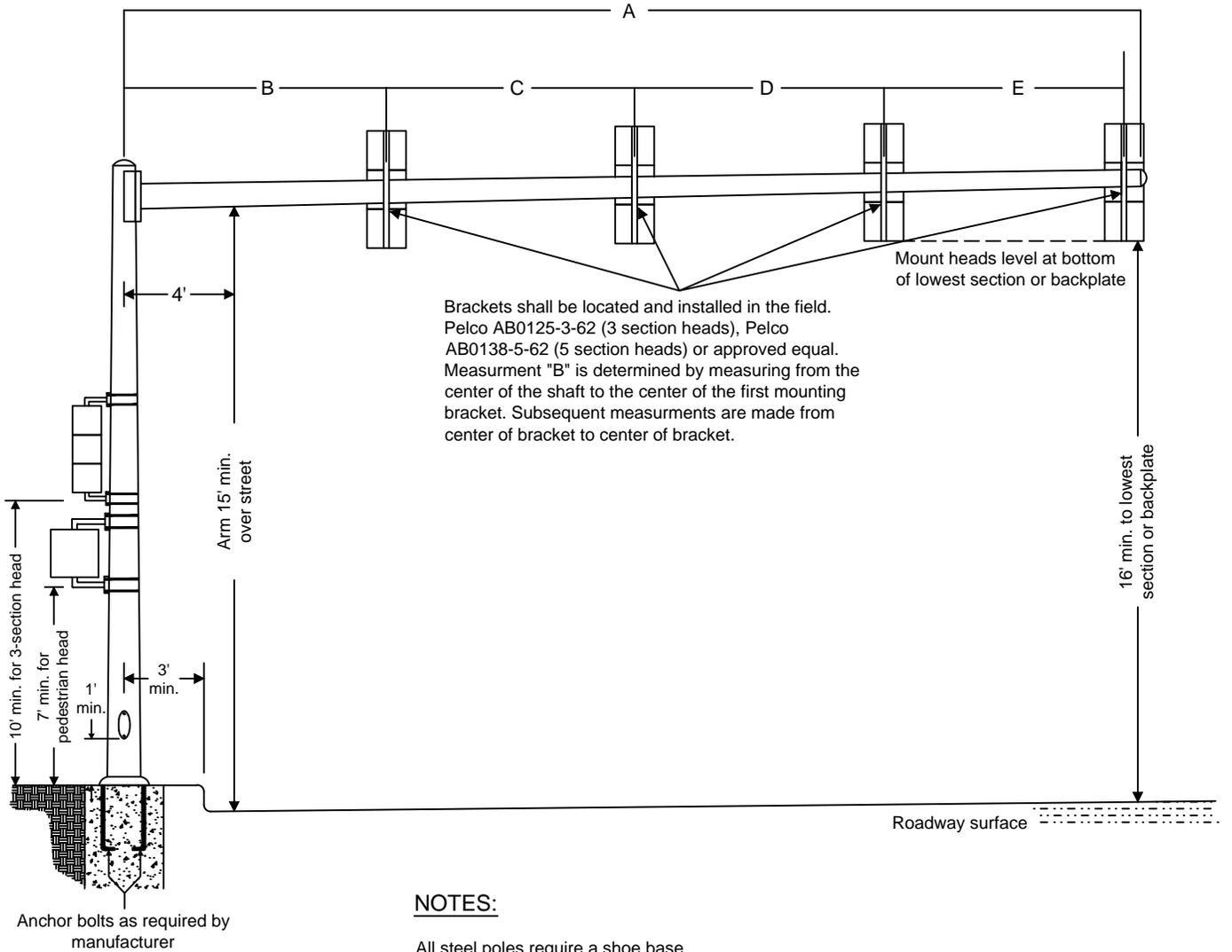
Contractor will provide the Engineer with 5 (five) sets of shop drawings for approval. No poles will be set unless approved by the Engineer.

NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS SPRINGFIELD, MO.	ALUMINUM MAST ARM	ADOPTED:
		TS-5

TYPE S

See plans for arm length and signal spacing details



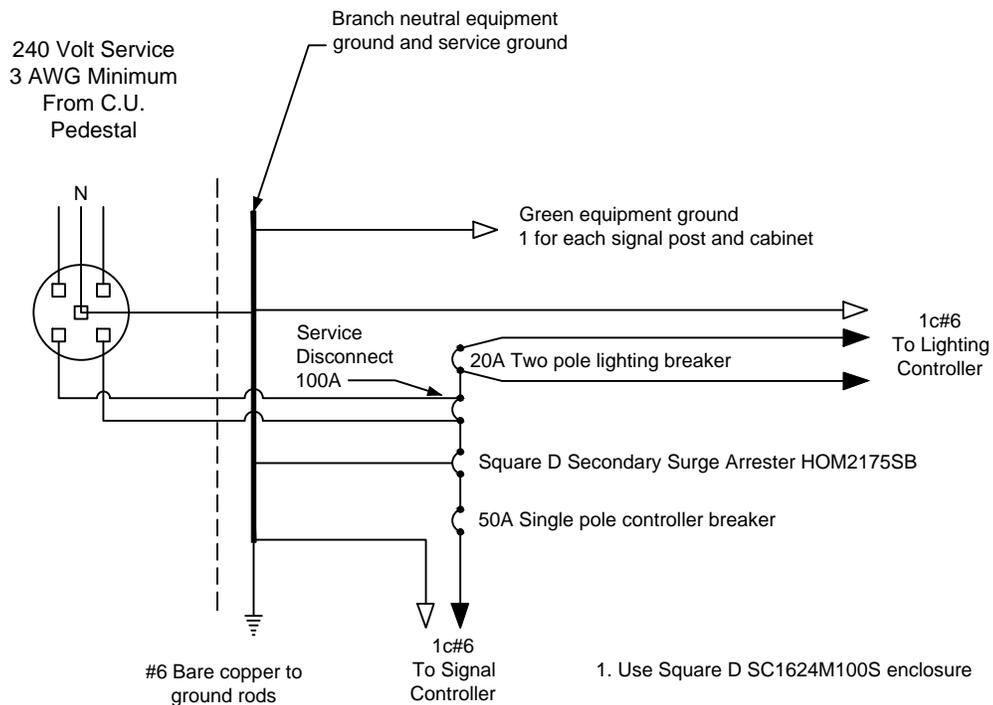
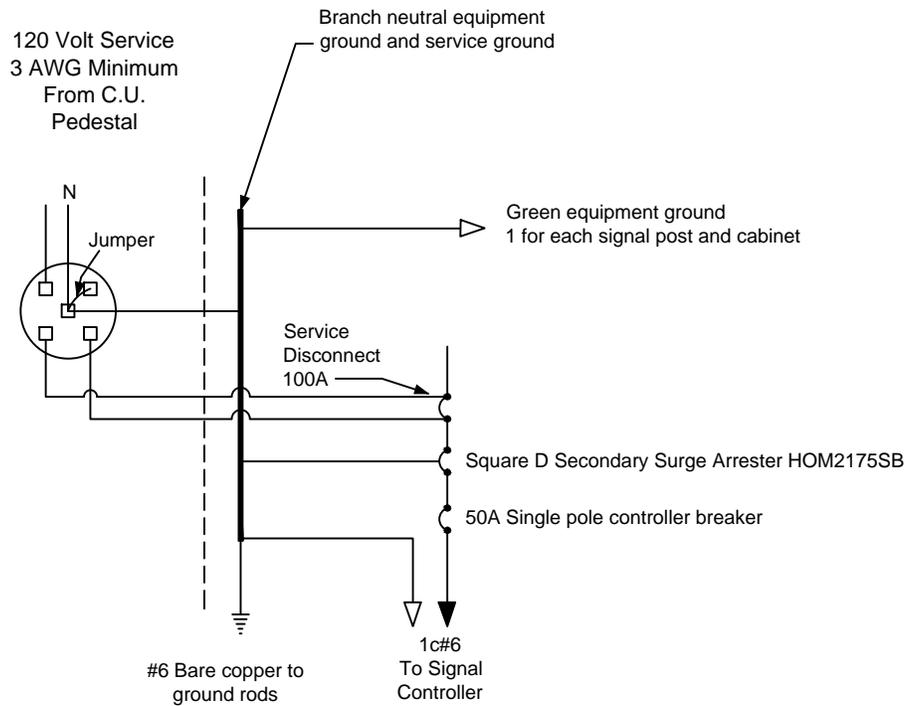
NOTES:

All steel poles require a shoe base.

See plans for base and conduit information.

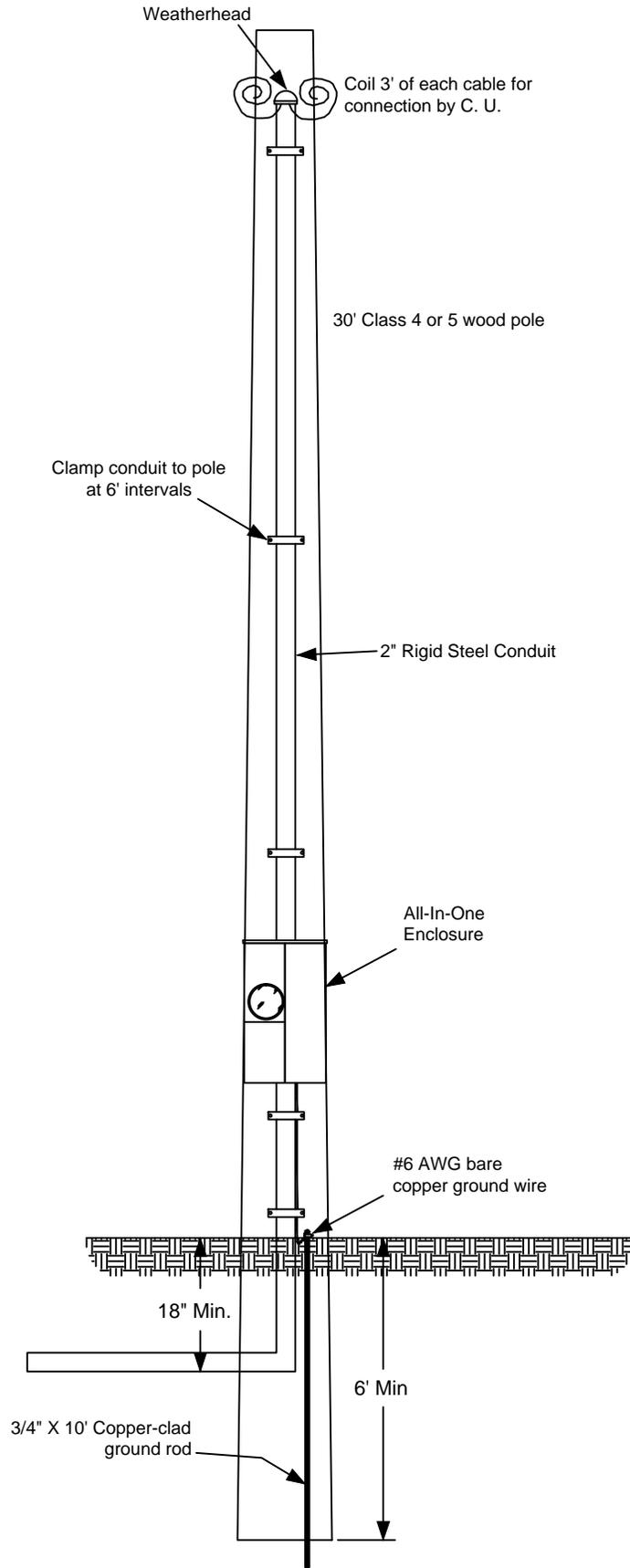
Contractor will provide the Engineer with 5 (five) sets of shop drawings for approval. No poles will be set unless approved by the Engineer.

NOT TO SCALE



1. Use Square D SC1624M100S enclosure
2. Power cable to the controller and lighting controller shall be black and one white neutral - do not mark with tape.

NOT TO SCALE



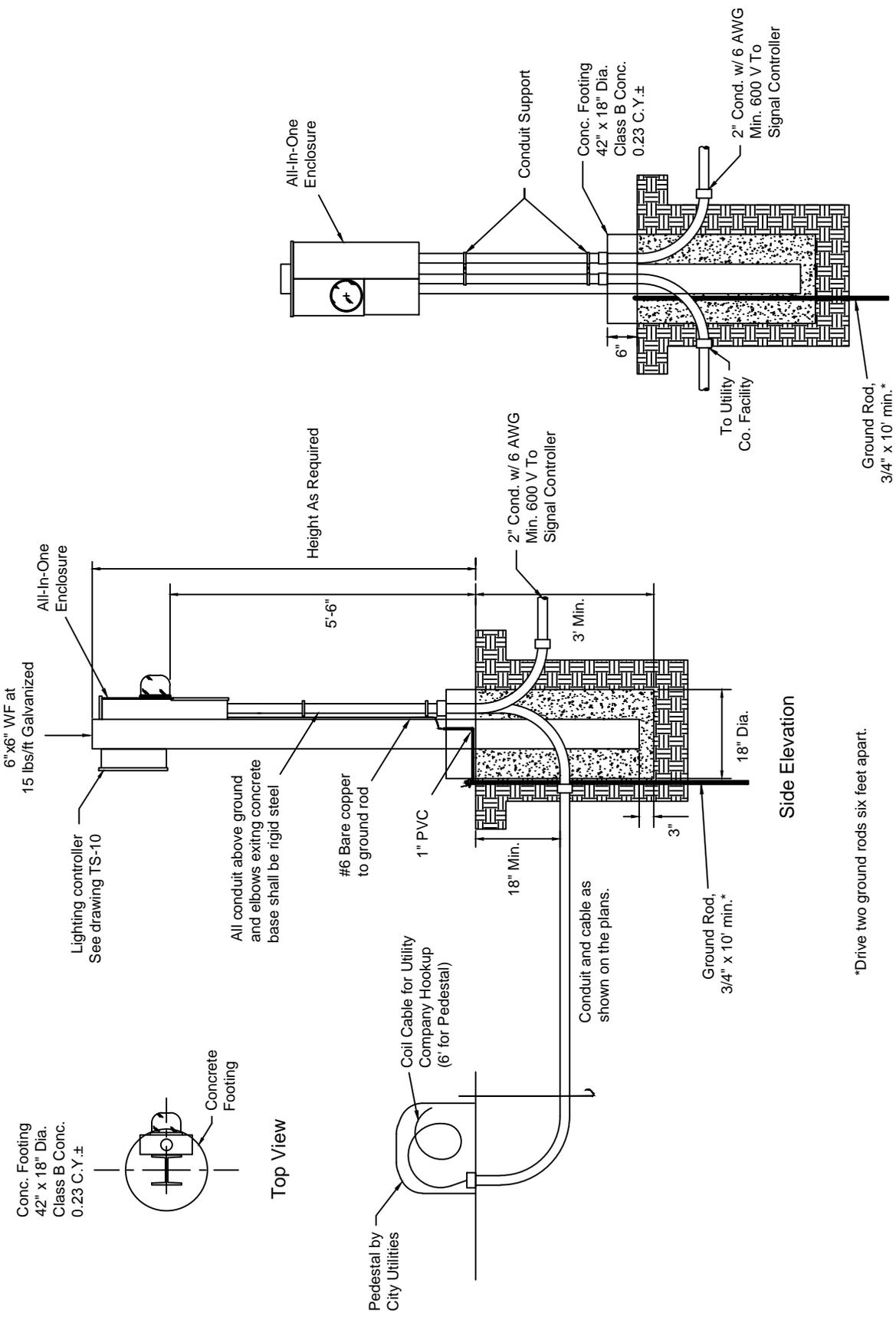
NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

TYPE I POWER SUPPLY

ADOPTED:

TS-8

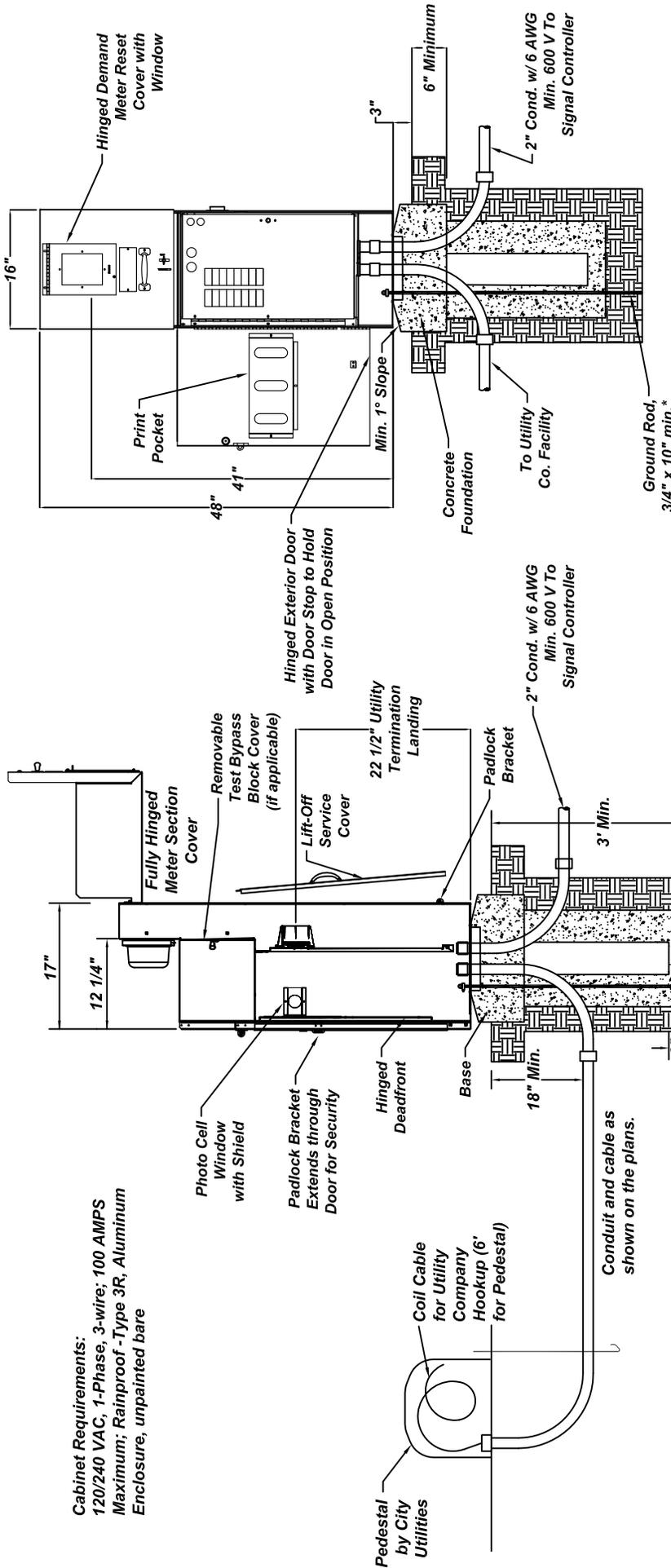


*Drive two ground rods six feet apart.

The Contractor is required to obtain an Electrical permit from Building Development Services for new or relocated power supplies. The permit fee is the responsibility of the Contractor.

NOT TO SCALE

Cabinet Requirements:
 120/240 VAC, 1-Phase, 3-wire, 3-wire; 100 AMPS
 Maximum; Rainproof - Type 3R, Aluminum
 Enclosure, unpainted bare



FRONT ELEVATION

3"
 Recommended Minimum
 Foundation Extension
 All Sides

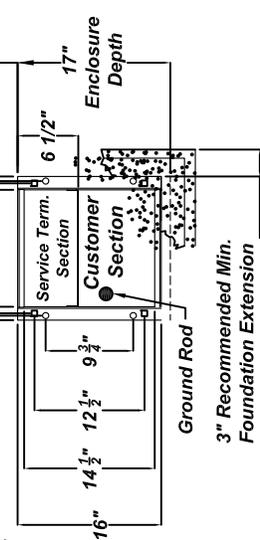
6"
 Recommended Minimum
 Foundation Depth Below
 Grade Level

36" Minimum
 Pedestal Clearance
 Typical Front and
 Back Required per
 N.E.C. 110-16

(4) 5/8-11 X 18"
 (450MM 16 UNC)
 Anchor Bolts
 Recommended

- Pedestal Mounting Holes
- Anchor Bolt Mounting Holes

36" MIN.
 Clearance
 Required for
 N.E.C 110-16
 Typical
 Front & Back



3" Recommended Min.
 Foundation Extension
 All Sides, 6" Rec.
 Minimum Depth.

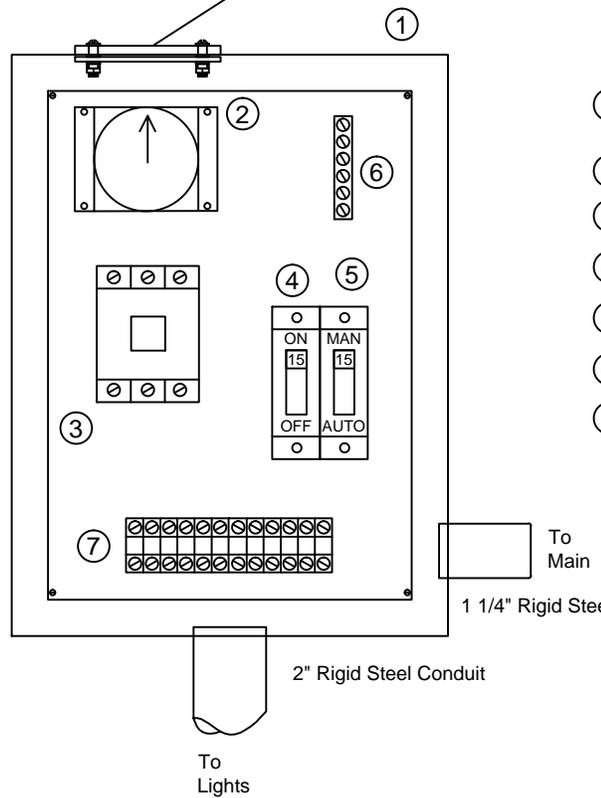
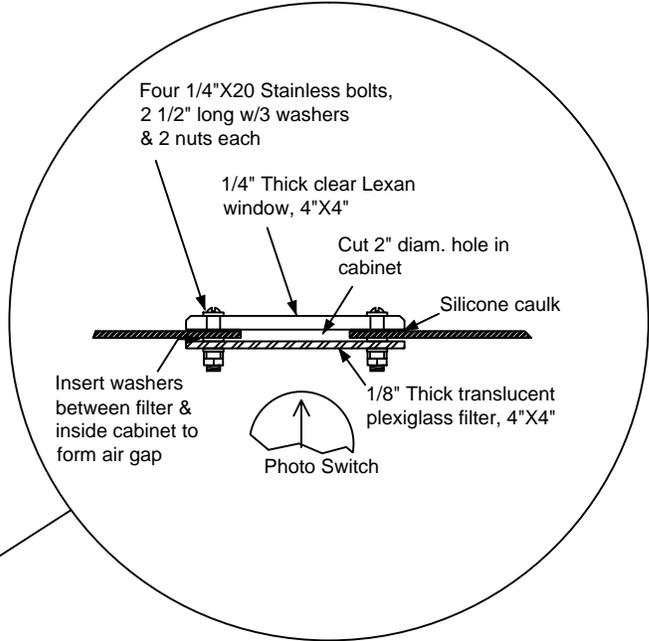
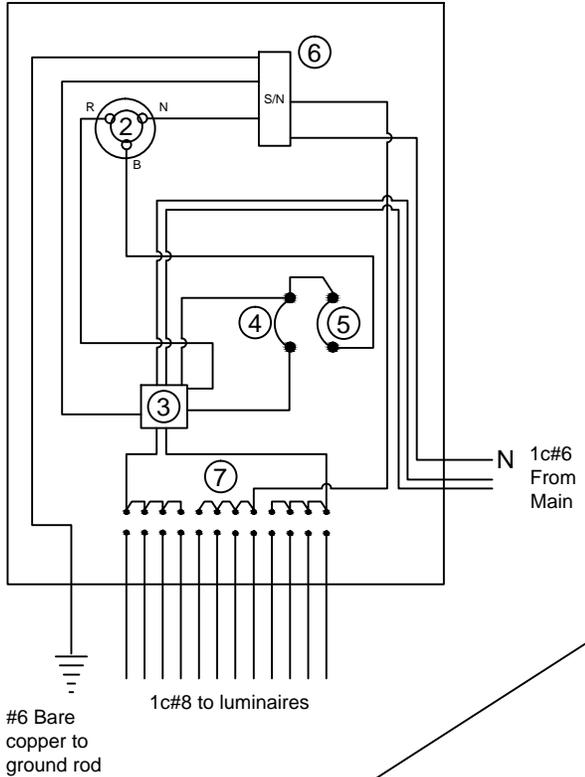
MOUNTING BASE DETAIL

SIDE ELEVATION

*Drive two ground rods six feet apart.

The Contractor is required to obtain an Electrical permit from Building Development Services for new or relocated power supplies. The permit fee is the responsibility of the Contractor.

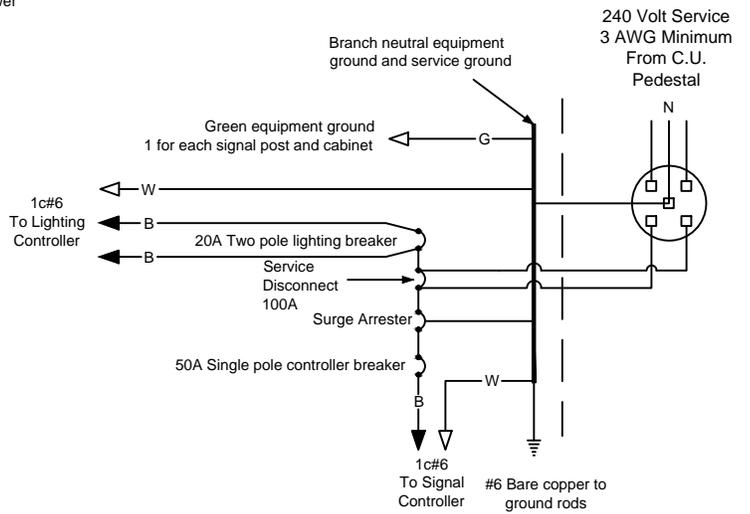
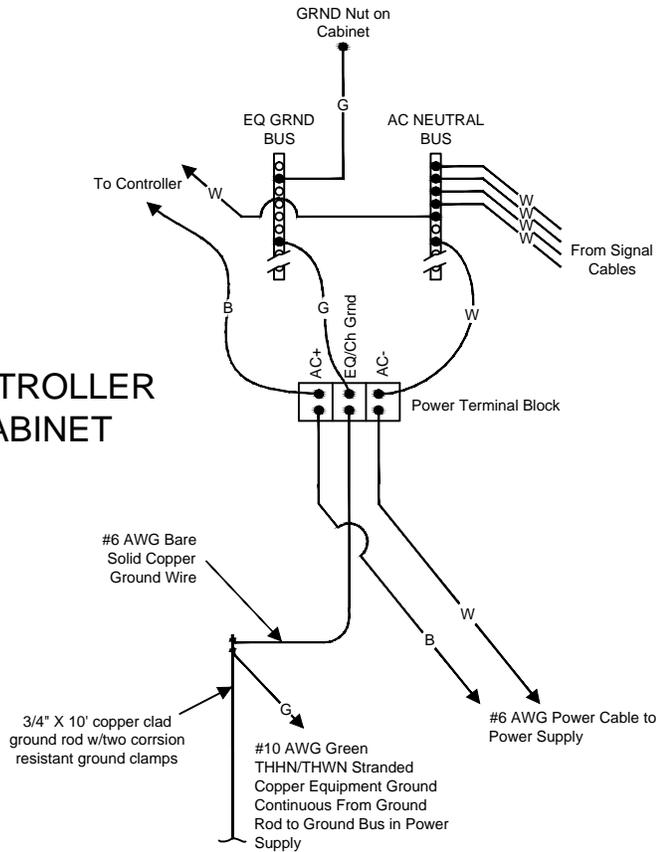
NOT TO SCALE



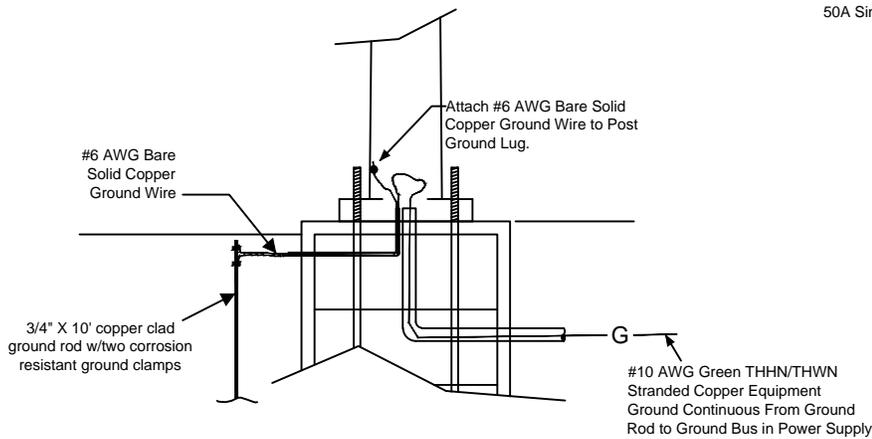
- ① 14"H x 12"W x 6"D 14 Ga. watertight aluminum or stainless steel enclosure
- ② Photoelectric Switch & Socket, 240V
- ③ Lighting Contactor, 2 Pole, 60 Amp, 240 V
- ④ 15 AMP single pole Control Breaker, 240 V
- ⑤ 15 AMP single pole Auto-Manual Switch, 240 V
- ⑥ Neutral Terminal Strip
- ⑦ Lighting Terminal Block, 600V, 12 position, insulated from back panel, barrier between each terminal & each end, accept #8 AWG cable

NOT TO SCALE

CONTROLLER CABINET

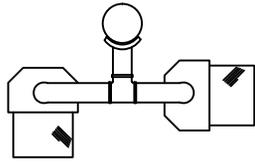


POWER SUPPLY

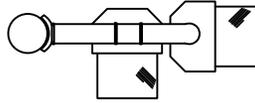


SIGNAL POLES

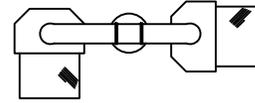
NOT TO SCALE



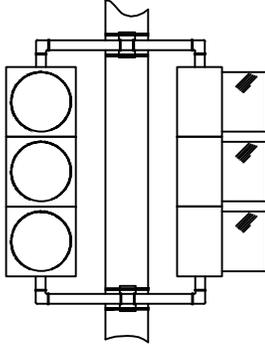
TYPE I
"O"



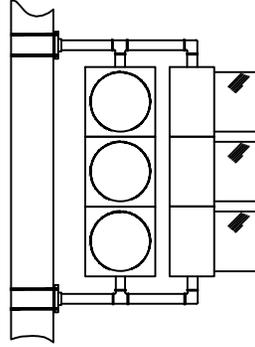
TYPE II
"O"



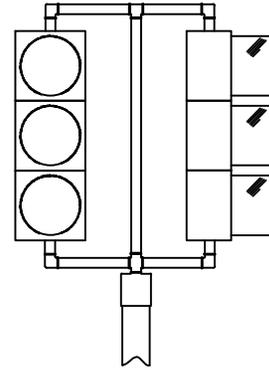
TYPE I
"T"



SIDE MOUNT

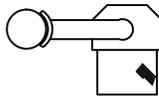


SIDE MOUNT



TOP MOUNT

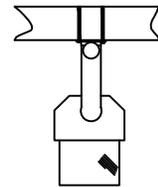
TWO WAY BRACKETS



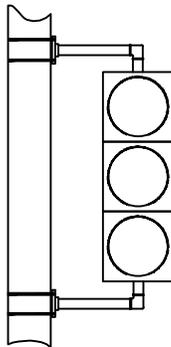
TYPE I
"O"



TYPE I
"T"



TYPE S



SIDE MOUNT

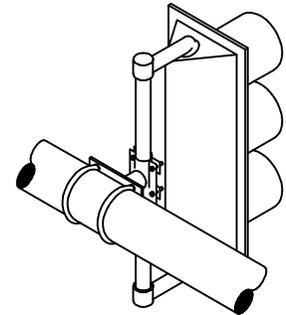


TOP MOUNT

T=Top Mount

O=On Side Mount

S="Astro-Brac"
3, 4, or 5 Section

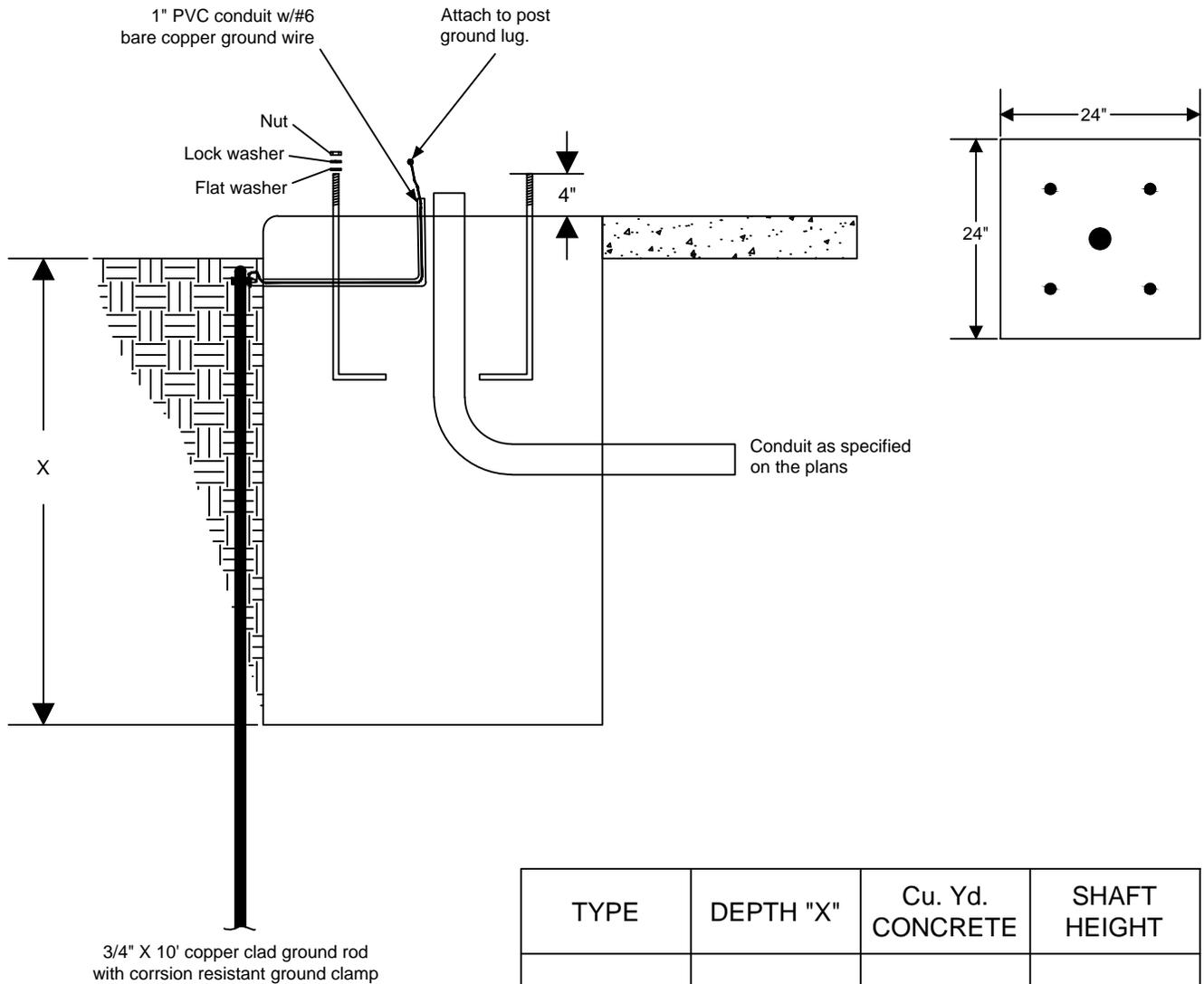


ONE WAY BRACKETS

ONE WAY BRACKETS

SIDE MOUNT Type I and Type II brackets are attached to mast arm poles and 10' or 14' pedestals using stainless steel banding.
TOP MOUNT Type I and Type II brackets are attached to 10' or 14' pedestals using an appropriately sized slip fitter.

NOT TO SCALE



TYPE	DEPTH "X"	Cu. Yd. CONCRETE	SHAFT HEIGHT
A-3	3'	.33	10'
A-4	4'	.59	14'

TYPE "A" SIGNAL BASE NOTES

1. Anchor bolt size, anchor bolt protection, and bolt circle shall be as shown on approved pole drawings.
2. Anchor bolts and conduit shall be held rigidly in place before and during concrete placement. Anchor bolts shall be set in place by means of a template constructed to space the anchor bolts in accordance with the pattern as shown on the manufacturer's approved pole drawings. The center of the template shall correspond to the center of the base.
3. Concrete shall be consolidated by an internal vibrator.
4. Set top of base 4" above grade if in parkway away from sidewalk and form the final 12" of base square. If base is adjacent to or in sidewalk, form the final 6" of base square after the post and mast arm has been set and plumbed. Final top elevation shall match sidewalk.
5. Install preformed expansion material where base abutts sidewalk/concrete.
6. Conduits shall extend a nominal 2" above the base.

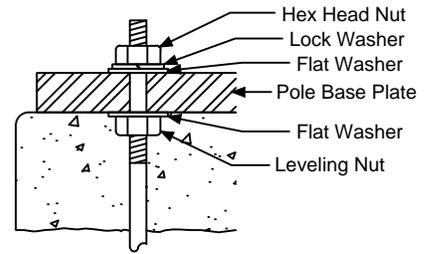
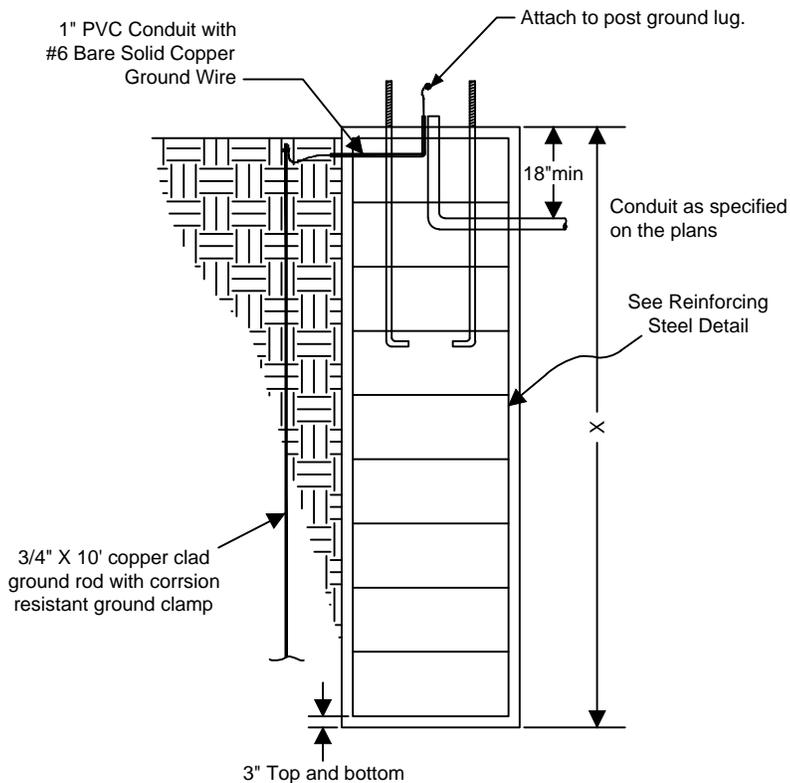
NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

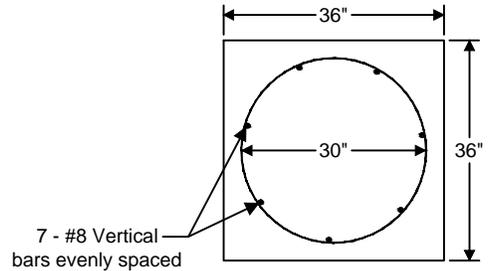
TYPE "A" SIGNAL BASE

ADOPTED:

TS-13



ANCHOR BOLT DETAIL



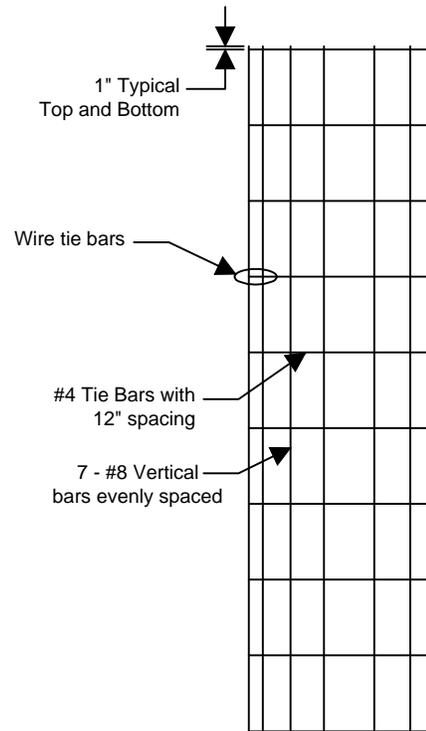
TOP VIEW

TYPE	DEPTH "X"	Cu. Yd. CONCRETE	ARM LENGTH
D-5	5'	1.38	25' or less
D-8	8'	2.16	30-35'
D-10	10'	2.69	40'-45'
D-12	12'	3.21	50'-55'

Mast arms are ordered in 5' increments.
 Mast arms 60' or longer require a special base design.

TYPE "D" SIGNAL BASE NOTES

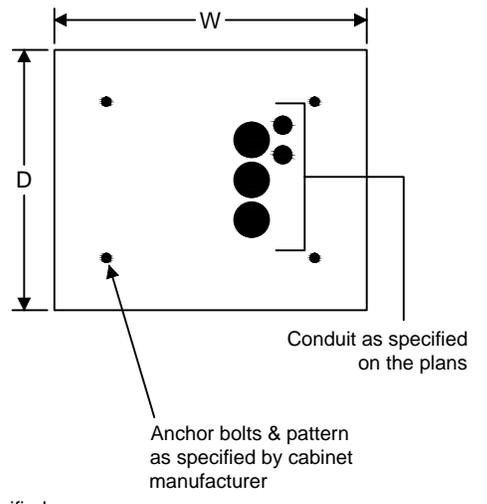
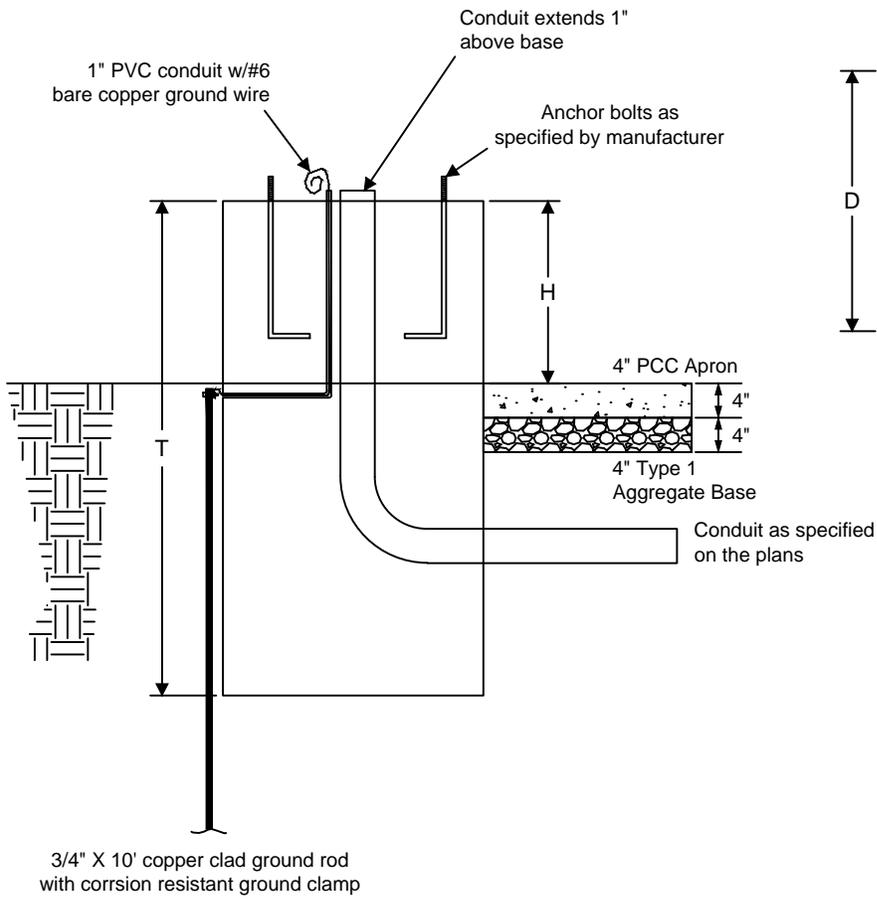
1. Anchor bolt size, anchor bolt protection, and bolt circle shall be as shown on approved pole drawings.
2. Anchor bolts and conduit shall be held rigidly in place before and during concrete placement. Anchor bolts shall be set in place by means of a template constructed to space the anchor bolts in accordance with the pattern as shown on the manufacturer's approved pole drawings. The center of the template shall correspond to the center of the base.
3. Concrete shall be consolidated by an internal vibrator.
4. Set top of base 4" above grade if in parkway away from sidewalk and form the final 12" of base square. If base is adjacent to or in sidewalk, form the final 6" of base square after the post and mast arm has been set and plumbed. Final top elevation shall match sidewalk.
5. Install preformed expansion material where base abutts sidewalk/concrete.
6. Conduits shall extend a nominal 2" above the base.



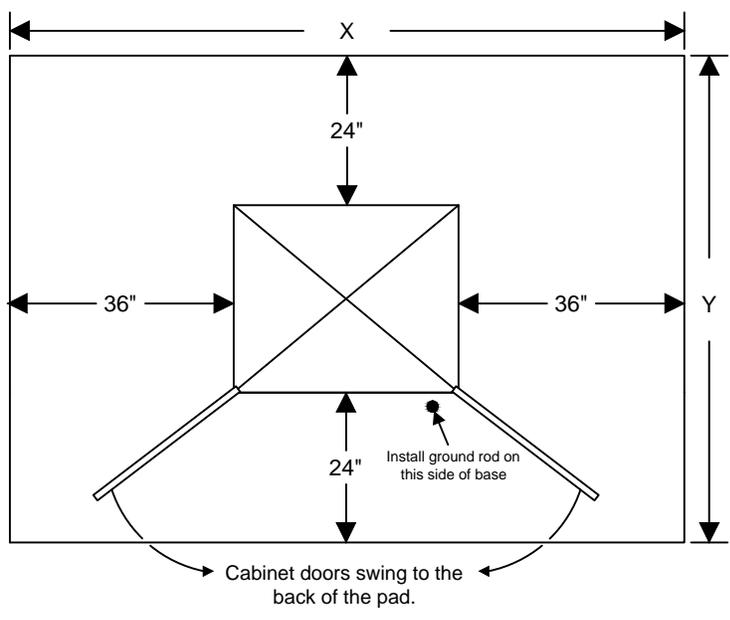
SIDE VIEW

REINFORCING STEEL DETAIL

NOT TO SCALE

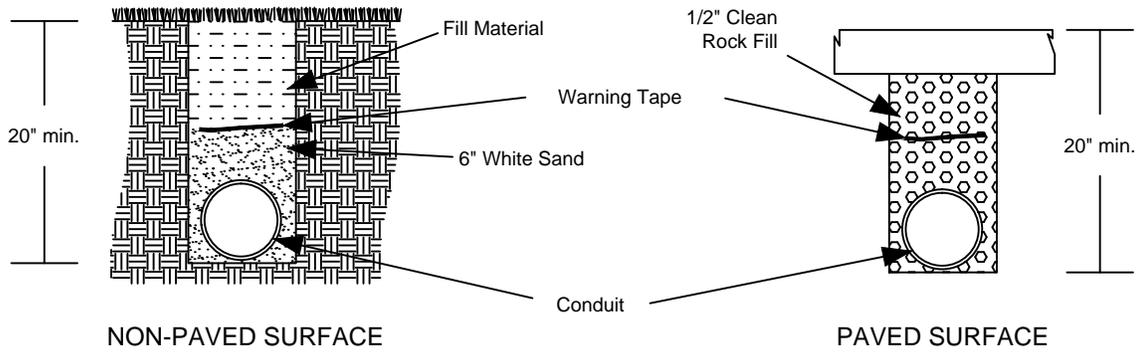


Cubic Yards Concrete				
	B	BS	C	D
With Apron	1.83	1.70	1.65	2.57
Without Apron	1.23	1.10	1.02	1.83



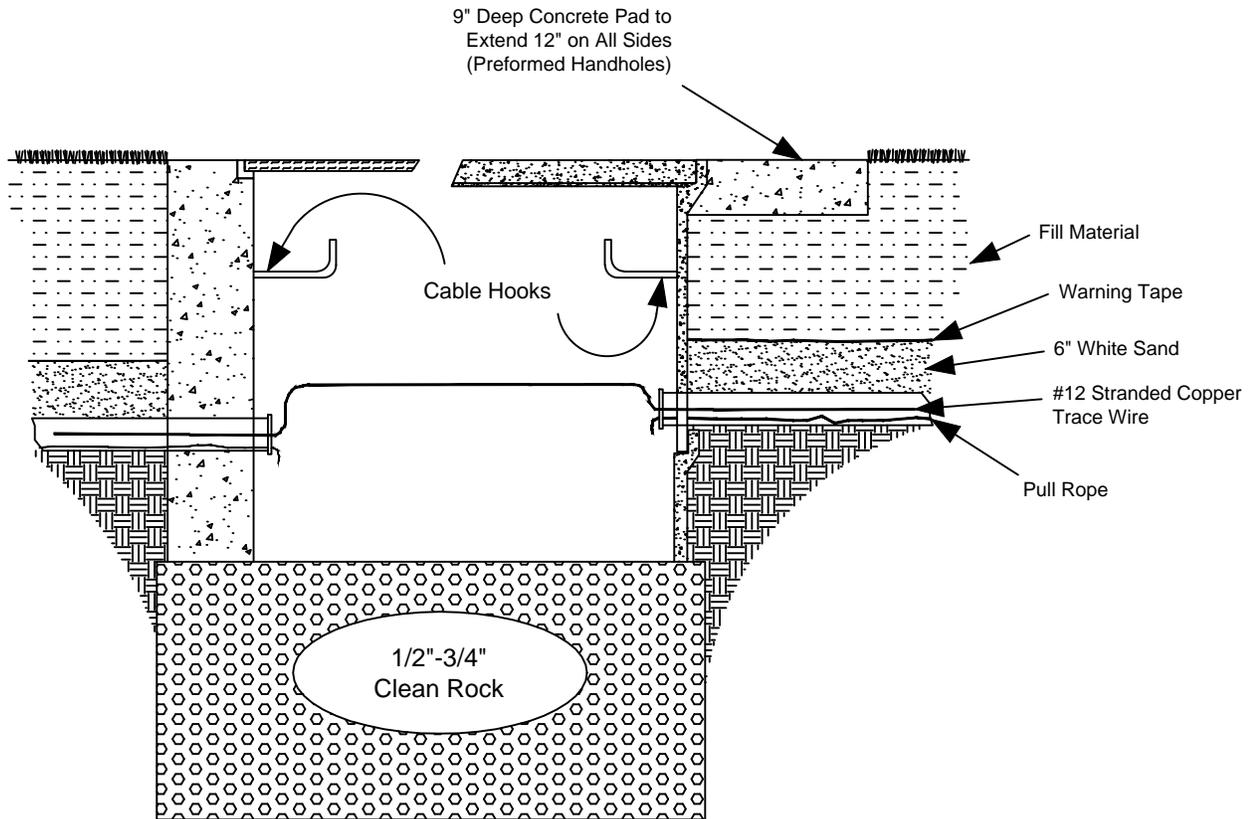
Dimensions				
	B	BS	C	D
W	30"	30"	36"	54"
D	30"	30"	30"	36"
H	28"	21"	8"	8"
T	64"	57"	44"	44"
X	102"	102"	108"	126"
Y	78"	78"	78"	84"

NOT TO SCALE



NOTES:

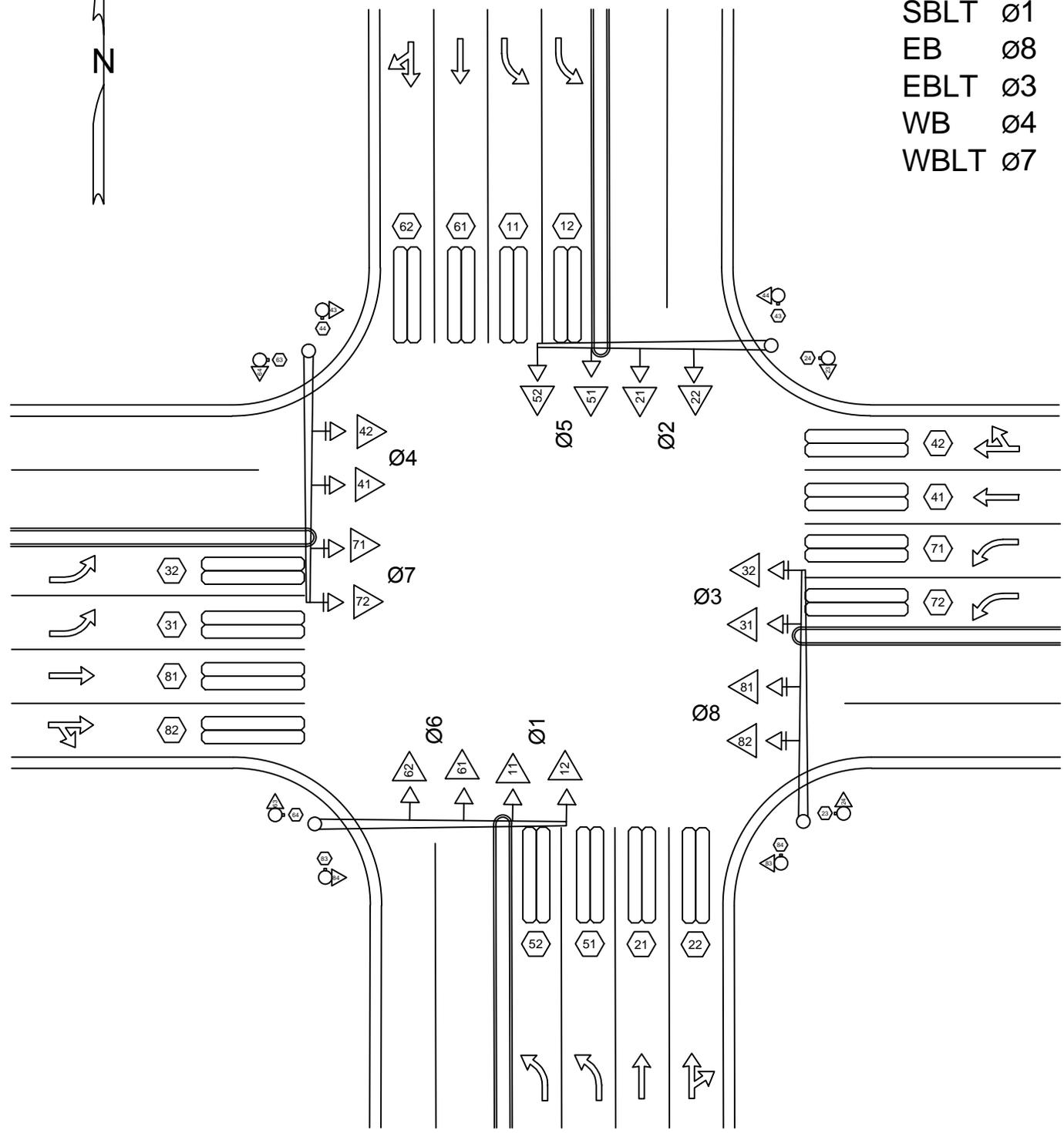
1. All conduit in trench, except interconnect conduit, shall be Schedule 40 PVC, unless otherwise specified.
2. Interconnect conduit shall be continuous Schedule 40 Heavy Duty Polyethylene, orange in color.
3. Trench shall be a minimum of 20" deep and shall be free of rocks and debris.
4. The conduit shall be covered with 6" of white sand if under non-paved surface and 1/2" clean rock fill if under paved surface..
5. Interconnect conduit shall be marked with an orange marking tape provided by the City.
6. The trench shall then be backfilled with material free of large rocks, broken concrete, and other debris.
7. A green jacketed #14 stranded copper trace wire shall be installed in all interconnect conduit.
8. Do not ground trace wire nor extend into controller cabinets.
9. No splices will be allowed in HDPE conduit.



NOT TO SCALE



- NB Ø2
- NBLT Ø5
- SB Ø6
- SBLT Ø1
- EB Ø8
- EBLT Ø3
- WB Ø4
- WBLT Ø7



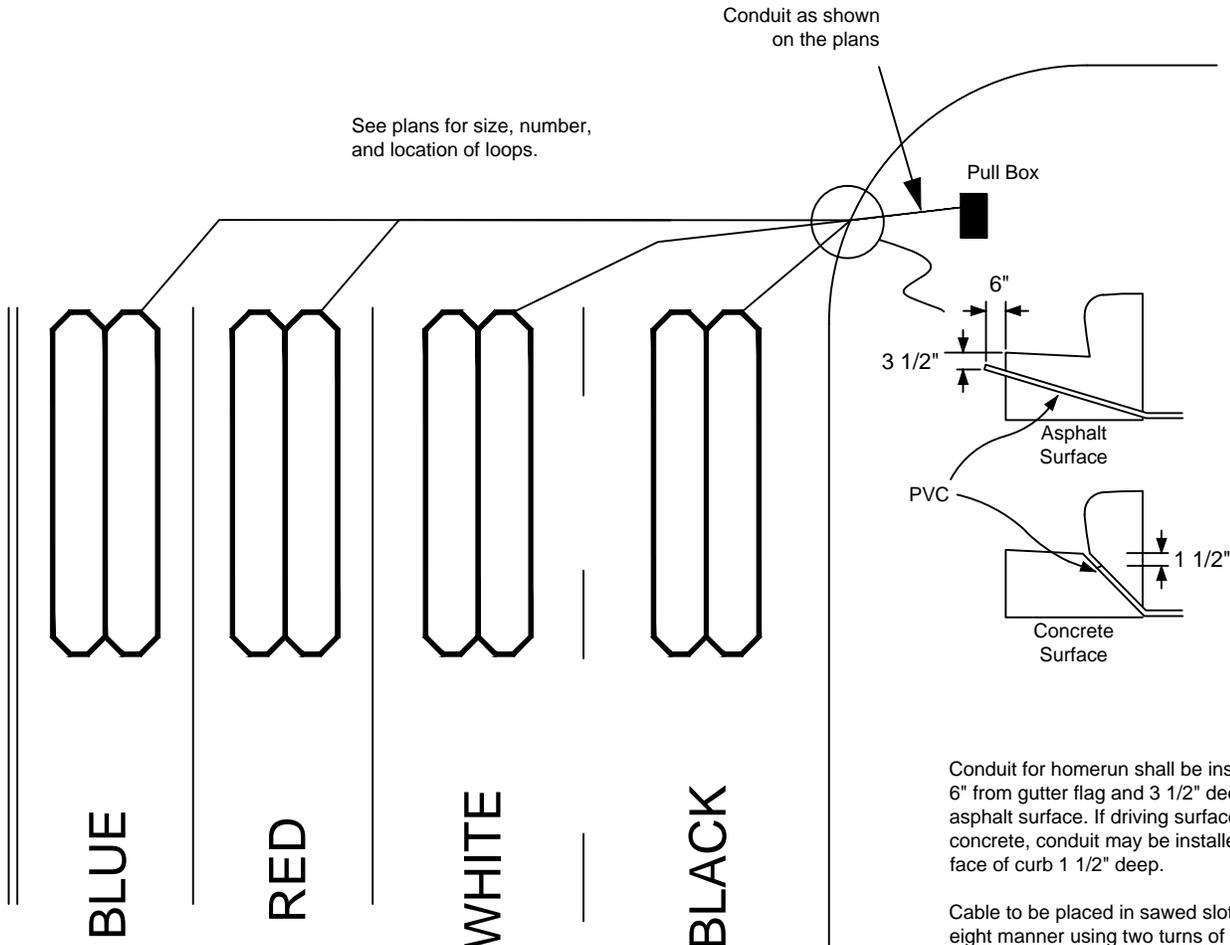
NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS
SPRINGFIELD, MO.

SIGNAL PHASING LAYOUT

ADOPTED:

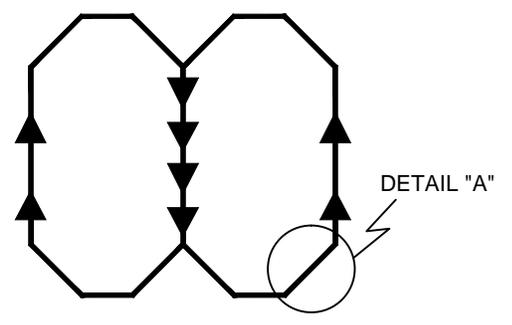
TS-17



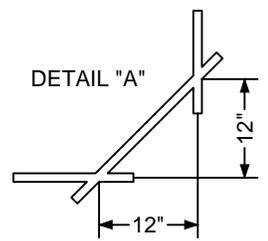
Conduit for homerun shall be installed 6" from gutter flag and 3 1/2" deep in asphalt surface. If driving surface is concrete, conduit may be installed at face of curb 1 1/2" deep.

Cable to be placed in sawed slot in a figure eight manner using two turns of cable, resulting in a 2-4-2 configuration.

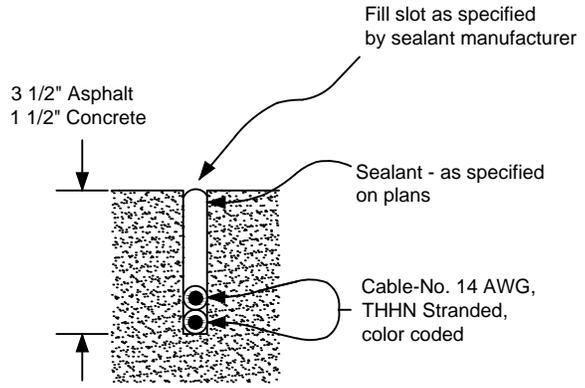
Twist homerun cable 3 turns per foot.



Overlap saw cuts to ensure full depth at corners. Cut 45 degree corners as shown.

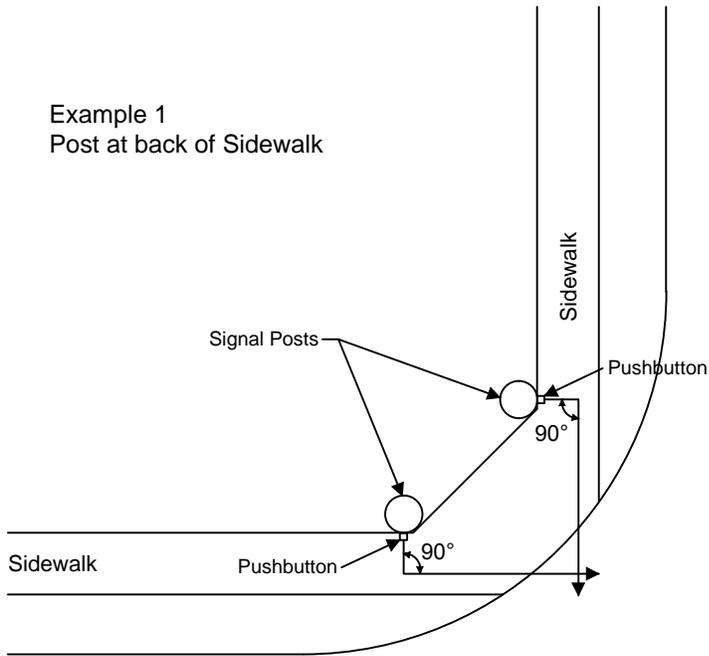


NOT TO SCALE



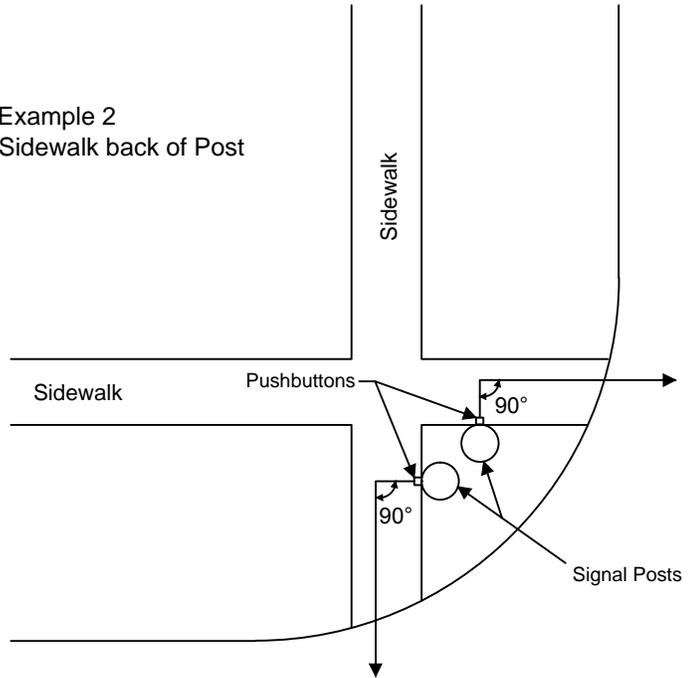
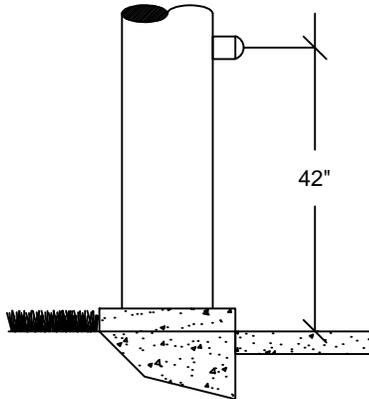
Lanes shall be designated from right to left, with the curb lane being lane 1. Black cable shall be used for lane 1, white for lane 2, red for lane 3, and blue for lane 4.

Example 1
Post at back of Sidewalk

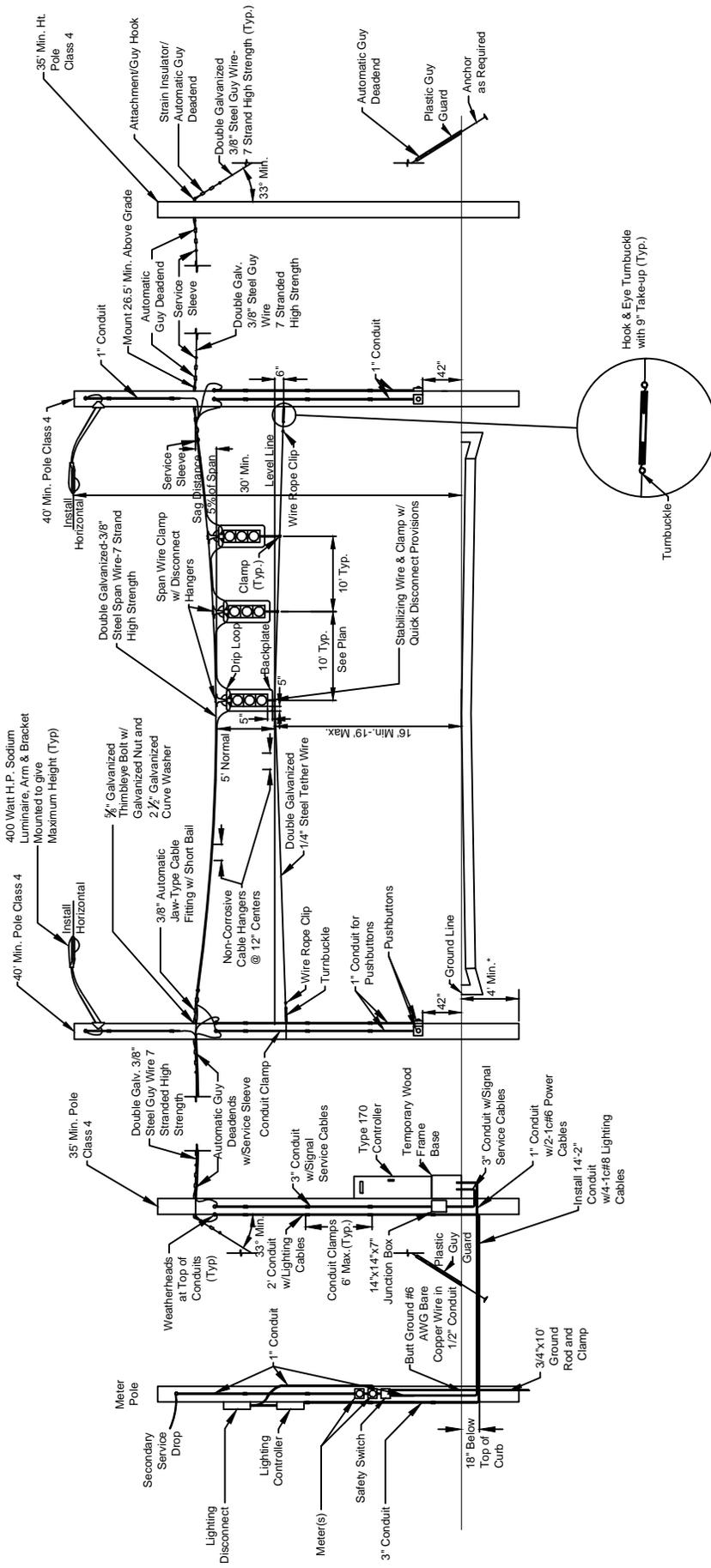


Rule of Thumb: Install the Pushbutton at 90 degree angle to the alignment of crosswalk it serves, 42" above sidewalk grade. Install on the faces adjacent to the sidewalk.

Example 2
Sidewalk back of Post

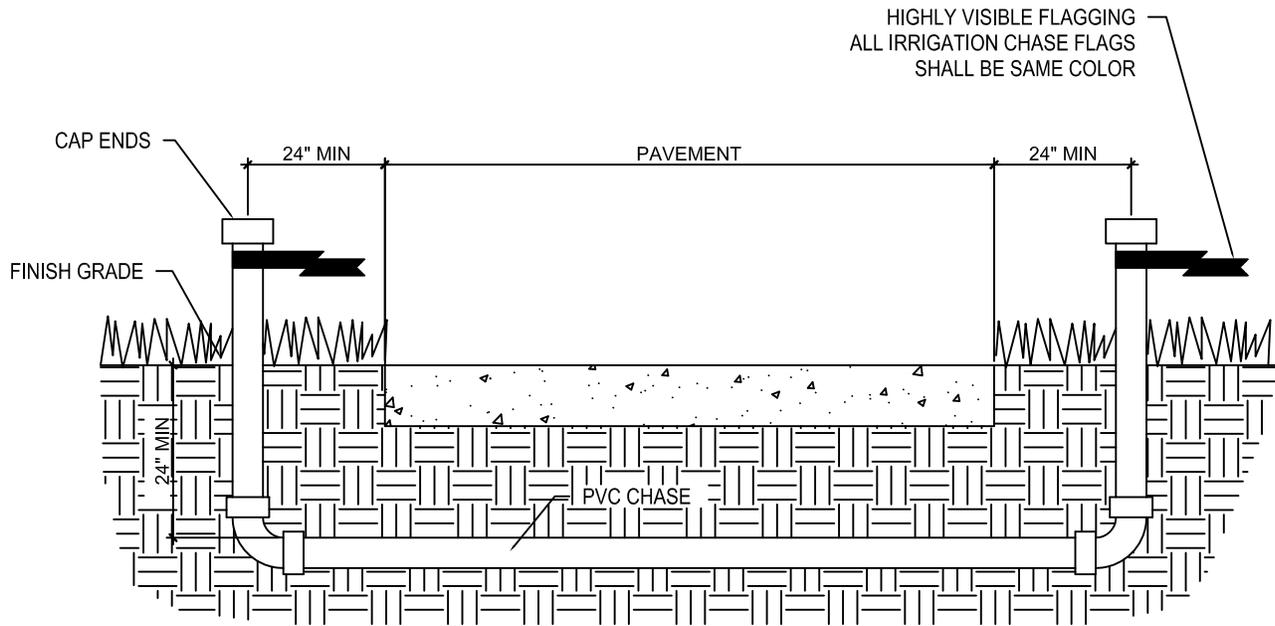


NOT TO SCALE



NOTE:
 Place pole 4' in ground minimum.
 Add 1' depth for every 5' in excess of 20' pole length.

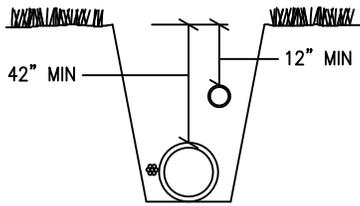
NOT TO SCALE



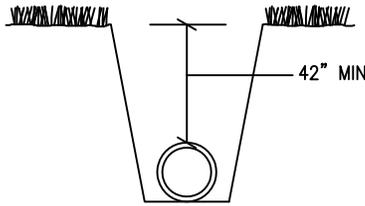
- * DETAIL SHOWN IS FOR INSTALLATION OF SLEEVES PRIOR TO CONSTRUCTION OF IRRIGATION SYSTEM OR PAVEMENT.
- * REFER TO IRRIGATION LAYOUT SHEETS FOR SLEEVE LOCATIONS AND SIZES.
- * PLACE CONTINUOUS TRACER WIRE INSIDE ALL SLEEVES
- * ALL WIRE SHALL BE IN SEPERATE 2" SLEEVE
- * ALL IRRIGATION PIPING SHALL BE IN SLEEVE MINIMUM OF 2" GREATER THAN SUM OUTER DIAMETER OF ALL PIPING

NOT TO SCALE

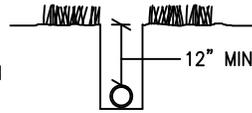
MAIN SUPPLY, LATERALS
& CONTROL WIRES



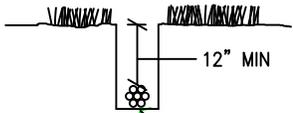
MAIN SUPPLY



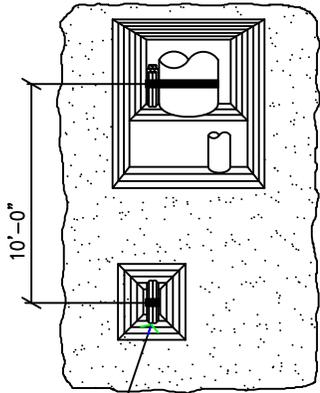
P.V.C.
LATERALS



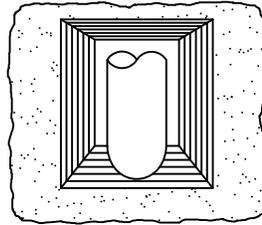
CONTROL WIRES



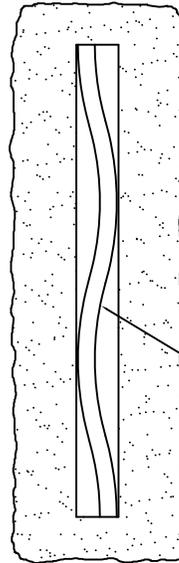
CONTROL WIRES
SHALL BE IN
PVC SLEEVE IF
UNDER PAVEMENT



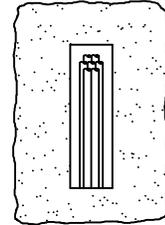
BUNDLE AND TAPE WIRING
AT 10 FT. INTERVALS TO
SIDE OF MAIN LINE



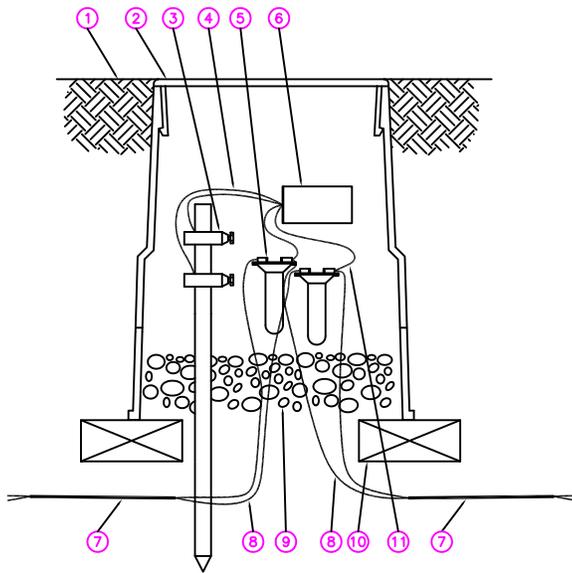
ALL MAIN SUPPLY
LINES TO BE INSTALLED
IN ACCORDANCE
WITH MANUFACTURER'S
INSTALLATION
SPECIFICATIONS



ALL PLASTIC PIPES TO BE
SNAKED IN TRENCHES
AS SHOWN



NOT TO SCALE

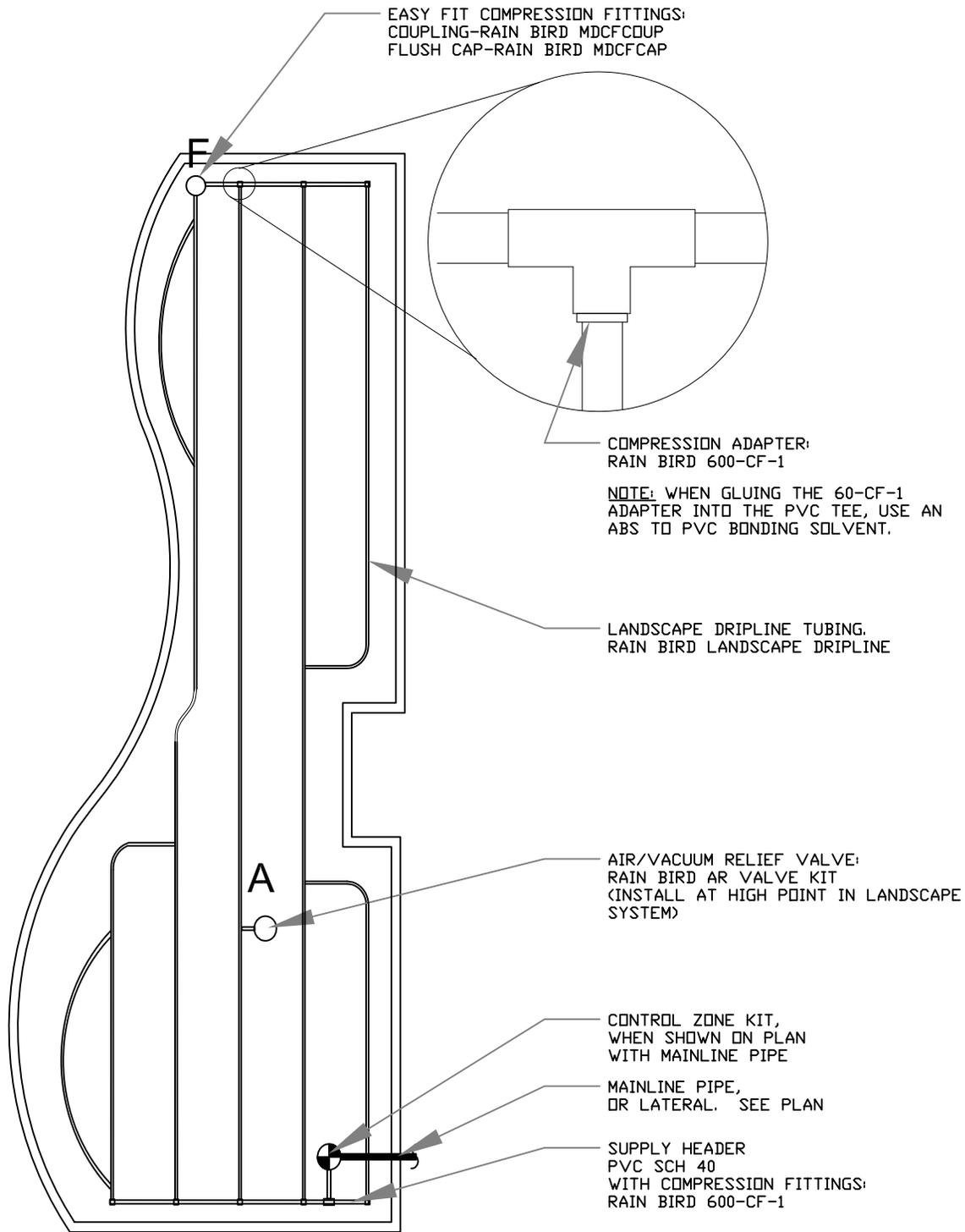


1. FINISH GRADE OR TOP OF MULCH
2. 10-INCH VALVE BOX WITH COVER
3. RAIN BIRD VB-10RNDG GROUNDING ROD: 10 OHMS OR LESS
4. GREEN/YELLOW WIRE FROM LSP-1TURFTURF TO GROUNDING ROD BRASS CLAMPS (1 OF 2)
5. DB SERIES WIRE CONNECTOR: RAIN BIRD DBTWC25 (1 OF 2)
6. LINE SURGE PROTECTOR: RAIN BIRD LSP-1TURF M10008
7. TWO-WIRE CABLE TO NEXT DEVICE (FIELD DECODER, SENSOR DECODER, LINE SURGE PROTECTOR OR ESP-LXD CONTROLLER)
8. COMMUNICATION WIRE TO NEXT DEVICE (FIELD DECODER, SENSOR DECODER, LINE SURGE PROTECTOR OR ESP-LXD CONTROLLER)
9. 3-INCH MINIMUM DEPTH OF 3/4-INCH WASHED GRAVEL
10. BRICK (1 OF 2)
11. BLUE WIRE FROM LSP-1TURF TO DB SERIES WIRE CONNECTOR

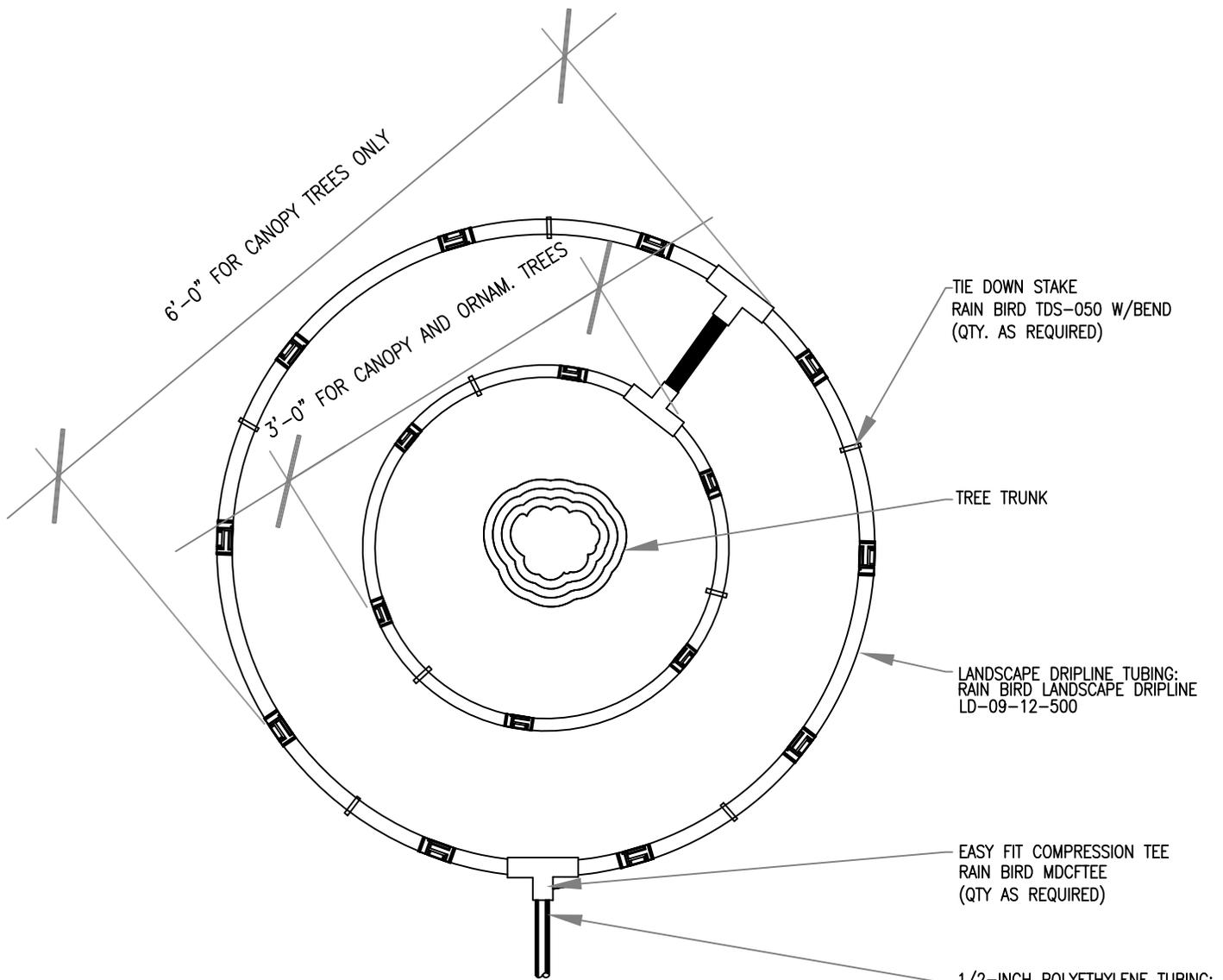
NOTES:

- A. LSP-1TURF SHOULD BE INSTALLED EVERY 500-FEET OR FOR EVERY EIGHT DECODERS ON TWO-WIRE PATH.
- B. LSP-1TURF TO BE INSTALLED AT END OF WIRE RUN THAT TERMINATES IN THE FIELD (STAR CONFIGURATION).
- C. RAIN BIRD FD-401TURF AND FD-601TURF FIELD DECODERS COME WITH LSP-1TURF'S BUILT-IN. FD-101TURF, FD-102TURF AND FD-202TURF REQUIRE SEPARATE LSP-1TURF PROTECTION.

NOT TO SCALE



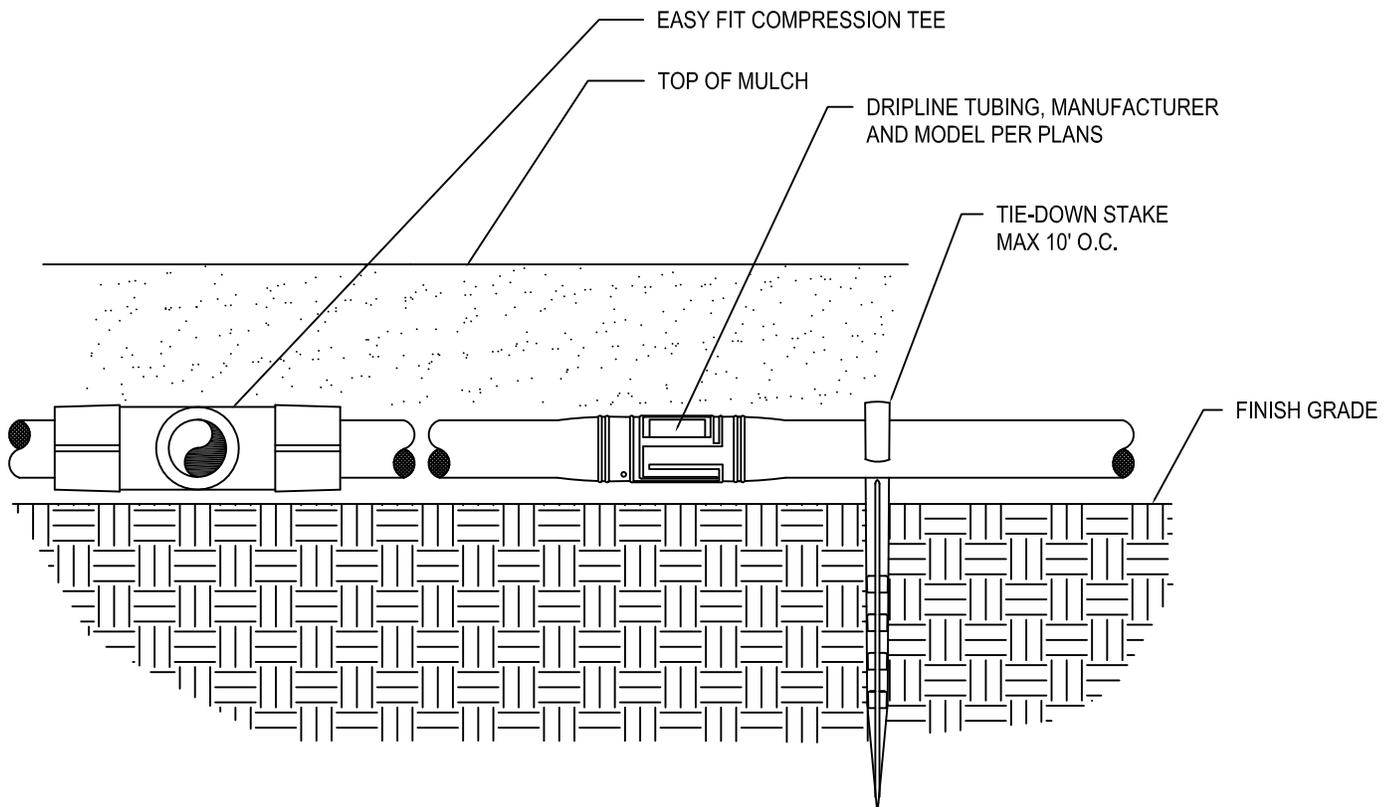
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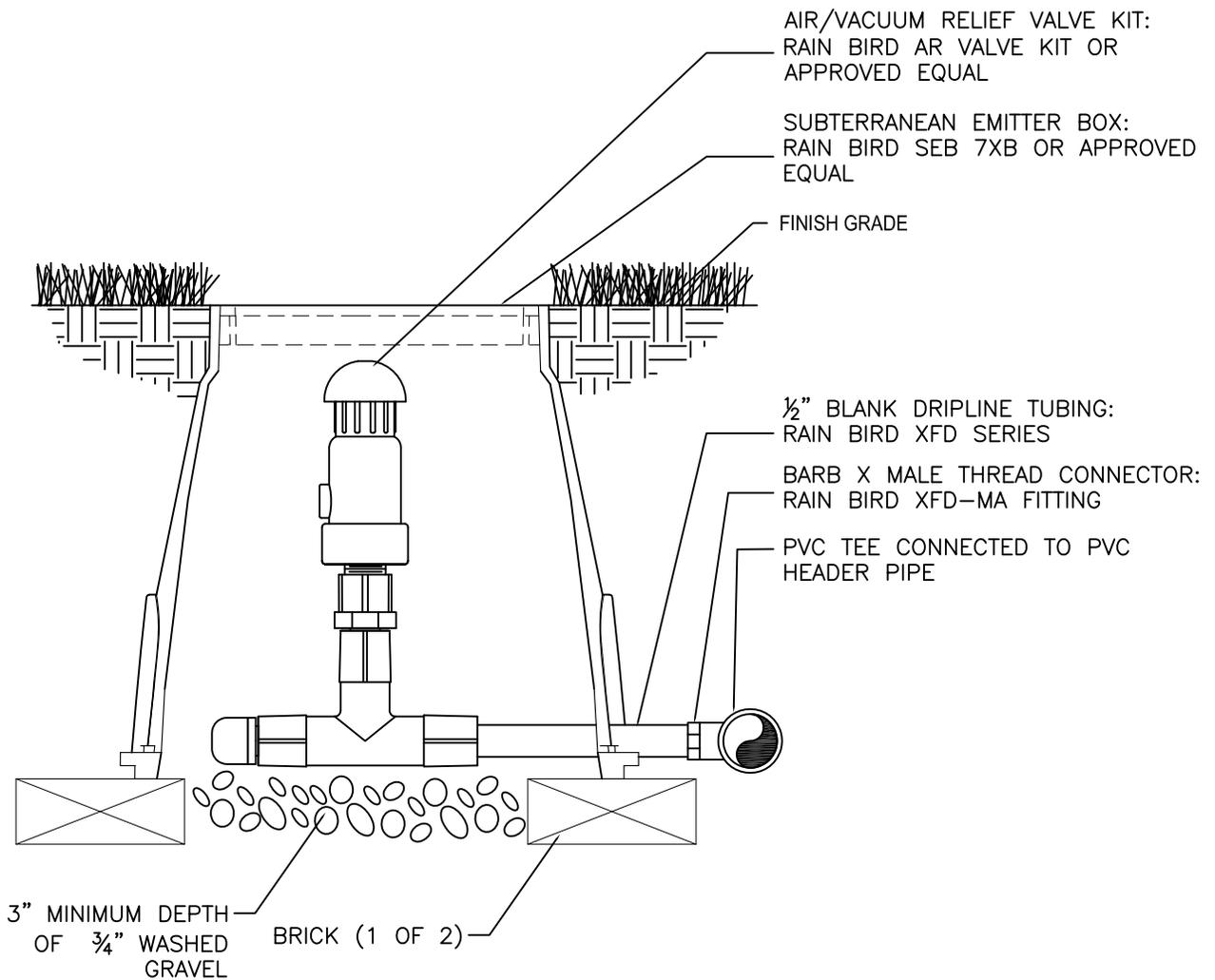
NOTE:

1. SEE "LOW-VOLUME LANDSCAPE IRRIGATION DESIGN MANUAL (D39030D)" FOR DRIPLINE EMITTER SPACING.
2. QUANTITY OF DRIPLINE RINGS, EMITTER SPACING AND FLOWS ARE DEPENDANT ON TREE CANOPY SIZE.

NOT TO SCALE

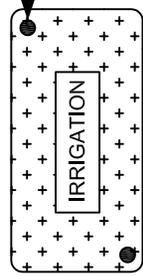


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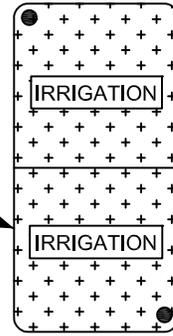
NOT TO SCALE

Stainless steel or brass
Penta-head bolts
(2 required)



Type I & II

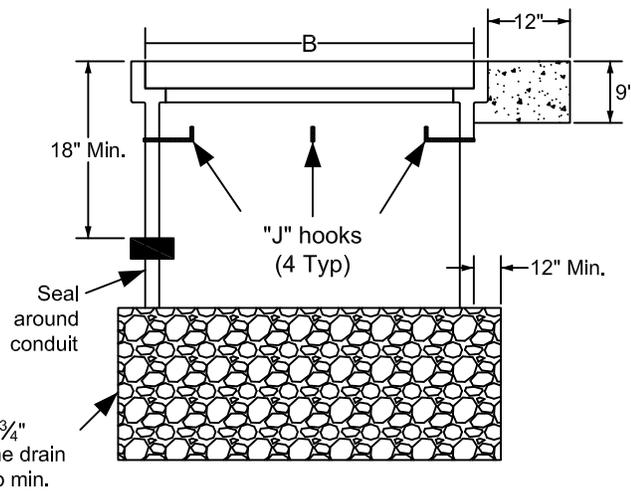
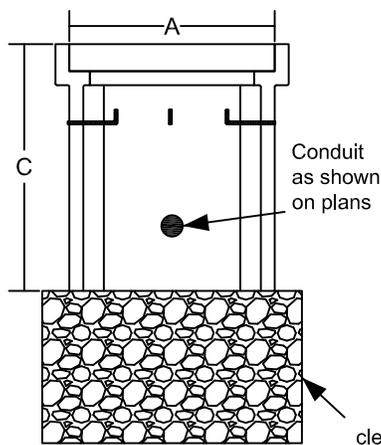
Skid resistant
surface



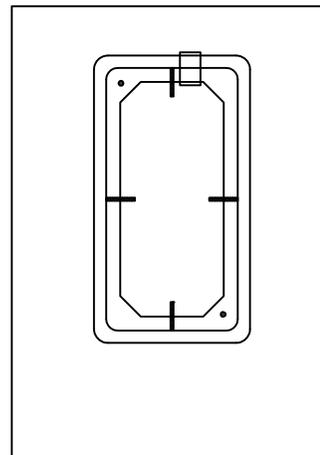
Type III

Two piece
interlocking
cover

Stainless steel
or brass
Penta-head bolts
(2 minimum)



DIMENSIONS			
	TYPE I	TYPE II	TYPE III
A	17"	24"	30"
B	30"	36"	48"
C	28"	30"	36"



9" Thick concrete
pad 12" all sides

Notes:

1. Preformed pull boxes shall be used unless otherwise specified on the plans.
2. Lift opening is required on all covers.
3. All dimensions are nominal.
4. If extensions are needed, they shall be compatible and from the same manufacturer.

NOT TO SCALE

NOTES:

DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS, CO-DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED; HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.

STAKE TREES ONLY IF DIFFICULT KEEPING PLUMB OR AS CITY INSPECTION.

MARK THE NORTH SIDE OF THE TREE IN THE NURSERY, AND ROTATE TREE TO FACE NORTH AT THE SITE WHEN EVER POSSIBLE.

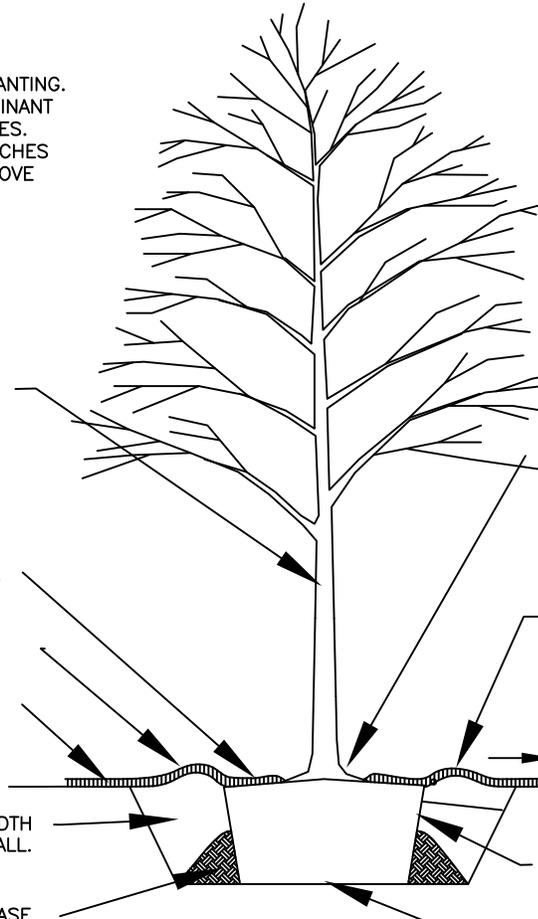
SET TOP OF ROOT BALL FLUSH TO GRADE OR 25MM-50MM (1"-2") HIGHER IN SLOWLY DRAINING SOILS.

MULCH RING, 1800MM (6') DIA.

75MM (3") MULCH. DO NOT PLACE MULCH IN CONTACT WITH TREE TRUNK.

TREE PIT MIN. WIDTH IS 2 X WIDTH OF ROOT BALL.

TAMP SOIL AROUND ROOT BALL BASE FIRMLY WITH FOOT PRESSURE SO THAT ROOT BALL DOESN'T SHIFT.



EACH TREE MUST BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL. TREES WHERE THE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DON'T COVER THE TOP OF THE ROOT BALL WITH SOIL.

100MM (4") HIGH EARTH SAUCER BEYOND EDGE OF ROOT BALL.

DRIP IRRIGATION RING. SEE DETAIL

SHOVEL-CUT EDGE AT EDGE OF MULCH RING. SEE DETAIL

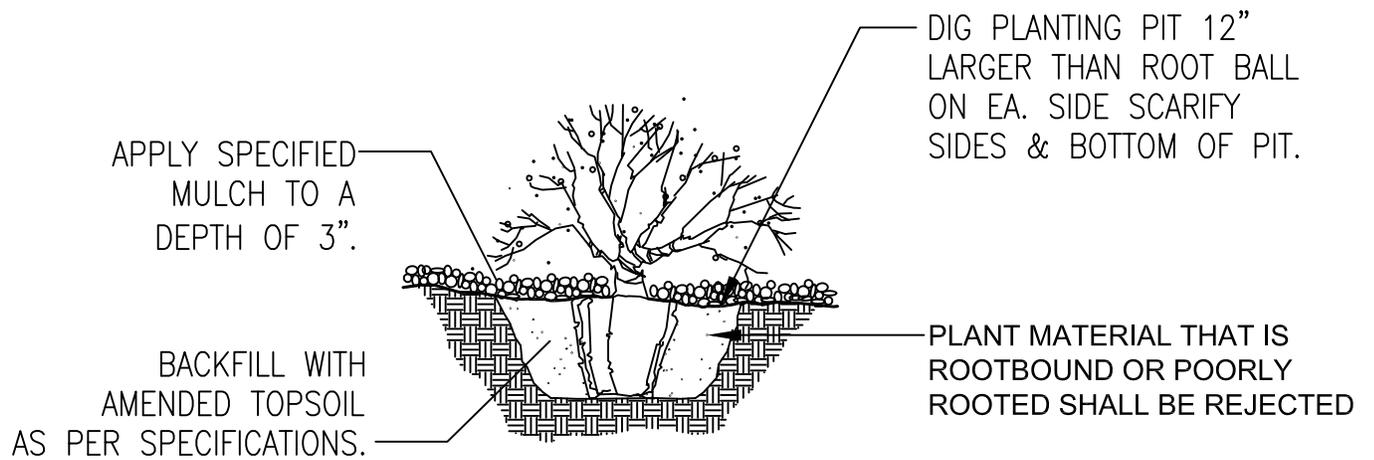
1.0'

REMOVE ALL TWINE, ROPE, WIRE AND BURLAP FROM ROOT BALL.

IF PLANT IS SHIPPED WITH A WIRE BASKET AROUND ROOT BALL, CUT THE WIRE BASKET & REMOVE IT.

PLACE ROOT BALL ON UNEXCAVATED OR TAMPED SOIL.

NOT TO SCALE

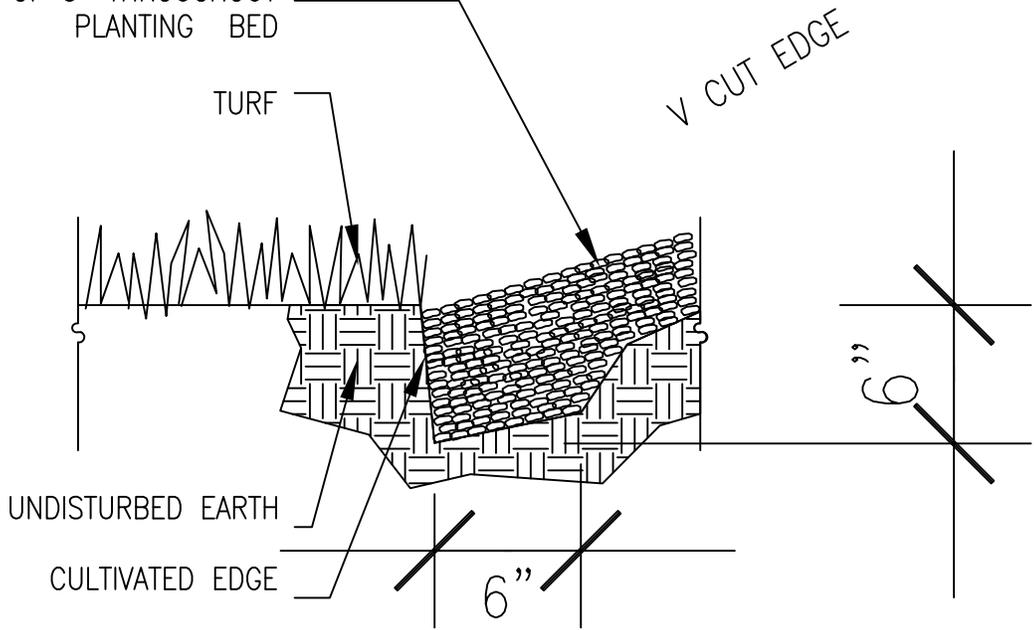


NOTE:

1. SET SHRUBS AT SAME GRADE AS GROWN IN NURSERY.
2. PRUNE ALL DAMAGED OR DEAD WOOD PRIOR TO PLANTING.

NOT TO SCALE

APPLY SPECIFIED MULCH TO
A DEPTH OF 3" THROUGHOUT
PLANTING BED



NOT TO SCALE