

# CITY *of* CAPE G I R A R D E A U

---

ENGINEERING DIVISION  
Cape Girardeau, Missouri

## ***STANDARD DRAWINGS***

*City of Cape Girardeau  
401 Independence  
Cape Girardeau, MO 63703*

**ISSUED February 25, 2016**

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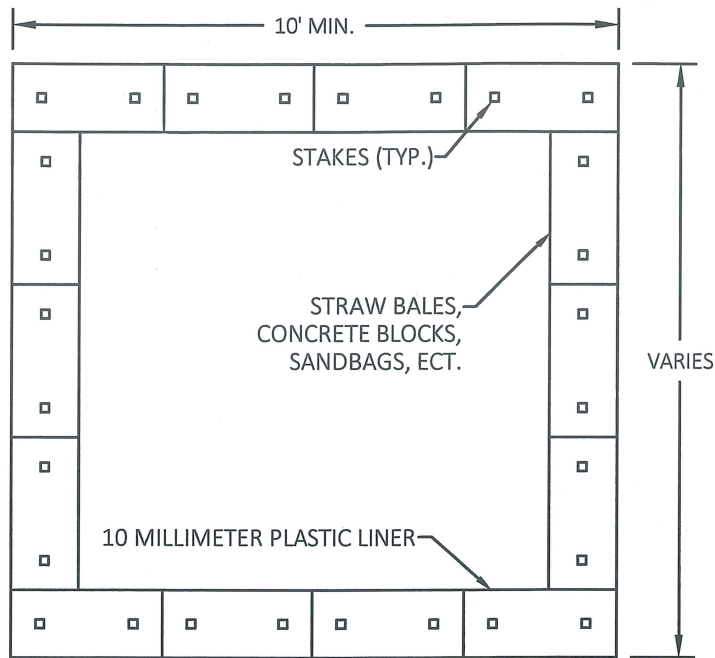
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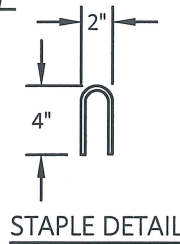
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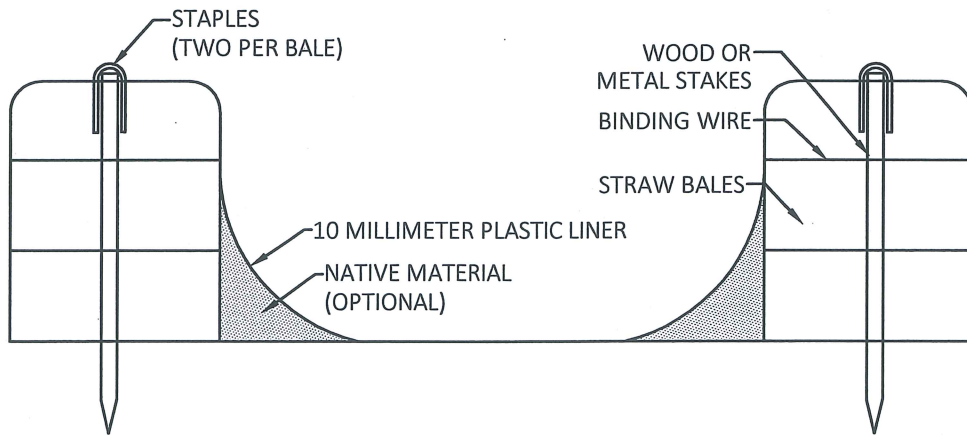
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PLAN



STAPLE DETAIL



SECTION

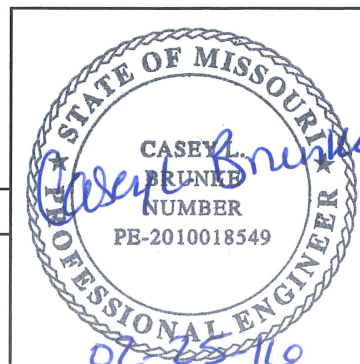
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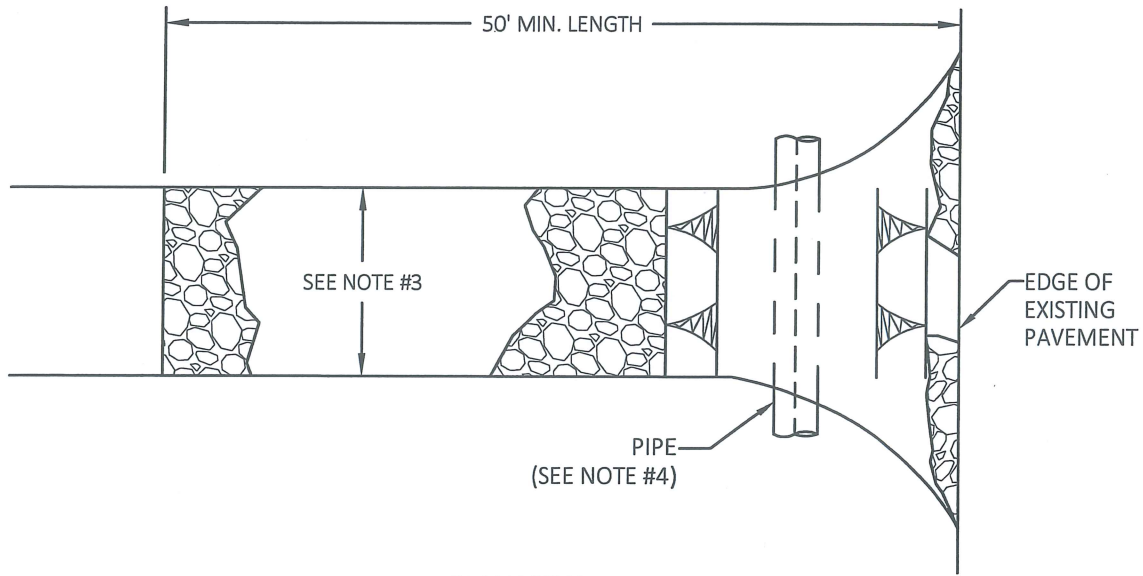
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Actual layout determined in field as necessary to accommodate anticipated number of washout.
3. Contractor shall be responsible for washout removal once washout operation have ceased.

**Concrete Washout**

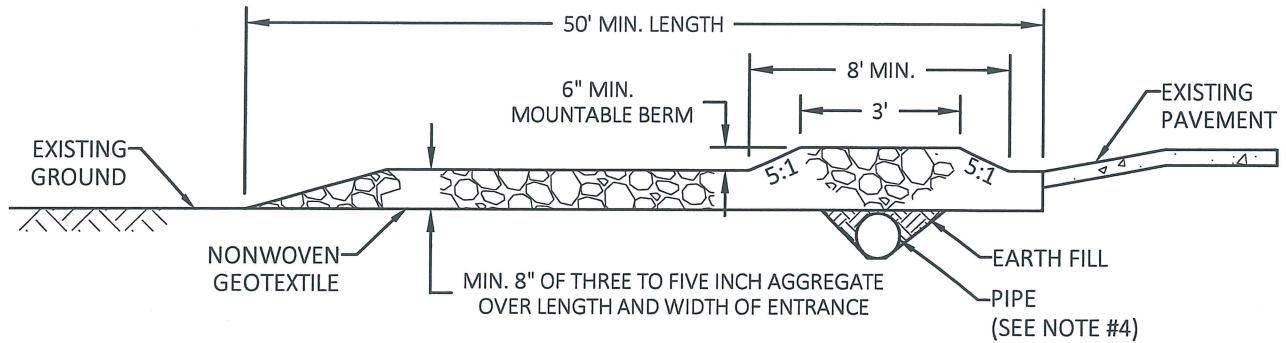
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PLAN VIEW



PROFILE

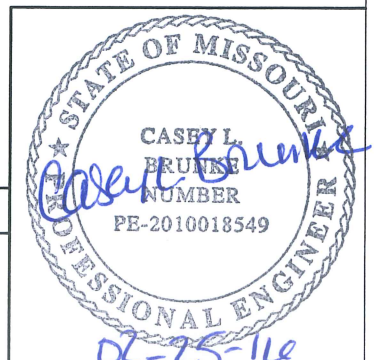
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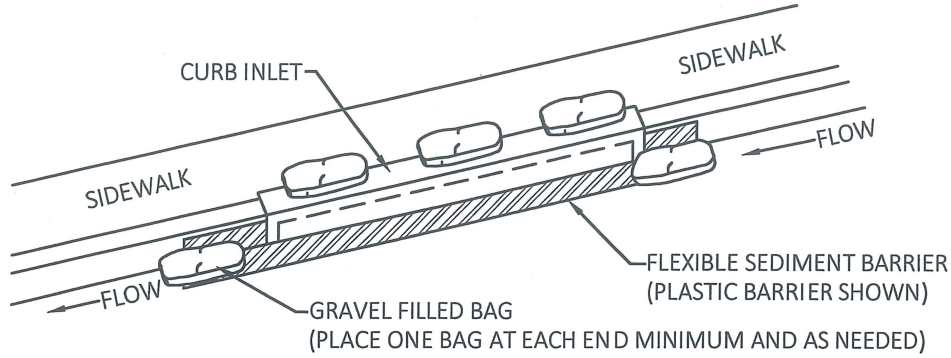
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Place construction entrance in accordance with the approved plan. Vehicles must travel over the entire length of the construction entrance. Use minimum length of 50 feet. Flare construction entrance ten feet minimum at each side of the existing road to provide a turning radius.
3. Width: Not less than full width of all points of ingress/egress.
4. Pipe all surface water flowing to or diverted toward the construction entrance under the entrance, maintaining positive drainage. Protect pipe installed through the construction entrance with a mountable berm with 5:1 slopes and a minimum of 12 inches of stone over the pipe. Provide pipe as specified on approved plan. When the construction entrance is located at a high spot and has no drainage to convey, a pipe is not necessary. A mountable berm is required where necessary to prevent runoff from flowing into street and/or to provide additional cover to protect pipe.
5. Stone Size: As required to be effective but not less than three to five inch minimum open graded rock.
6. Prepare subgrade and place nonwoven geotextile over the entire area prior to placing of stone.
7. Maintain entrance in a condition that minimizes tracking of sediment. Add stone or make other repairs as conditions demand to maintain clean surface, mountable berm, and specified dimensions. Immediately remove stone and/or sediment spilled, dropped, or tracked onto adjacent roadway by vacuuming, scraping, and/or sweeping.
8. Washing roadway to remove mud tracked onto pavement is not acceptable unless wash water is directed to an approved sediment control practice.
9. Maintenance: The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto Public Right-of-Way. This may require periodic top dressing with additional stone as conditions demand, as well as repair and clean out of any associated sediment removal devices. All sediment that is spilled, dropped, washed or tracked onto Public Right-of-Way must be removed immediately. Periodic inspections and maintenance shall be provided after each rain.

**Construction Entrance**

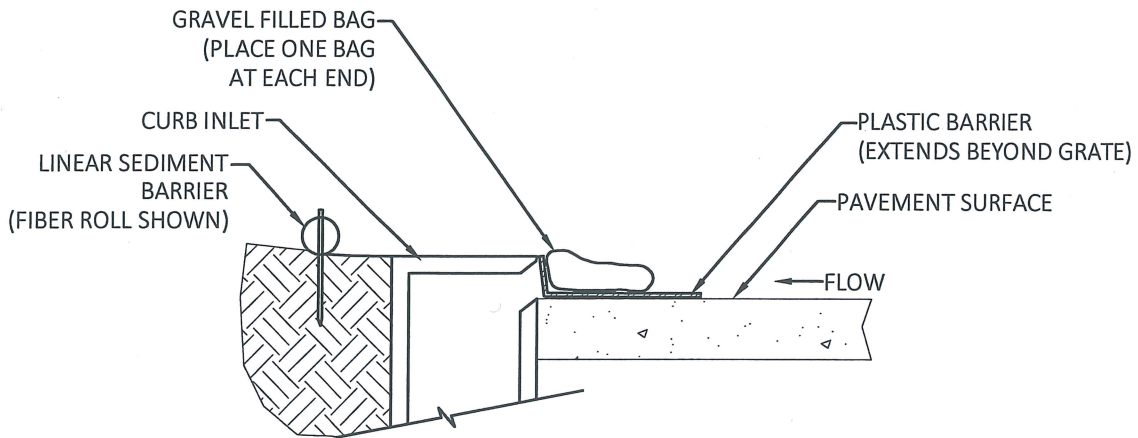
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PERSPECTIVE



SECTION

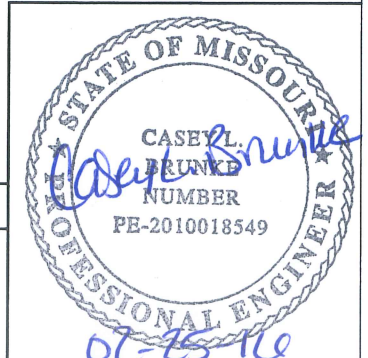
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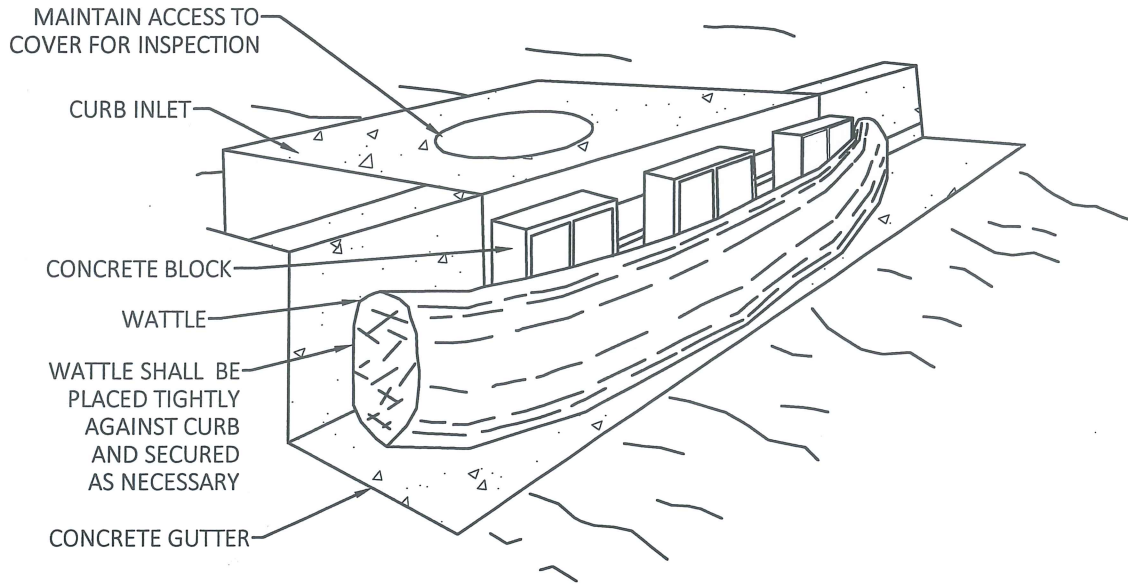
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Inlet diversion shall only be used with the approval of the Engineer. Additional Inlet on Grade devices shall be used in conjunction with approved inlet diversions.
3. Inlet Diversion may be used with or without the Linear Sediment Barrier, subject to approval by the Engineer.

**Inlet Protection - Curb Inlet Diversion**

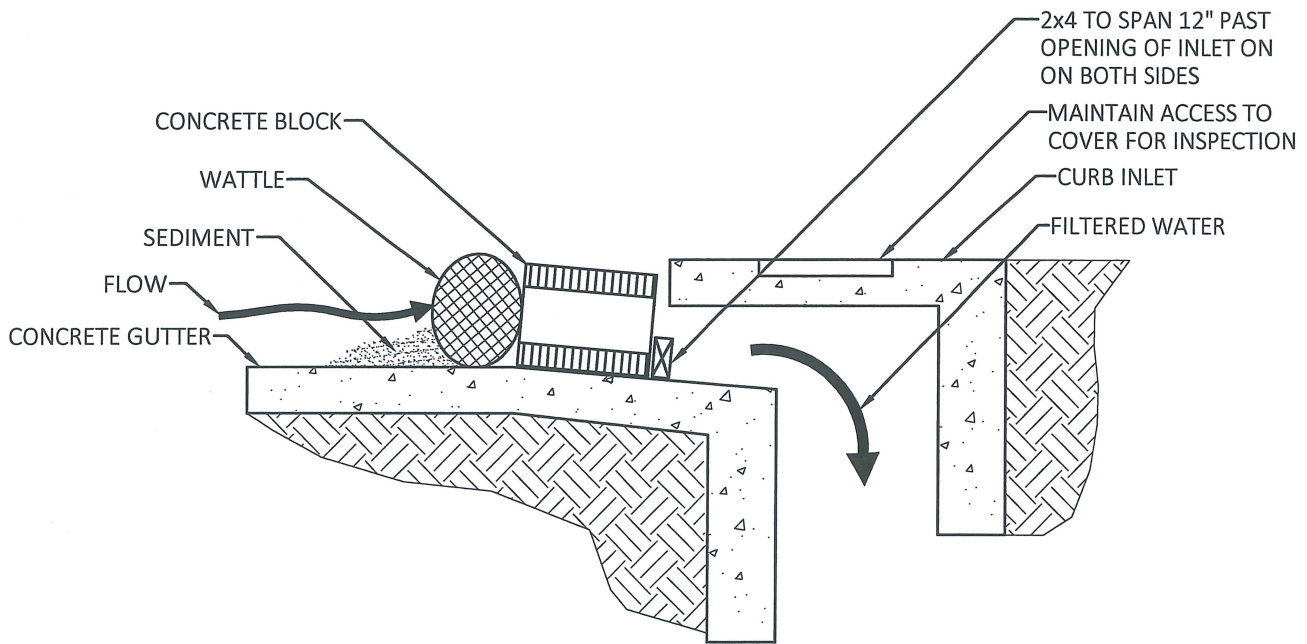
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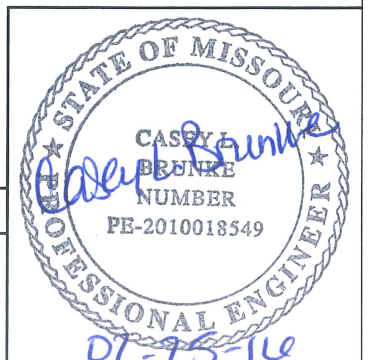
PERSPECTIVE



SECTION

Notes:

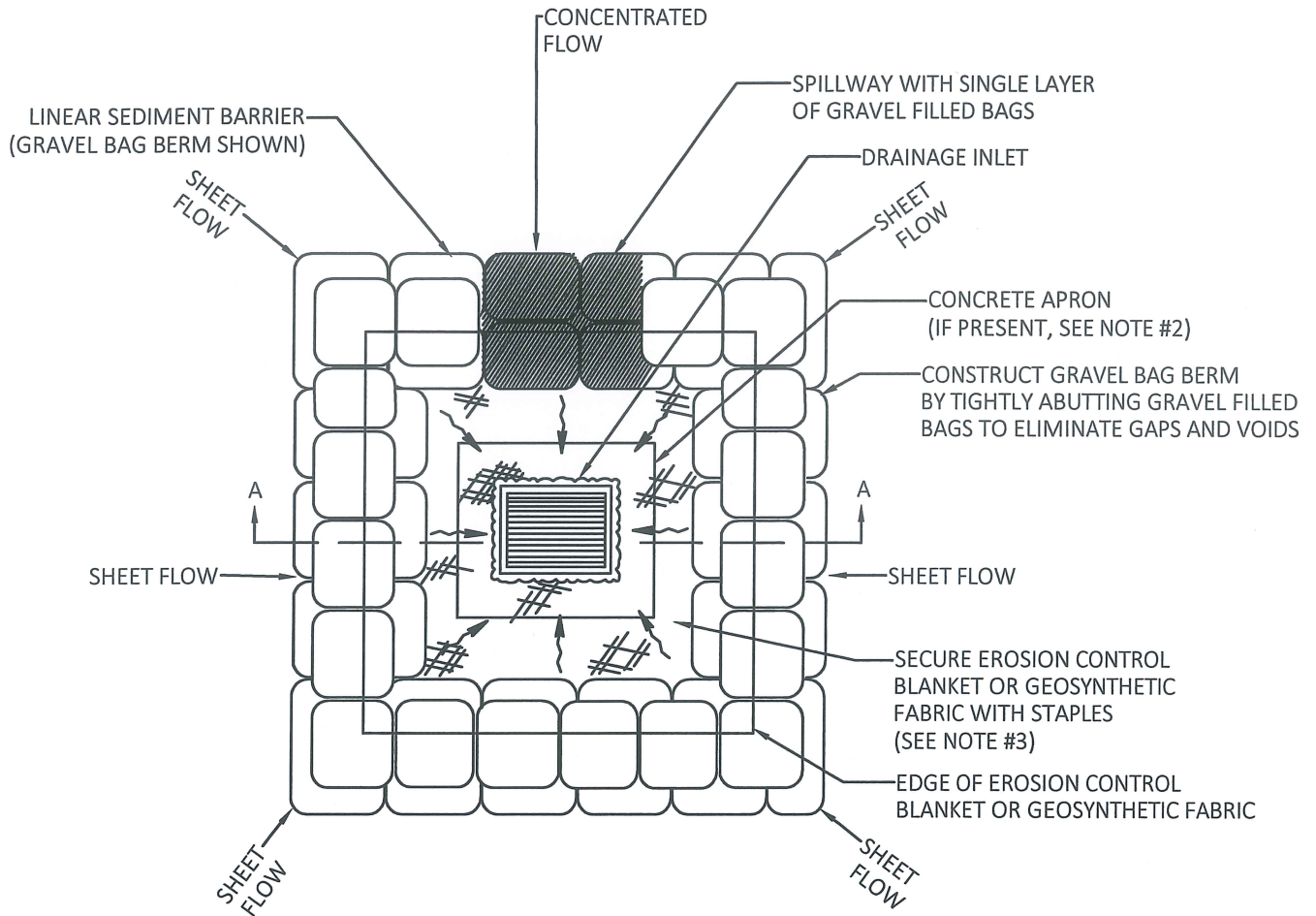
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. This method of Inlet Protection is applicable at curb inlets where ponding is in front of the structures and unprotected areas.
3. Depending on the opening of the inlet, the concrete block may have to be placed vertically.



**Inlet Protection - Curb Inlet with Wattle**

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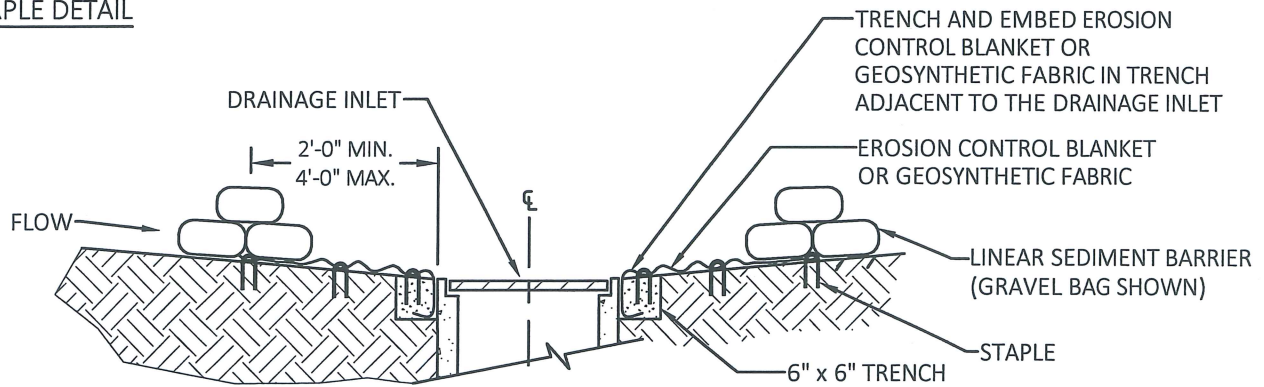
**CITY of CAPE GIRARDEAU**  
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PLAN



STAPLE DETAIL



SECTION A-A

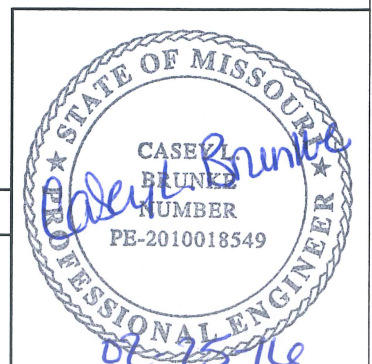
**Notes:**

1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Position erosion control blanket at edge of concrete apron and secure in trench.
3. Erosion control blanket is not required if the area adjacent to the inlet is vegetated or paved.

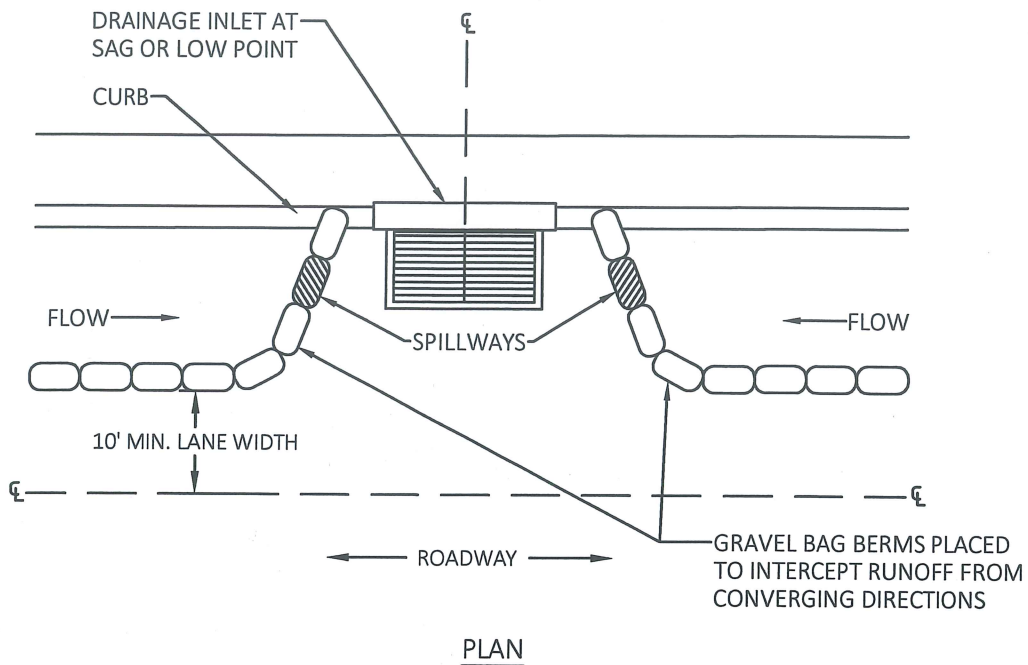
**Inlet Protection - Area Inlet**

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Slope or Roadway (Percent) %	1 to 3.9	4 to 5.9	6 to 7.9	8 to 10	10+
Maximum Interval between Berms	100'	75'	50'	25'	12'

FOR SLOPE OF LESS THAN 1% INSTALL BARRIERS IF EROSION/ SEDIMENT IS PRESENT, SUBJECT TO THE APPROVAL OF ENGINEER.

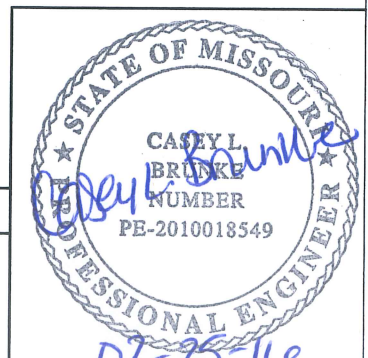
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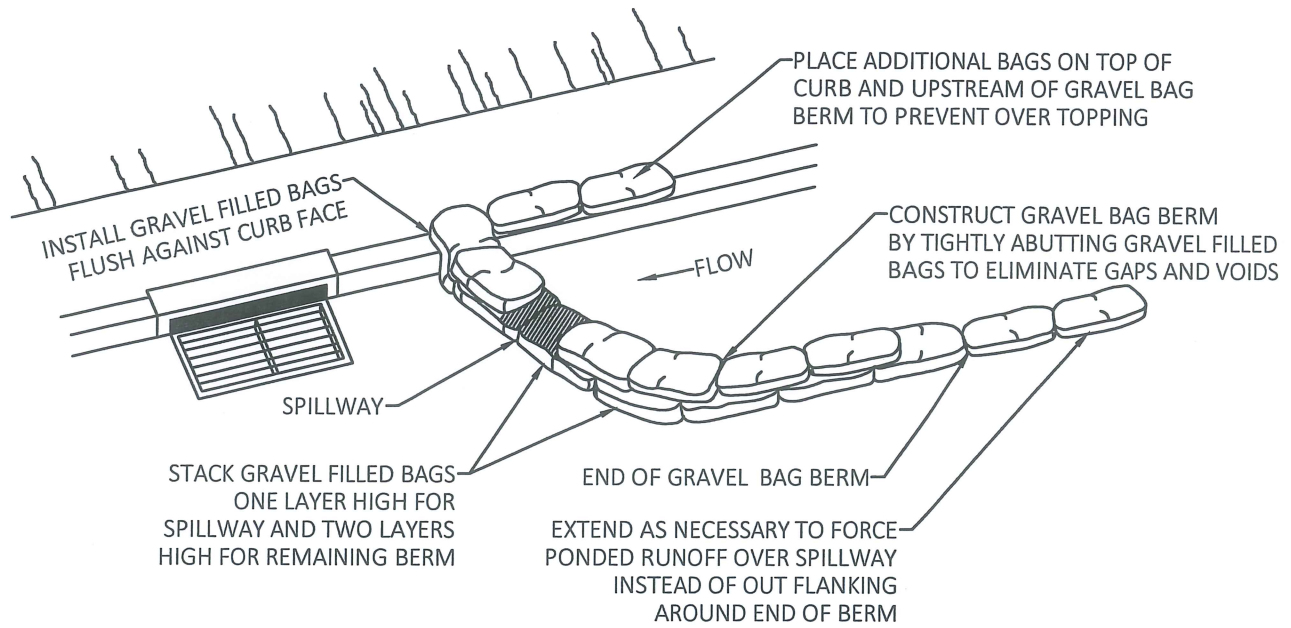
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Place traffic cones adjacent to drainage inlet protection.
3. Dimensions may vary to fit field conditions.
4. Install a minimum of three gravel bag berms upstream of each drainage inlet to be protected.

**Inlet Protection - Inlet at Sag Point**

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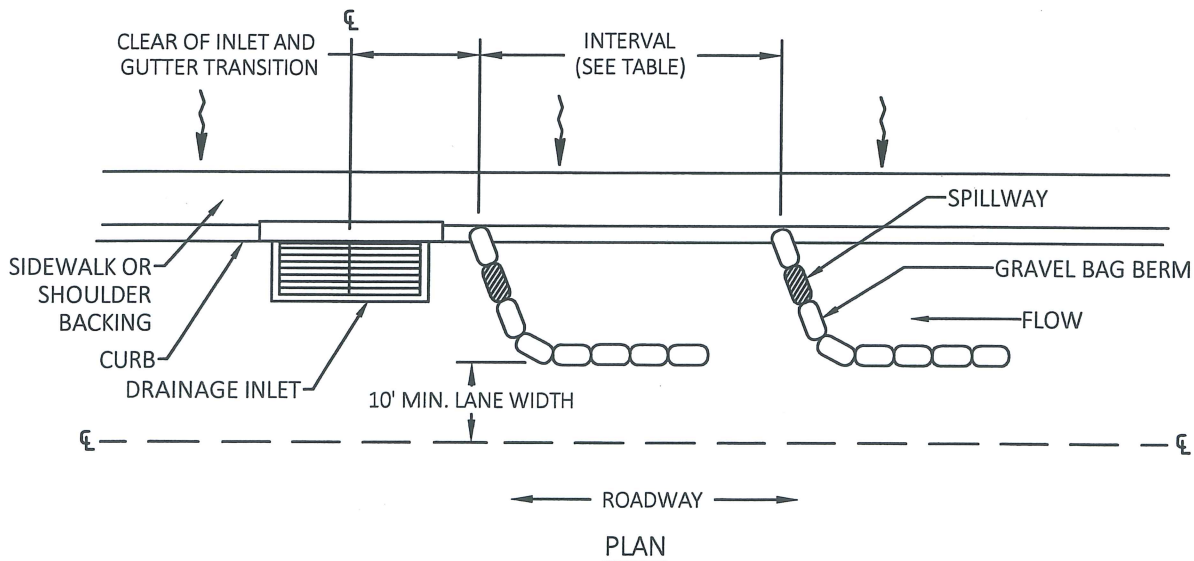




PERSPECTIVE

Gravel Bag Berm Spacing Table					
Slope or Roadway (Percent) %	1 to 3.9	4 to 5.9	6 to 7.9	8 to 10	10+
Maximum Interval between Berms	100'	75'	50'	25'	12'

FOR SLOPE OF LESS THAN 1% INSTALL BARRIERS IF EROSION/ SEDIMENT IS PRESENT, SUBJECT TO THE APPROVAL OF ENGINEER.



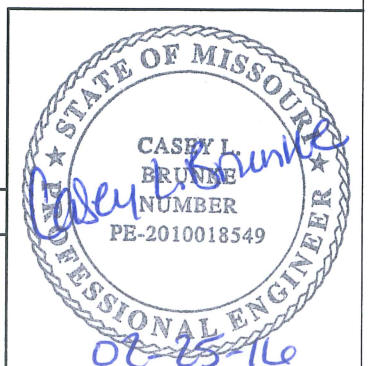
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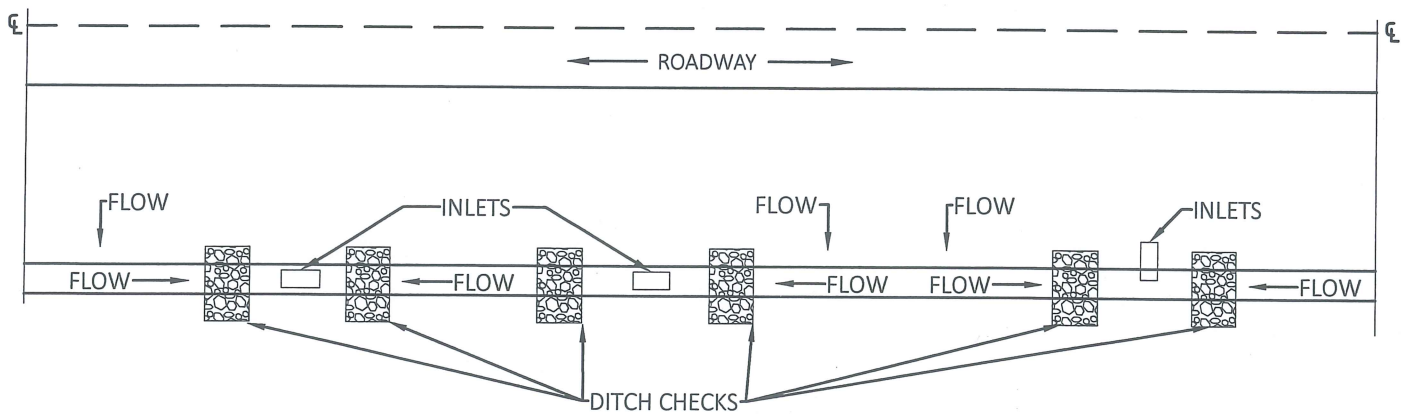
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Place traffic cones adjacent to drainage inlet protection.
3. Dimensions may vary to fit conditions.
4. Install a minimum of three gravel bag berms upstream of each drainage inlet to be protected.

**Inlet Protection - Inlet on Grade**

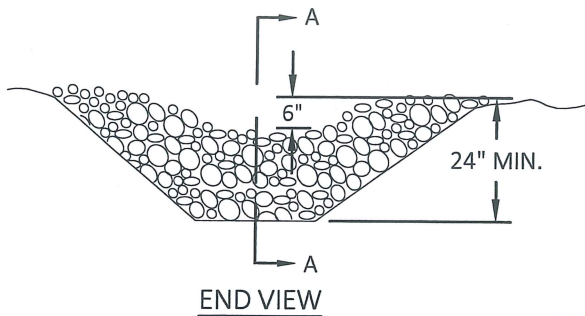
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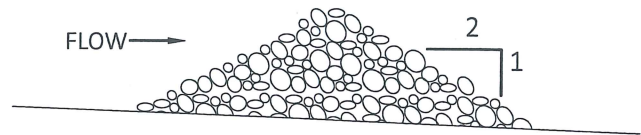




AREA INLET DITCH CHECK



END VIEW



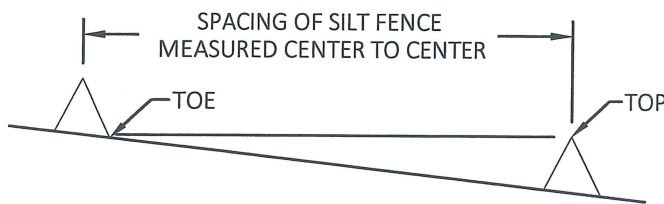
SECTION A-A

DITCH CHECK

**Example Ditch Check Spacing for Standard Heights (FT.)**

Ditch Slope %	Spacing for 24" Height	Spacing for 18" Height
0.5	400	300
1.0	200	150
1.5	133	100
2.0	100	75
2.5	80	60
3.0	66	50
3.5	57	43
4.0	50	38
4.5	44	33
5.0	40	30
5.5	38	27
6.0	35	25
6.5	30	23
7.0	28	21
7.5	26	20
8.0	25	19
8.5	23	18
9.0	22	17
9.5	21	16
10.0	20	15

ELEVATION OF TOE MUST BE SAME OR LESS THAN ELEVATION OF TOP.



MINIMUM DITCH CHECK SPACING

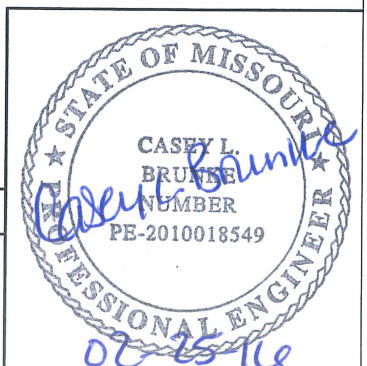
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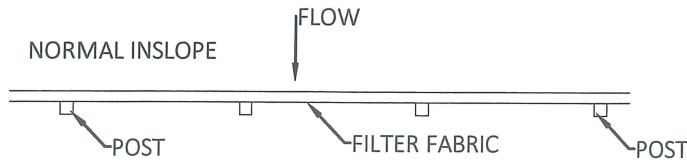
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Rock Ditch Check shall be removed after vegetation has sufficiently matured to protect the ditch or swales, as determined by the Engineer, or after ditch liner has been placed.
3. Ditch checks located adjacent to area inlets shall provide a minimum of 12 inches and a maximum of 18 inches of height above the inlet grade.
4. The predominate size of rock used shall range between four and 12 inches.

**Rock Ditch Checks**

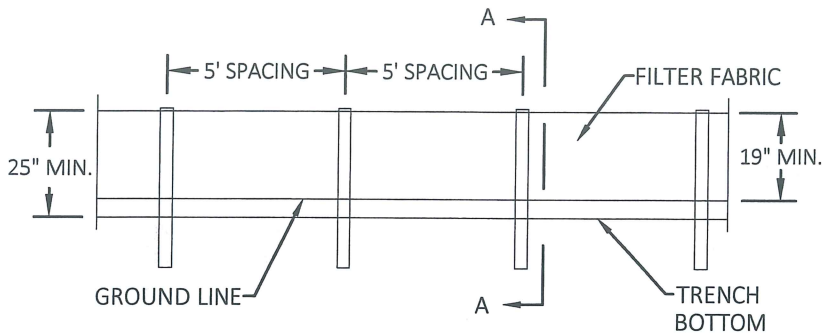
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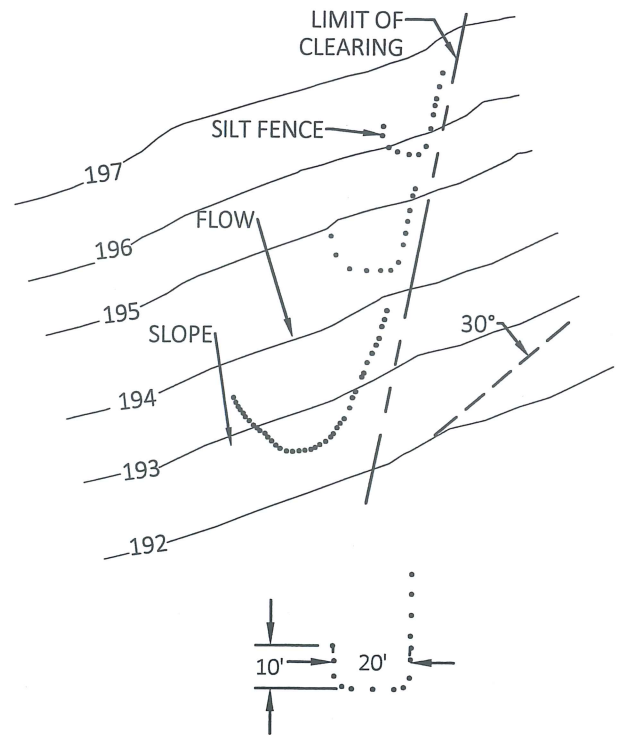




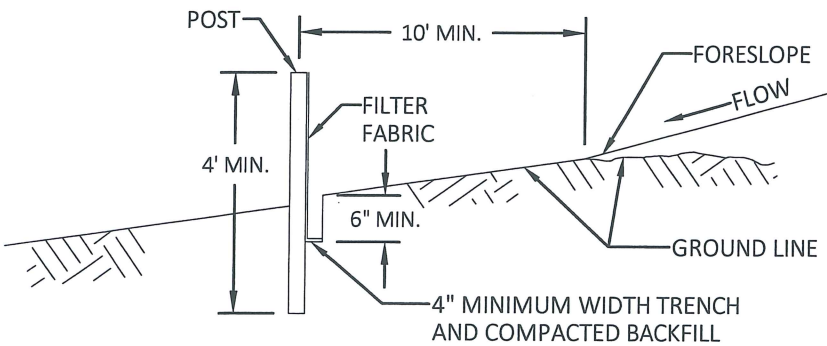
PLAN VIEW



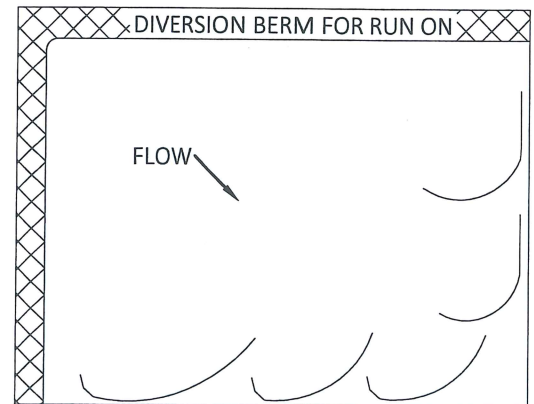
ELEVATION DETAIL



J-HOOK DIMENSIONS (TYP.)



SECTION A-A



- SILT FENCE PLACEMENT

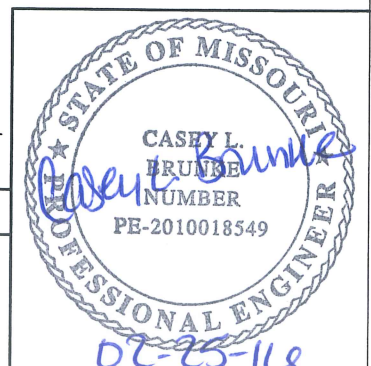
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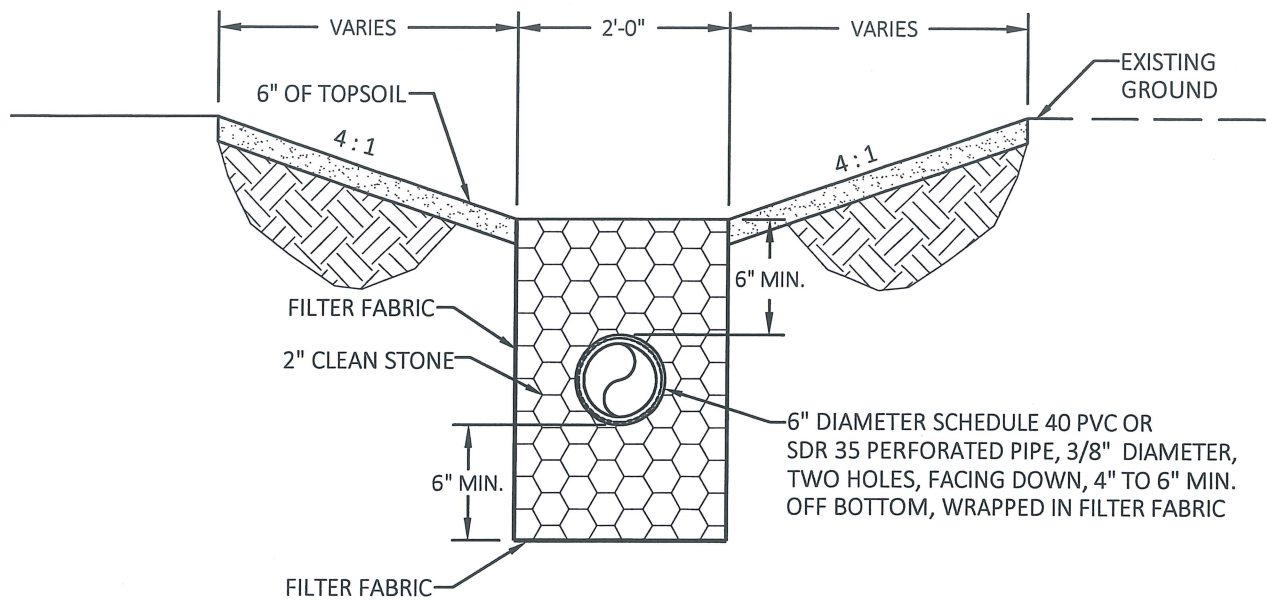
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. On all slopes greater than ten feet high, mid-slope runs of silt fence shall be provided.
3. For fabric silt fence, the minimum longitudinal splice overlap shall be two feet with a post at each end. The fabric shall be secured to posts.
4. Silt fence shall not be used on concentrated flows, across drainage ditches or drains. Instead ditch checks shall be used as shown on plans or as directed by Engineer.
5. One quarter (1/4) acre per 100 feet of fence with maximum length of 600 feet.
6. Drive support stakes to half of their length.
7. J-Hook minimum width of 20 feet with a ten foot length of fence turned uphill as shown, is recommended. Where space is limited narrower hooks may be used with a higher spacing frequency. J-Hooks shall be used when the silt fence is installed at an angle of 30 degrees or greater from parallel to the contours.

**Silt Fence and J-Hooks**

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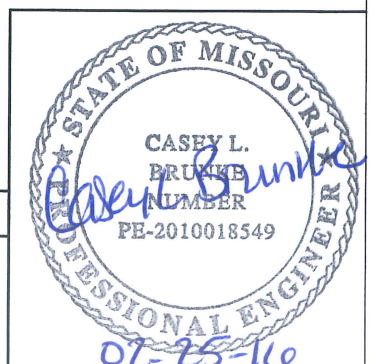
**Notes:**

All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.

**Infiltration Trench**

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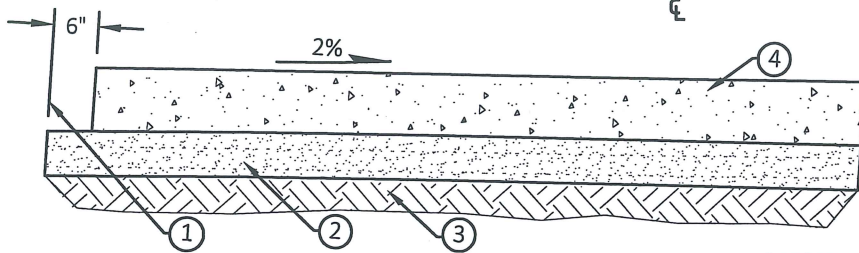
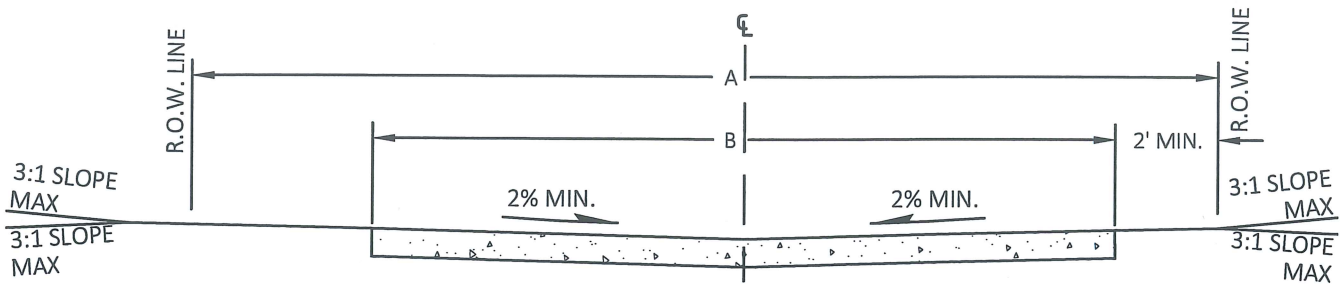
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Street Standards Development Type:	Max. Block Length	Max. Cul-De-Sac Length	Max. Loop Street Length
Single Family Lots > 1 Ac.	1000'-0"	800'-0"	3000'-0"
Single Family & Two Family Lots < 1 Ac.	800'-0"	600'-0"	2400'-0"
Multifamily Residential and Townhouses	600'-0"	500'-0"	1800'-0"
Commercial	500'-0"	500'-0"	1500'-0"

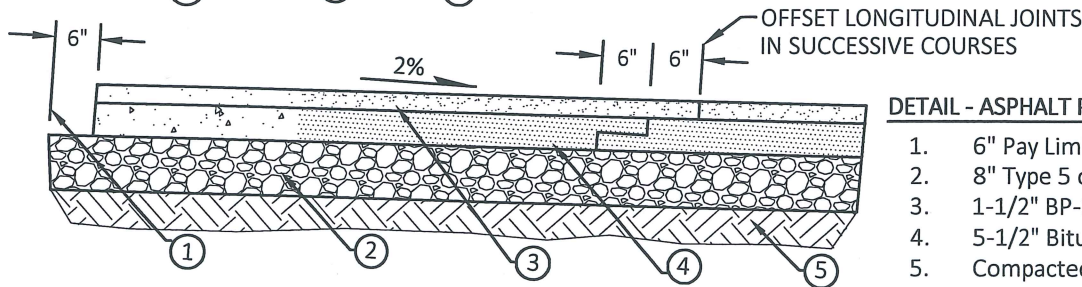
**Notes:**

1. Vertical curves: All changes in grade shall be connected by vertical curves to provide a smooth transition and the required sight distance.
2. Blocks shall have sufficient depth to provide for two tiers of lots of appropriate depth.
3. Refer to the City Code for additional design requirements.



**DETAIL - CONCRETE PAVEMENT KEY:**

1. 6" Pay Limit of Aggregate Base
2. 4" Type 5 or Type 7 Aggregate
3. Compacted Subgrade
4. 7" Portland Cement Concrete



**DETAIL - ASPHALT PAVEMENT KEY:**

1. 6" Pay Limit for Aggregate Base
2. 8" Type 5 or Type 7 Aggregate
3. 1-1/2" BP-2 Asphalt Pavement
4. 5-1/2" Bituminous Base (Placed in 2 Lifts)
5. Compacted Subgrade

Alley Widths Development Type:	"A" Right-of-Way	"B" Pavement	Maximum Grade (%)
Single Family Lots > 1 Ac.	20'-0"	14'-0"	12
Single Family & Two Family Lots < 1 Ac.	20'-0"	14'-0"	11
Multifamily Residential and Townhouses	20'-0"	14'-0"	10
Commercial	20'-0"	14'-0"	10

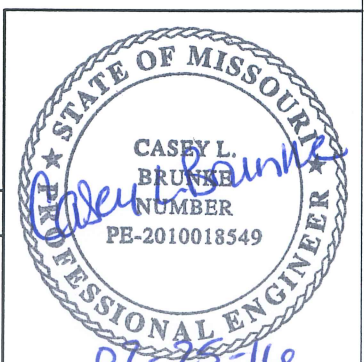
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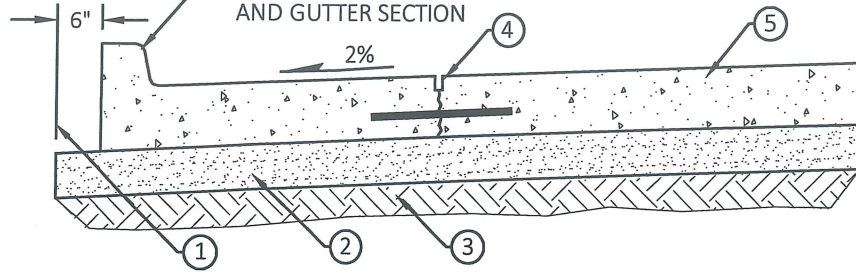
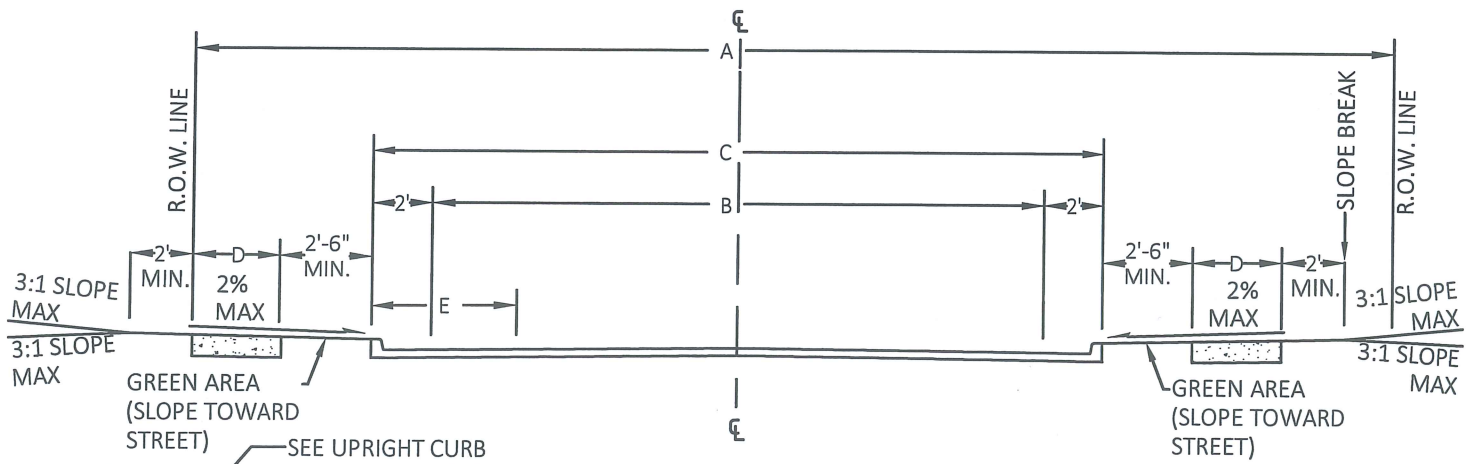
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Minimum alley grade shall be 2.0% to 4.0% to insure proper drainage.
3. Refer to Street Standards in City Code for additional requirements.
4. Utility easements of a ten foot width shall be provided on one or both sides of the Right of Way, as directed by the Engineer.
5. If alley pavement abuts a structure, a 1/2" isolation joint shall be between the pavement and the structure.

**Street Standards and Alley Typical Sections**

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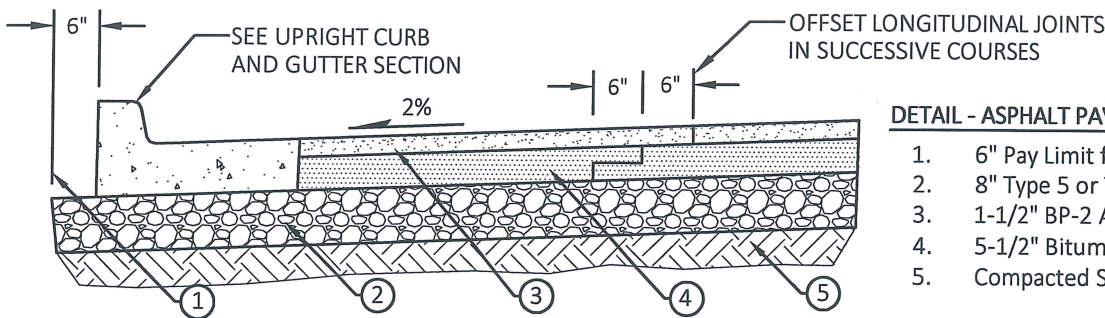
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**DETAIL - CONCRETE PAVEMENT KEY:**

1. 6" Pay Limit of Aggregate Base
2. 4" Type 5 or Type 7 Aggregate
3. Compacted Subgrade
4. Location of Type "C" Joint
5. 7" Portland Cement Concrete



**DETAIL - ASPHALT PAVEMENT KEY:**

1. 6" Pay Limit for Aggregate Base
2. 8" Type 5 or Type 7 Aggregate
3. 1-1/2" BP-2 Asphalt Pavement
4. 5-1/2" Bituminous Base (Placed in 2 Lifts)
5. Compacted Subgrade

Local Street Widths Development Type:	"A" Right-of-Way	"B" Pavement	"C" Back of Curb	"D" Sidewalk	"E" On-Street Parking Lanes (Width/ Side)	Maximum Grade (%)
Single Family Lots > 1 Ac.	50'-0"	20'-0"	24'-0" *	N/A	7' One Side Only	12
Single Family & Two Family Lots < 1 Ac.	50'-0"	24'-0"	28'-0"	5'-0"	7' One Side Only	11
Multifamily Residential and Townhouses	60'-0"	36'-0"	40'-0"	6'-0"	7' Both Sides	10
Commercial	60'-0"	36'-0"	40'-0"	6'-0"	None	8

\*TWO 2-FOOT SHOULDERS MAY BE USED IN LIEU OF CURBS.

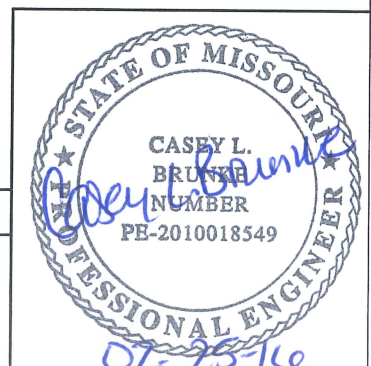
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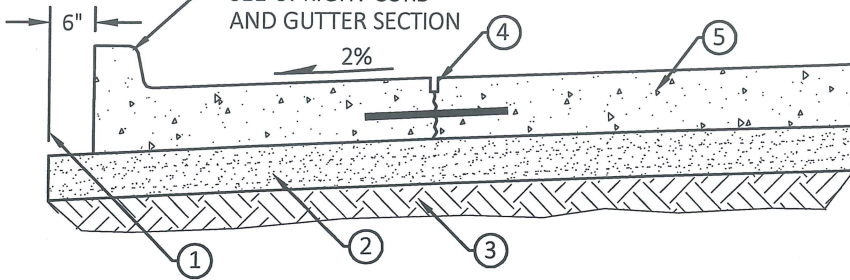
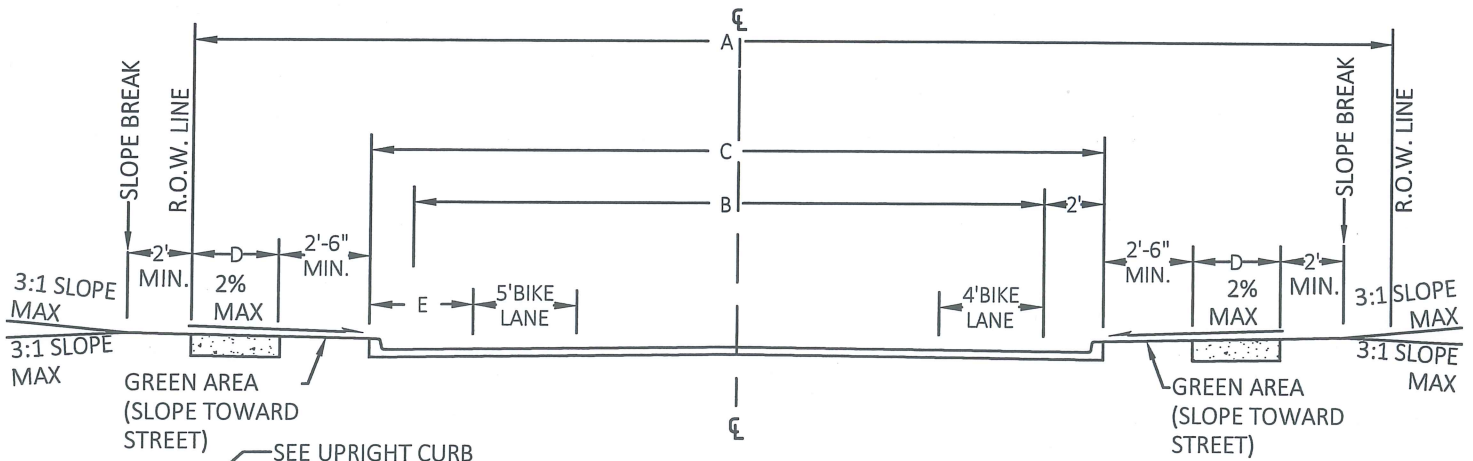
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Sidewalk offset widths greater than 2.5 feet are desirable in situations where it eliminates the need to depress the sidewalk profile across multiple driveways and accommodate street lighting.
3. Bike lanes may be required in some instances resulting in pavement widths greater than those shown. Refer to City Code.
4. Minimum street grade shall be 1.0% to insure proper drainage.
5. Utility easements of a ten foot width shall be provided on each side of Right-of-Way.
6. Additional lanes and Right-of-Way widths may be required to meet traffic needs.
7. Refer to Street Standards in City Code for additional requirements.
8. For concrete pavement see Joint Layout.

**Local Street Typical Sections**

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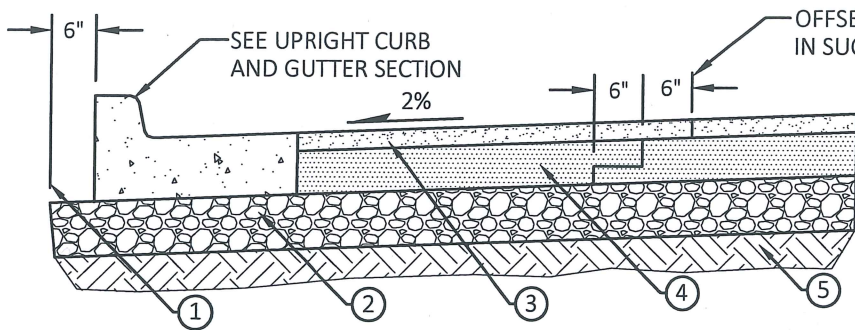
**CITY of CAPE GIRARDEAU**  
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**DETAIL - CONCRETE PAVEMENT KEY:**

- 6" Pay Limit of Aggregate Base
- 4" Type 5 or Type 7 Aggregate
- Compacted Subgrade
- Location of Type "C" Joint
- 7" Portland Cement Concrete



**DETAIL - ASPHALT PAVEMENT KEY:**

- 6" Pay Limit for Aggregate Base
- 8" Type 5 or Type 7 Aggregate
- 1-1/2" BP-2 Asphalt Pavement
- 5-1/2" Bituminous Base (Placed in 2 Lifts)
- Compacted Subgrade

Collector Street Widths Development Type:	"A" Right-of-Way	"B" Pavement	"C" Back of Curb	"D" Sidewalk	"E" On-Street Parking Lanes (Width/ Side)	Maximum Grade (%)
Single Family Residential Lots > 1 Ac.	60'-0"	24'-0"	28'-0"	5'-0"	None	10
Single Family & Two Family Lots < 1 Ac.	60'-0"	27'-0"	31'-0"	5'-0"	7' One Side Only	10
Multifamily Residential and Townhouses	80'-0"	36'-0"	40'-0"	6'-0"	7' Both Sides	10
Commercial	80'-0"	40'-0"	44'-0"	6'-0"	8' Both Sides	7

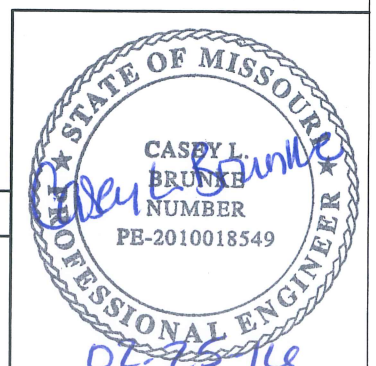
**Notes:**

- All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
- Sidewalk offset widths greater than 2.5 feet are desirable in situations where it eliminates the need to depress the sidewalk profile across multiple driveways and accommodate street lighting.
- Bike lanes may be required in some instances resulting in pavement widths greater than those shown. Refer to City Code.
- Minimum street grade shall be 1.0% to insure proper drainage.
- Utility easements of a ten foot width shall be provided on each side of Right-of-Way.
- Additional lanes and Right-of-Way widths may be required to meet traffic needs.
- Refer to Street Standards in City Code for additional requirements.
- For concrete pavement see Joint Layout.

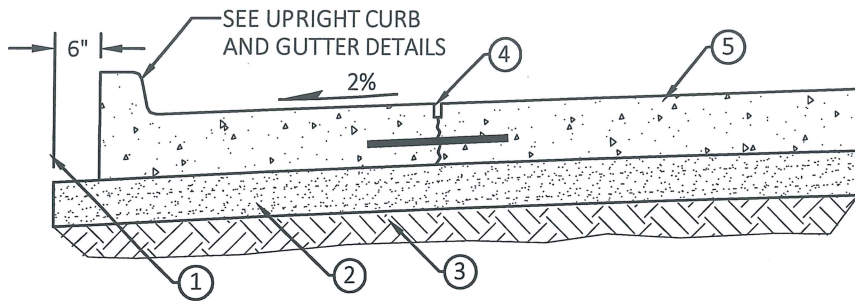
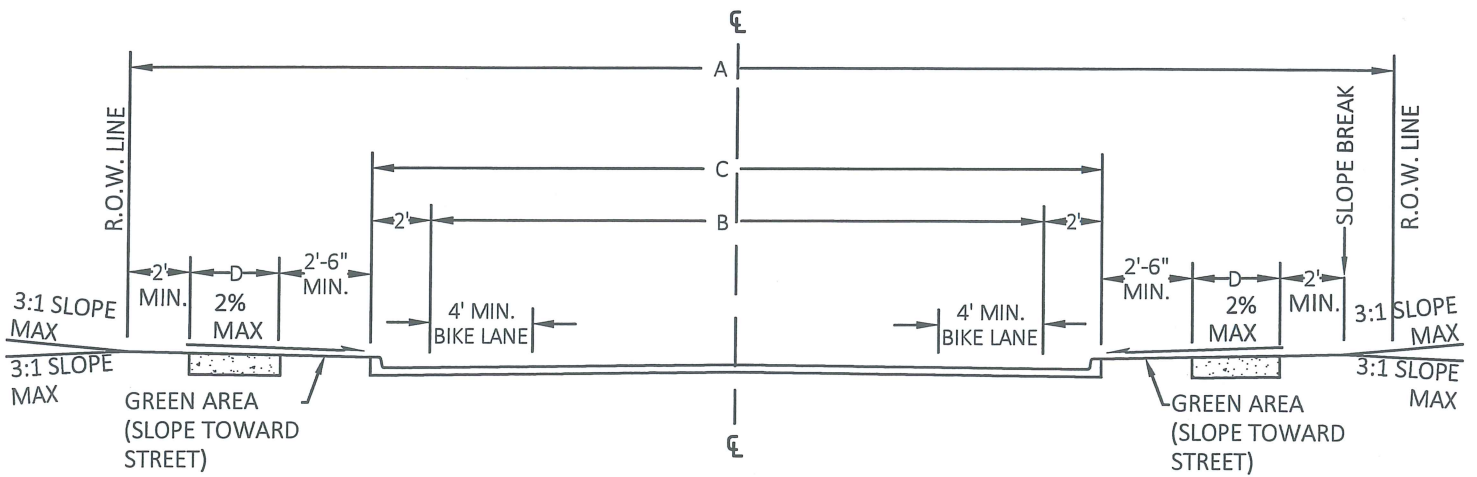
**Collector Street Typical Sections**

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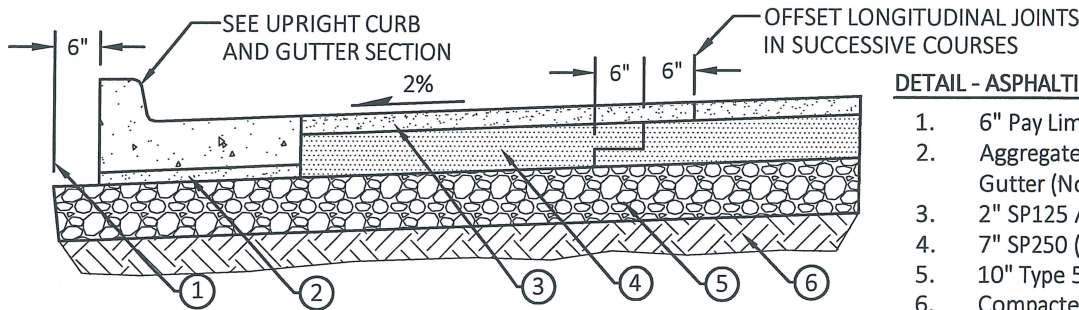






**DETAIL - CONCRETE PAVEMENT KEY:**

1. 6" Pay Limit of Aggregate Base
2. 6" Type 5 or Type 7 Aggregate
3. Compacted Subgrade
4. Location of Type "C" Joint
5. 8" Portland Cement Concrete



**DETAIL - ASPHALTIC CONCRETE PAVEMENT KEY:**

1. 6" Pay Limit for Aggregate Base
2. Aggregate Base or Thicken Curb and Gutter (No Direct Pay)
3. 2" SP125 Asphaltic Concrete Pavement
4. 7" SP250 (Placed in 2 Lifts)
5. 10" Type 5 or Type 7 Aggregate
6. Compacted Subgrade

Arterial Street Widths Development Type:	"A" Right-of-Way	"B" Pavement	"C" Back of Curb	"D" Sidewalk	Bike Lanes Min.	Maximum Grade (%)
Multifamily Residential and Townhouses	100'-0"	36'-0"	40'-0"	6'-0"	4'-0"	8
Commercial	100'-0"	36'-0"	40'-0"	6'-0"	4'-0"	6

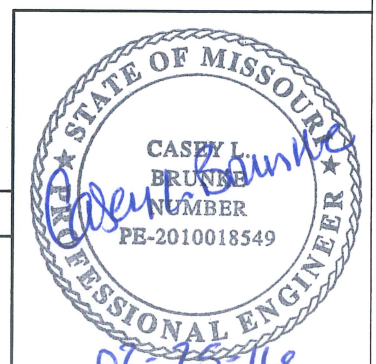
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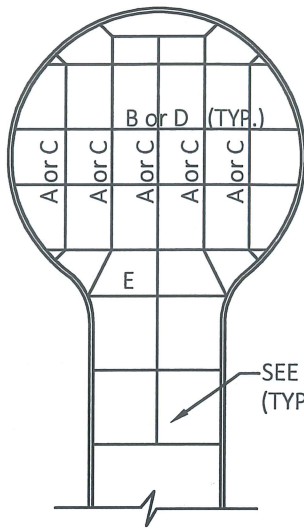
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Sidewalk offset widths greater than 2.5 feet are desirable in situations where it eliminates the need to depress the sidewalk profile across multiple driveways and accommodate street lighting.
3. Bike lanes may be required in some instances resulting in pavement widths greater than those shown. Refer to City Code.
4. Minimum street grade shall be 1.0% to insure proper drainage.
5. Utility easements of a ten foot width shall be provided on each side of Right-of-Way.
6. Additional lanes and Right-of-Way widths may be required to meet traffic needs.
7. Refer to Street Standards in City Code for additional requirements.
8. For concrete pavement see Joint Layout.

**Arterial Street Typical Sections**

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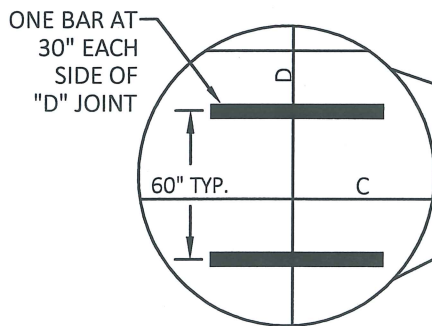
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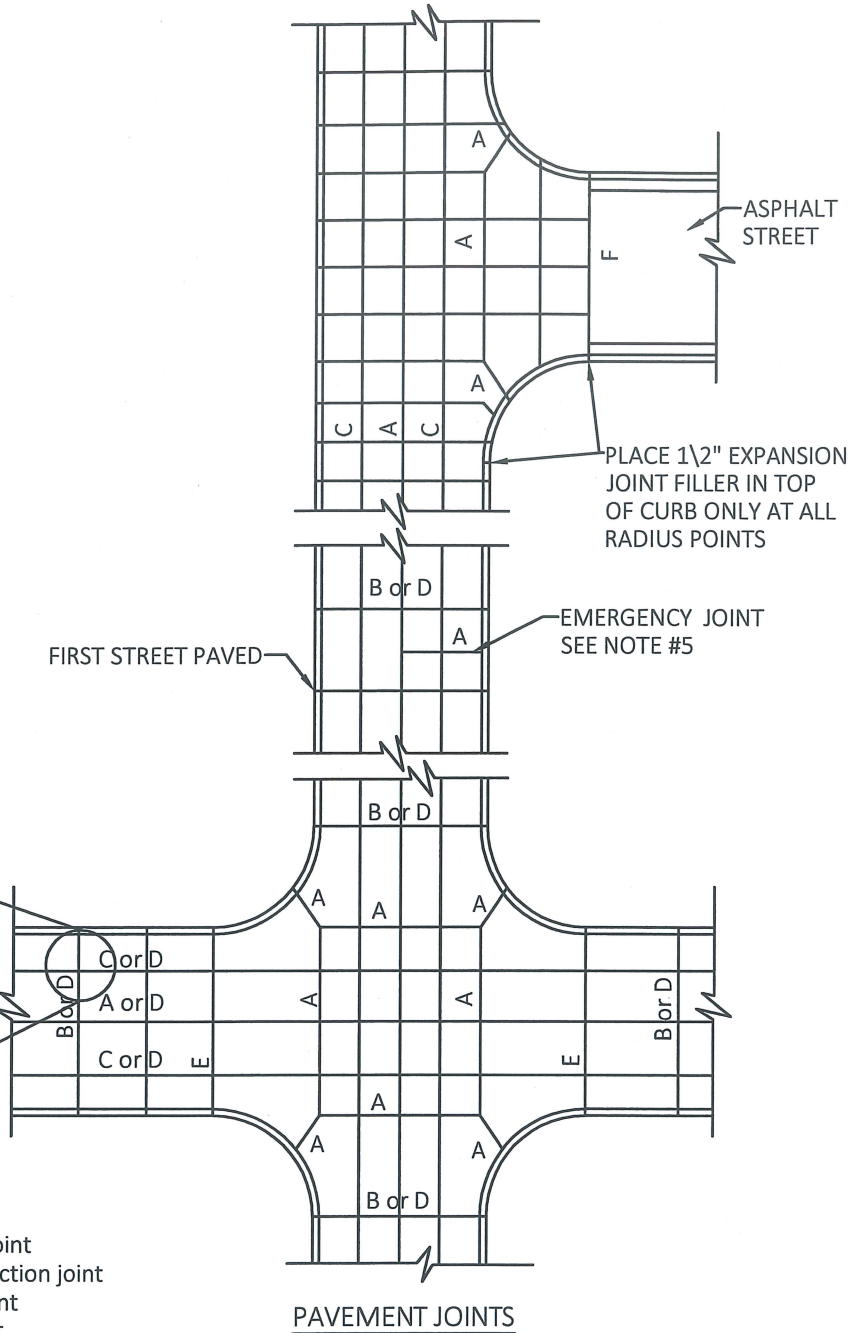
CUL-DE-SAC JOINT PLAN

SEE NOTE #2  
(TYP. ALL SLABS)



Joint Types:

- A - Longitudinal Construction joint
- B - Planned Transverse Construction joint
- C - Longitudinal Contraction joint
- D - Transverse Contraction joint
- E - Isolation joints
- F - Pavement Connection



PAVEMENT JOINTS

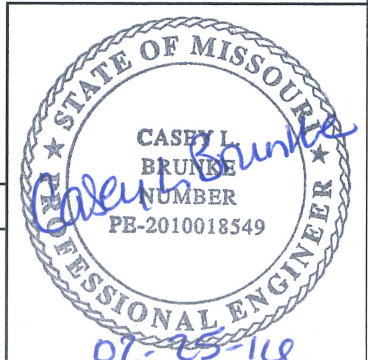
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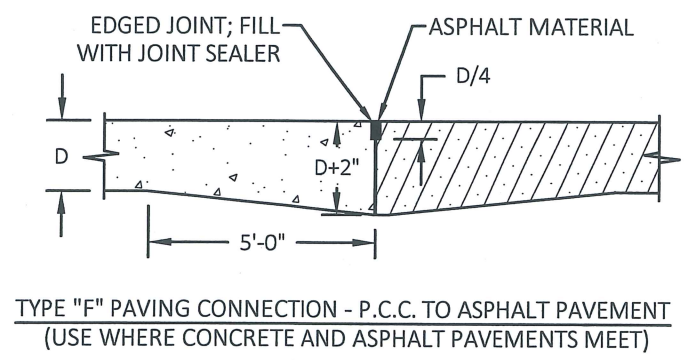
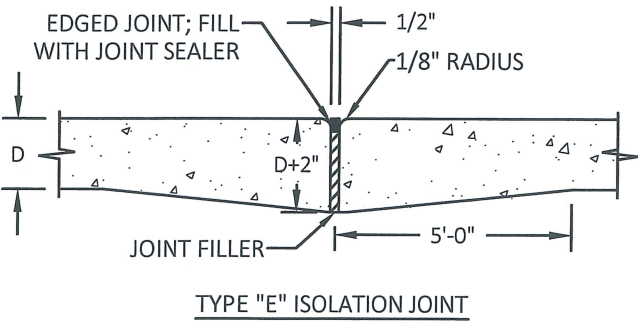
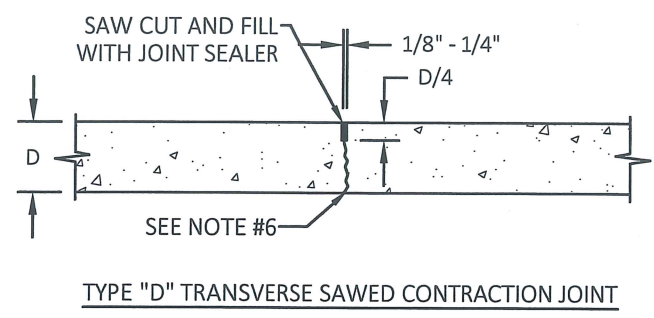
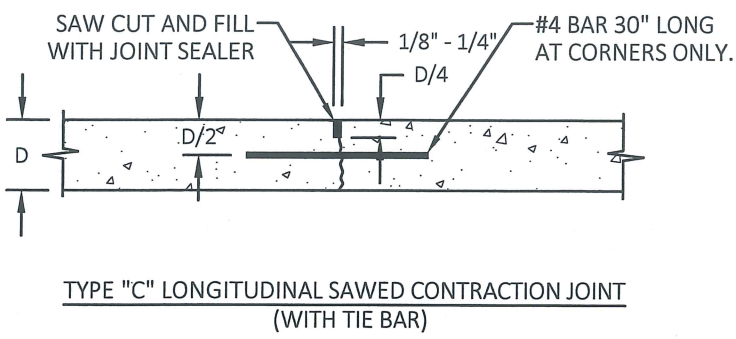
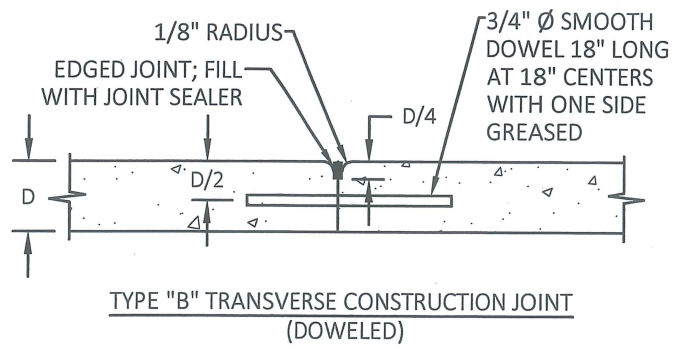
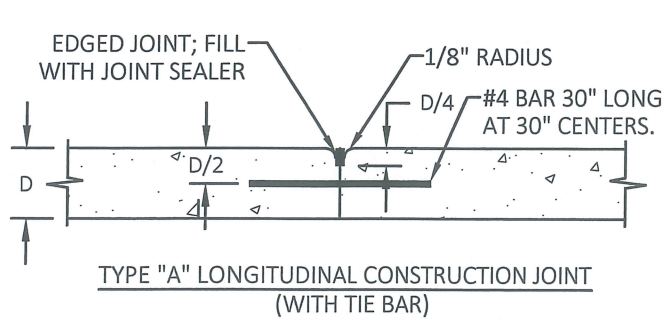
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Longitudinal Joints shall be maximum spacing of 14 feet. Transverse joints shall be maximum spacing of 15 feet. Ratio length-to-width for slabs shall be 3 to 2 maximum.
3. Joints type "C" and "D" shall be sawed as soon as concrete can withstand raveling. All sawed joints shall be cleaned and filled with bituminous compound following sawing.
4. Use Type "A" or "B" Joint at end of days work.
5. Emergency transverse joints shall be Type "A" with #4 rebar 30" long at 24" centers.

**Joint Layout Details for Concrete Pavement**

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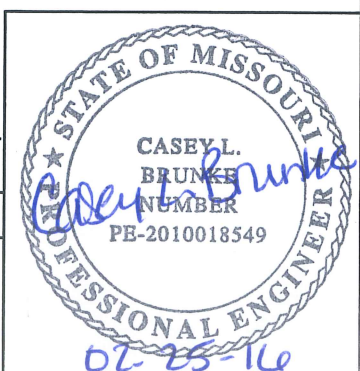
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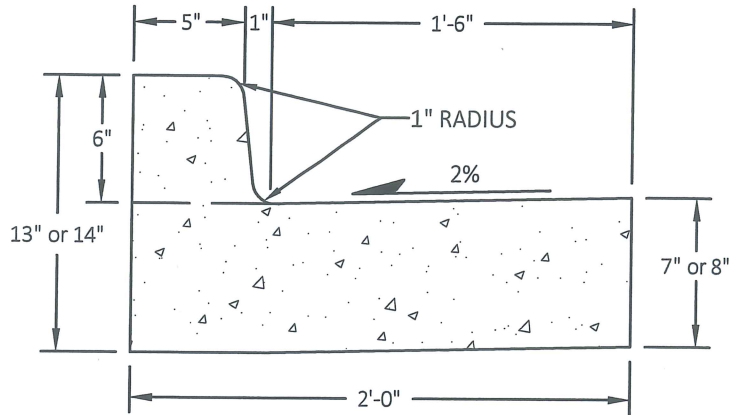
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Saw cut depth shall be one quarter (1/4) of the pavement thickness (D).
3. Bars that are drilled shall be tightly set with epoxy filler, per APL.
4. Isolation joint filler shall consist of 3/4" preformed fiber expansion joint filler, per APL.
5. Thickened edge isolation joints shall be placed at "T" intersections and unsymmetrical intersections at locations shown on the Joint Layout Detail. Isolation joints shall be constructed adjacent to fixed objects when specified by the Engineer. Isolation joints placed at fixed objects do not require a thickened edge.
6. For Contraction and Isolation joints in sidewalks see City of Cape Girardeau Standard Specifications.
7. See APL for joint sealant material.

**Joint Details - Portland Cement Concrete Pavement Streets**

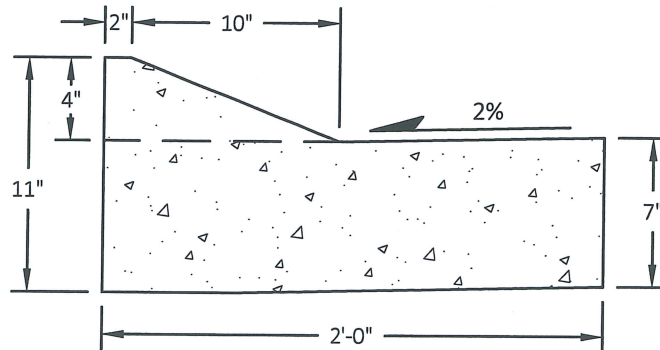
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UPRIGHT 6" CURB AND GUTTER SECTION



LIP CURB AND GUTTER SECTION

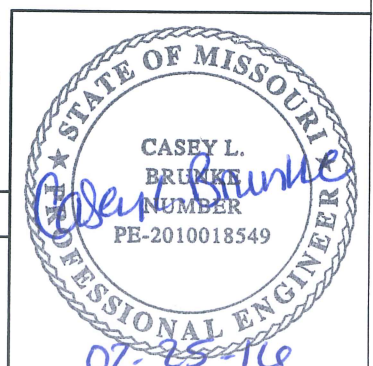
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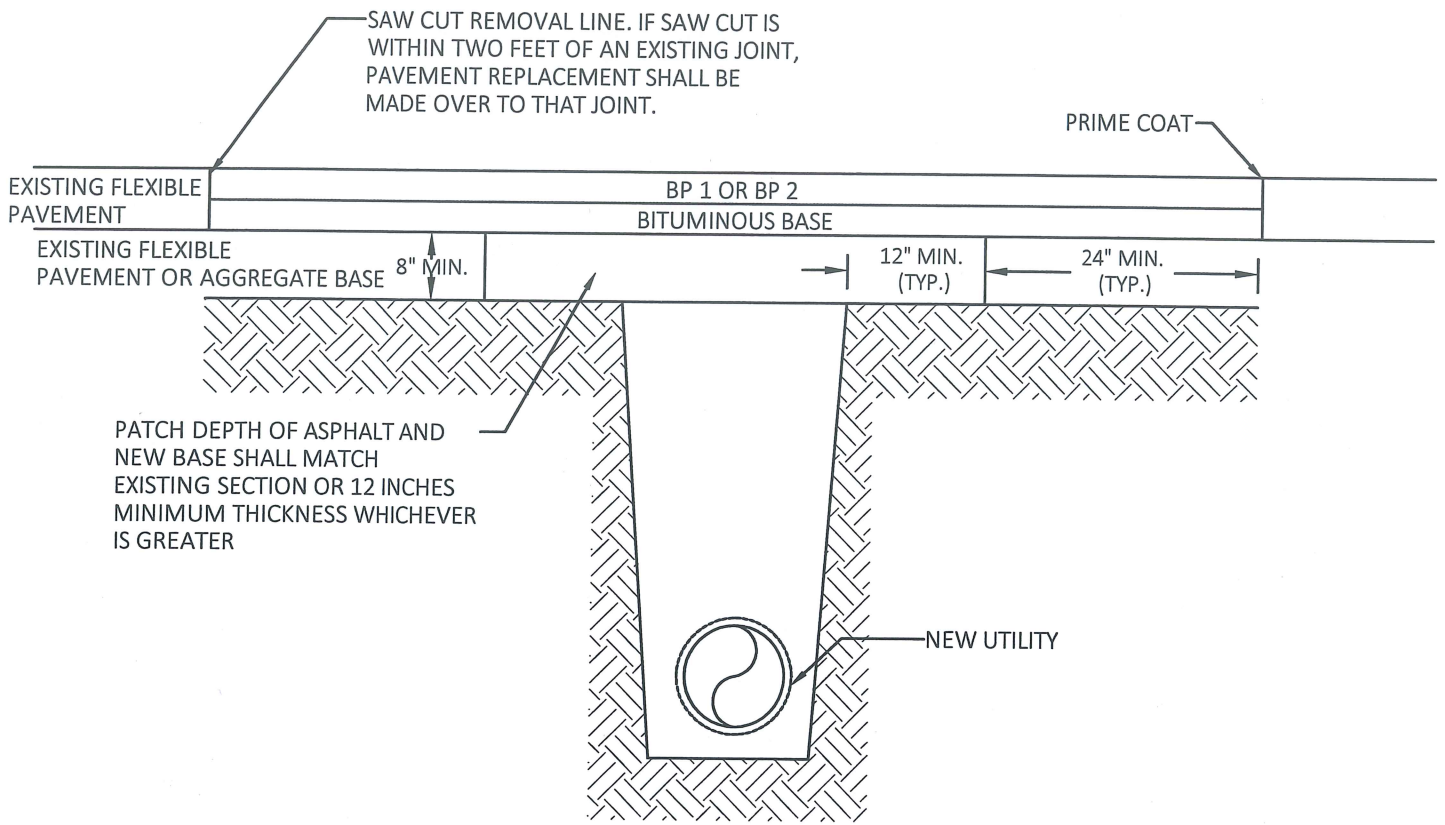
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Lip curb allowed on Local and Collector Streets only.
3. Concrete shall have 28 day minimum strength of 4000 PSI.
4. Upright curb must be used if sidewalk located less than 2.5 feet from back of curb.
5. A six (6") inch curb shall not be depressed over four and half (4 1/2") inches.
6. All curbs and gutters shall be placed monolithically.
7. Saw cut contraction joints for curb and gutter sections at 15 foot intervals or as directed by Engineer. Provide half (1/2) inch preformed expansion joints at 75 foot intervals and at ends of curb returns and all radius points.
8. See Street Sections regarding placement of base under curb and gutter.
9. Integral curb shall be at the same profile.

**Curb and Gutter**

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**Notes:**

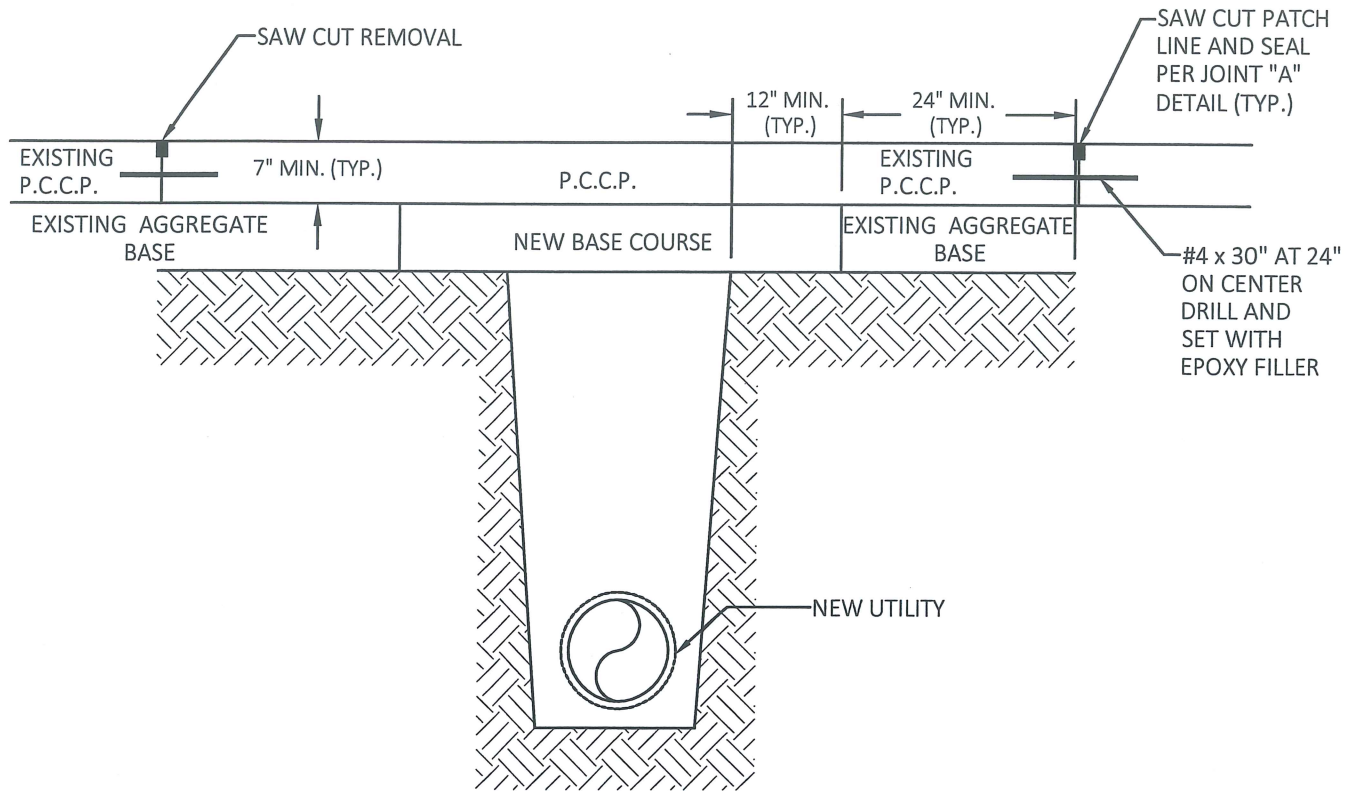
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All excavations in City Right-of-Way require permits in conjunction with a three day notice prior to the start of work. Contractor shall be responsible for providing and maintaining traffic control during construction. All traffic control devices shall conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the MoDOT Quality Standards for Temporary Traffic Control Devices.
3. All cuts in streets, curbs and sidewalks shall be sawed. Backfill shall be aggregate compacted to density equal to that of the surrounding materials.
4. Surface of the new patch shall conform to the grade that existed prior to excavation so as to leave the street surface smooth. Disturbed unpaved areas shall be leveled, seeded and mulched.
5. Non-emergency excavations shall occur from 8:30 AM to 4:00 PM week days. There shall be a 48 hour maximum "open time" for excavations before temporary or permanent patch is made. All openings shall be closed and the street opened for traffic by 4:00 PM daily.
6. Where it is necessary to leave an excavation open, such as for concrete curing in the bottom of manholes, a cover shall be provided and set over the opening that will support any load that may pass over the hole.
7. When an emergency occurs that requires excavation within City Right-of-Way and City offices are closed, the work may be done but the City shall be notified immediately when offices are re-opened.

**Flexible Pavement Repair**

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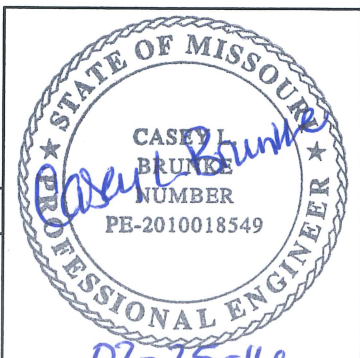
**Notes:**

1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Concrete shall have 28 day minimum strength of 4000 PSI.
3. All excavations in City Right-of-Way require permits. Contractor shall be responsible for providing and maintaining traffic control during construction. All traffic control devices shall conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the MoDOT Quality Standards for Temporary Traffic Control Devices.
4. All cuts in streets, curbs and sidewalks shall be sawed. Backfill shall be aggregate compacted to density equal to that of the surrounding materials.
5. Surface of the new patch shall conform to the grade that existed prior to excavation so as to leave the street surface smooth. Disturbed unpaved areas shall be leveled, seeded and mulched.
6. Non-emergency excavations shall occur from 8:30 AM to 4:00 PM week days. There shall be a 48 hour maximum "open time" for excavations before temporary or permanent patch is made. All openings shall be closed and the street opened for traffic by 4:00 PM daily.
7. Where it is necessary to leave an excavation open, such as for concrete curing in the bottom of manholes, a cover shall be provided and set over the opening that will support any load that may pass over the hole.
8. When an emergency occurs that requires excavation within City Right-of-Way and City offices are closed, the work may be done but the City shall be notified immediately when offices are re-opened.
9. When concrete patches are completed, the excavation permit number and date shall be imprinted in the surface of the patch.
10. If saw cut is within two feet of an existing pavement joint, pavement replacement shall be made over to that joint.
11. Patch depth of concrete and new base shall match existing section or 11 inches minimum whichever is greater.

**Concrete Pavement Repair**

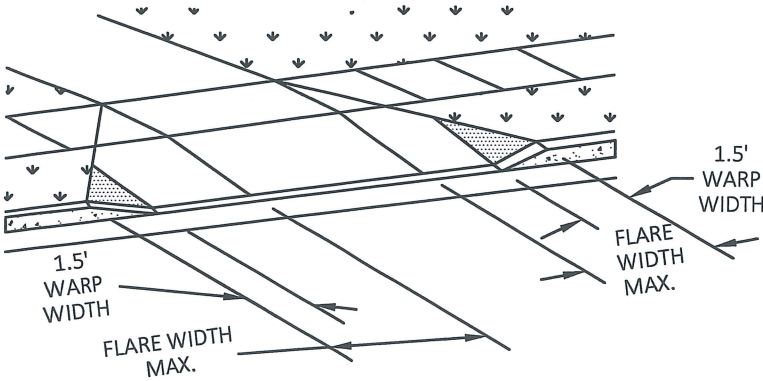
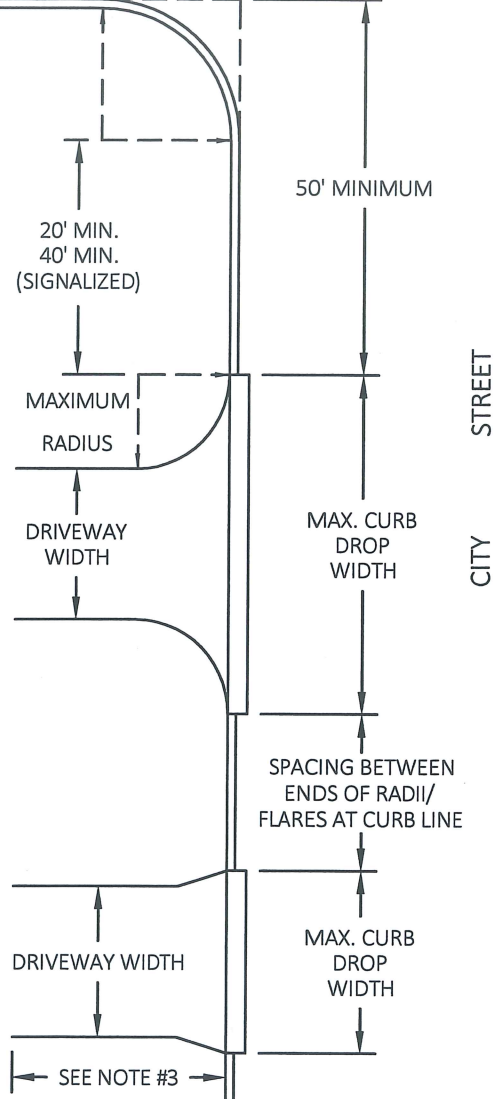
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Design Criteria	Residential	Commercial	Industrial
Sidewalk Grade	2% or Less	2% or Less	2% or Less
Driveway Width	10'-30'	10'-30'	14'-40'
Driveway with a Radius			
Maximum Radius	10'	25'	55'
Maximum Curb Drop Width (Opening at Street)	50'	80'	150'
Spacing between the Ends of Radii at Curb Line	10'	30'	50'
Driveway with a Flare			
Maximum Flare Width (Including Warp)	5'	10'	25'
Warp Width	1.5'	1.5'	1.5'
Maximum Curb Drop Width (Opening at Street)	40'	50'	90'
Spacing between Flares at Curb Line	10'	30'	50'



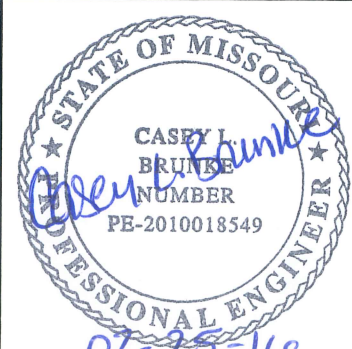
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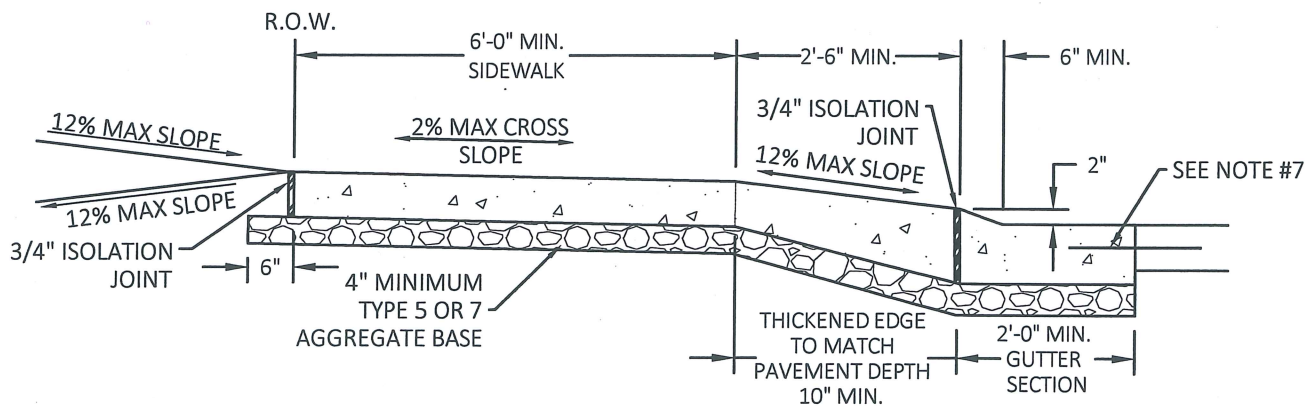
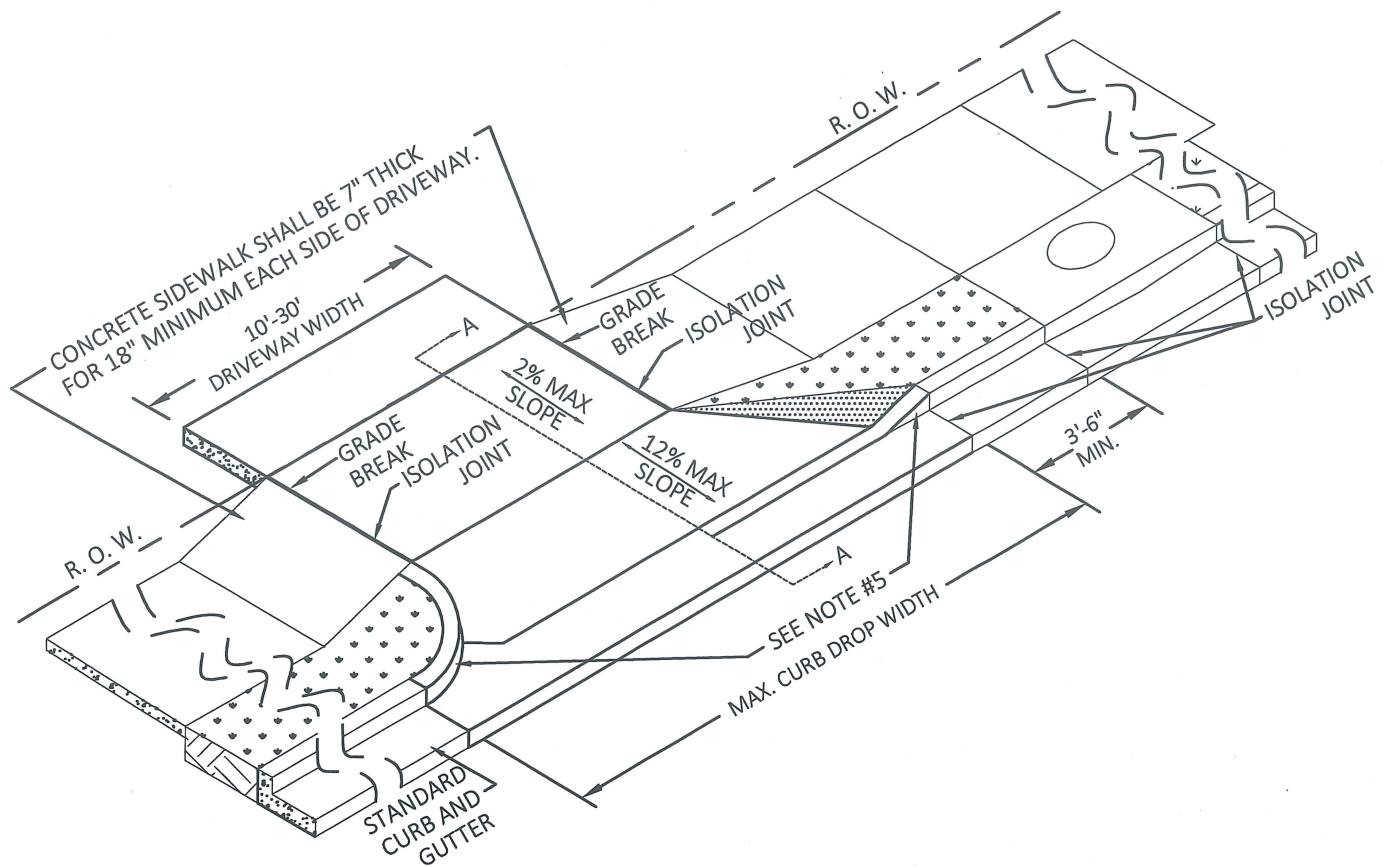
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. No portion of the driveway flare or radius shall extend onto adjacent property frontage.
3. A minimum driveway throat length is measured between the parking lot and the curb line which shall be required for multi-family, commercial, and industrial driveways as described in the City Code.
4. Industrial driveways shall be designed for site specific conditions and be constructed with an ADA Compliant sidewalk crossing whether or not a sidewalk connection is made.
5. All Industrial driveways within City Right-of-Way shall be seven inch thick concrete minimum with four inches of Type 5 or 7 aggregate base.
6. Fifty foot minimum corner clearance is required for Local and Collector streets as measured from the intersection of the tangent lines of the corner radius. See City Code for Arterial streets.

**Driveway Standards**

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SECTION A-A

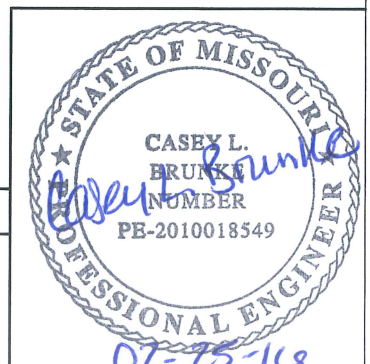
Notes:

1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All Commercial driveways within City Right-of-Way shall be seven inch thick concrete minimum with four inches of Type 5 or 7 aggregate base.
3. All driveways shall be constructed with an ADA Compliant sidewalk crossing whether or not a sidewalk connection is made.
4. Driveway grade within the City Right-of-Way shall not exceed twelve percent, excluding the sidewalk crossing surface.
5. The driveway approach may have either a radius or a flare. The maximum radius shall be 25 feet. This driveway design is intended for low to moderate peak hour volumes. Driveways with higher volumes shall be engineered to accommodate traffic flow needs.
6. Isolation joints of 3/4" preformed fiber expansion joint filler shall be provided at the Right-of-Way line. See Standard Specifications for additional joint requirements at locations where "Street Creep" may be a potential issue. See APL for fiber filler and joint sealer.
7. Drill and epoxy #4 x 18" long deformed bars on 18" centers.
8. 8.33% maximum slope for sidewalk ramps.

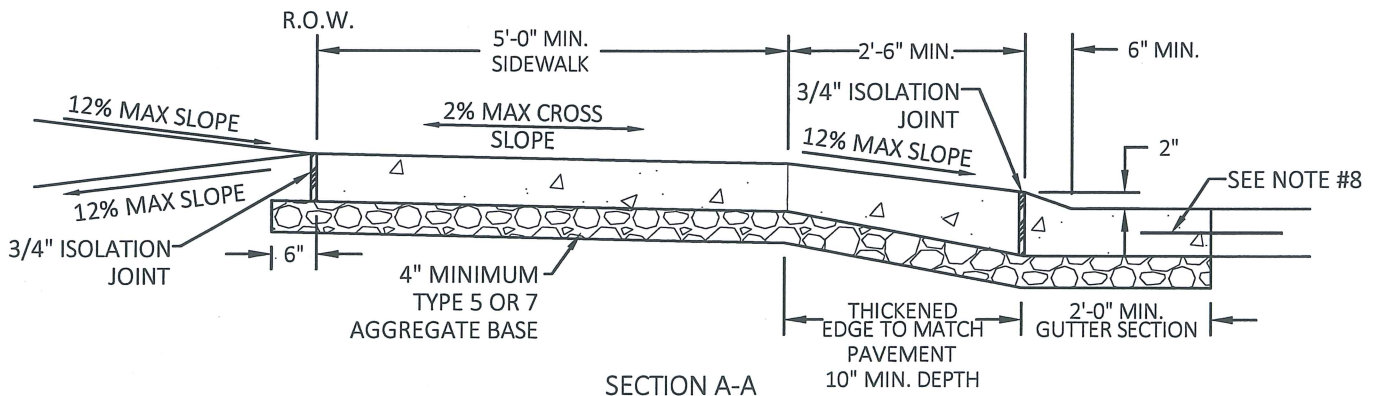
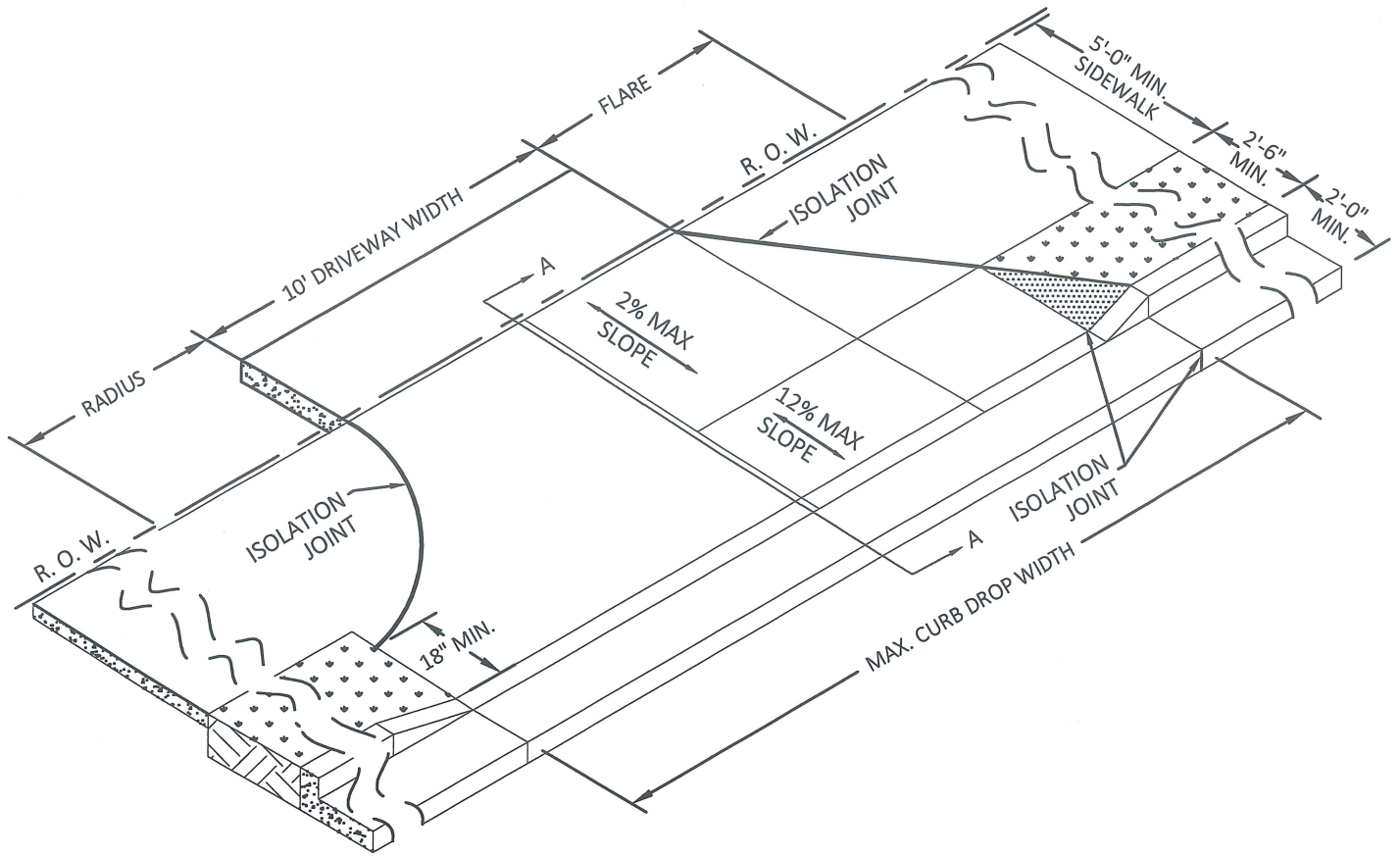
**Commercial Driveway with Green Area (Curbed or Flared)**

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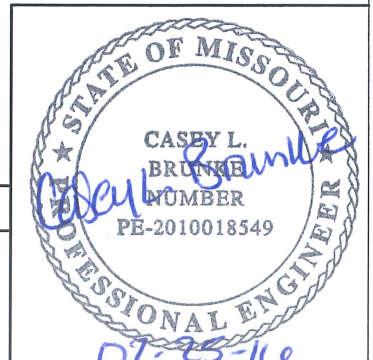
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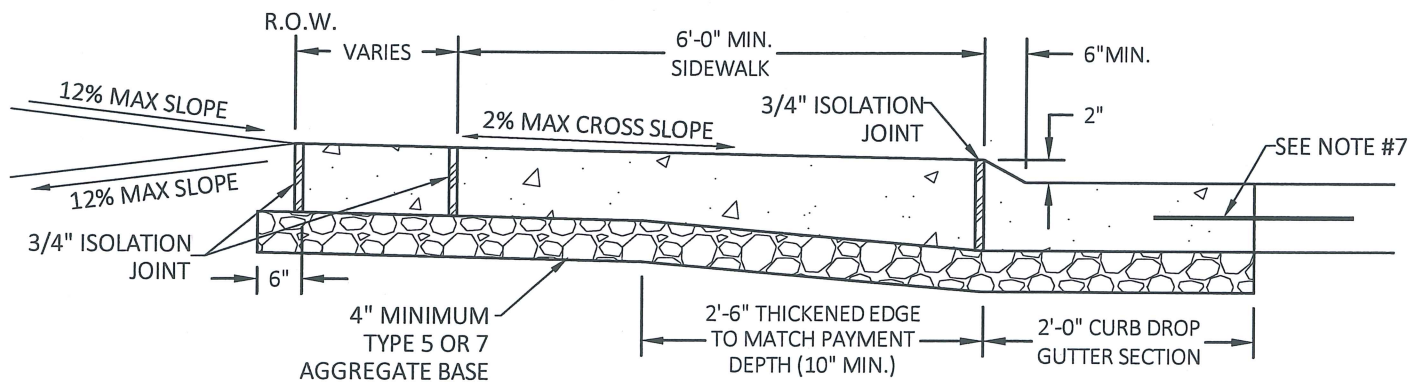
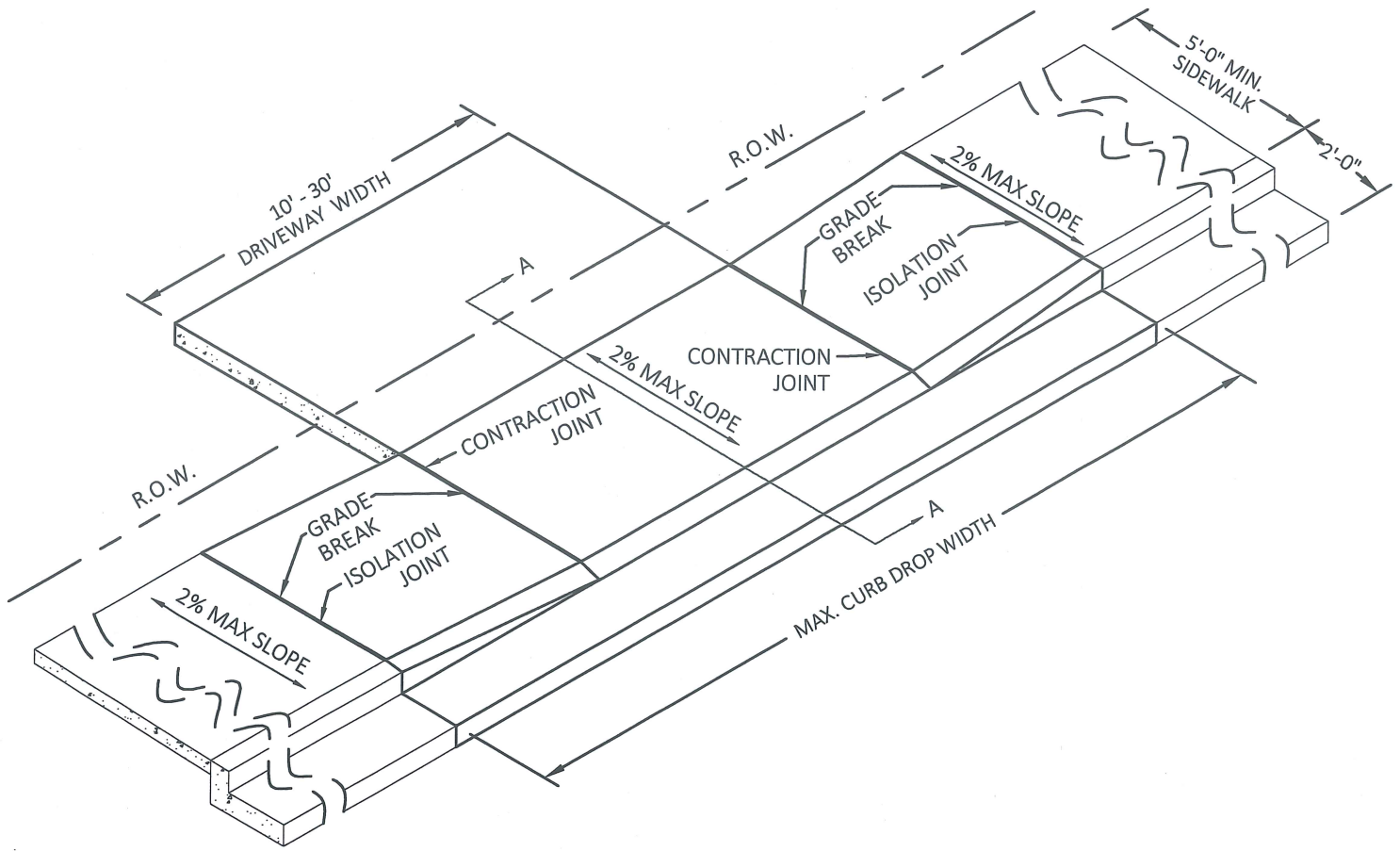
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All Residential driveways within City Right-of-Way shall be six inch thick concrete minimum with four inches of Type 5 or 7 aggregate base.
3. All driveways shall be constructed with an ADA Compliant sidewalk crossing whether or not a sidewalk connection is made.
4. Driveway grade within the City Right-of-Way shall not exceed twelve percent, excluding the sidewalk crossing surface.
5. The driveway approach may have either a radius or a flare. The maximum radius shall be 15 feet, this driveway design is intended for low to moderate peak hour volumes. Driveways with higher volumes shall be engineered to accommodate traffic flow needs.
6. Driveways for duplex units with two double garages can be spaced less than ten feet apart provided that the combined width (including the space between driveways) does not exceed 30 feet.
7. Isolation joints of 3/4" preformed fiber expansion joint filler shall be provided between driveway slab and street and at the Right-of-Way line. See Standard Specifications for additional joint requirements at locations where "Street Creep" may be a potential issue. See APL for fiber filler and joint sealer.
8. Drill and epoxy #4 x 18" long deformed bars on 18" centers.

**Residential Driveway with Green Area (Radius or Flared)**

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SECTION A-A

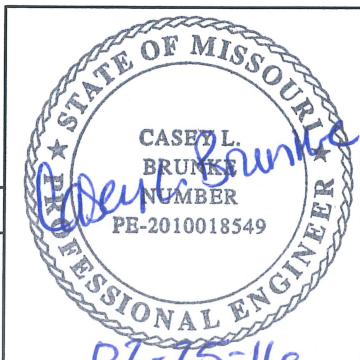
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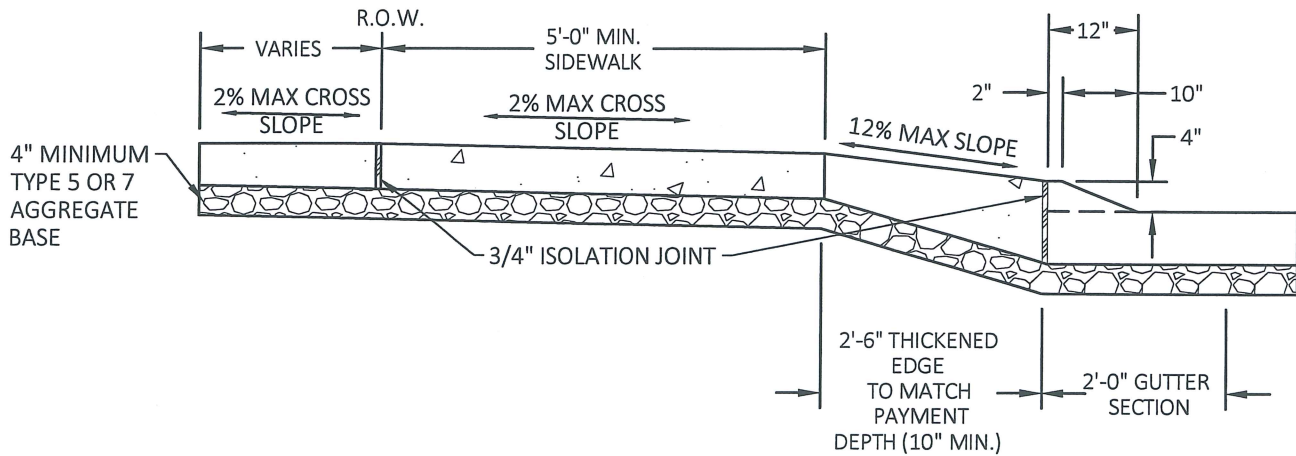
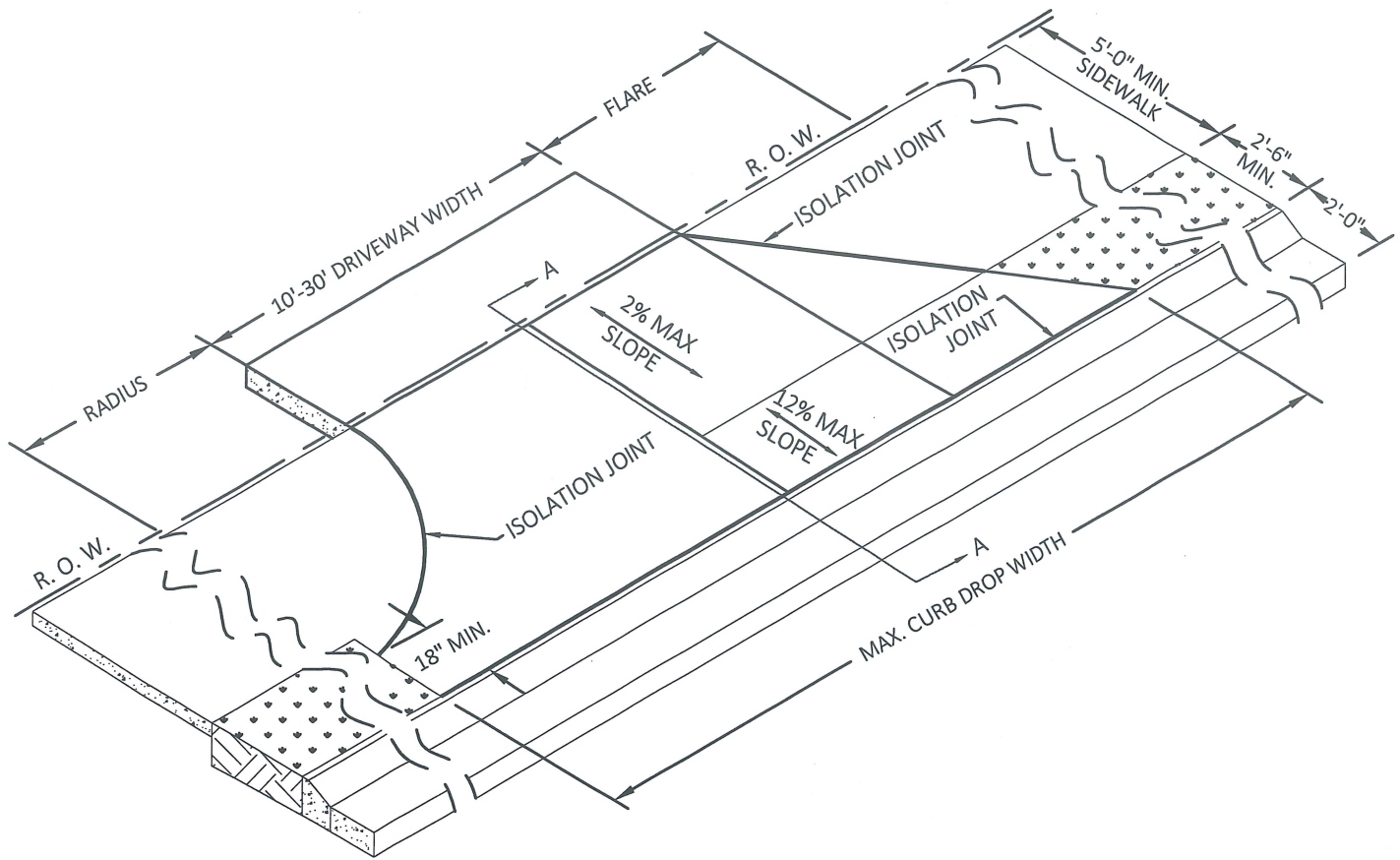
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All Commercial driveways within City Right-of-Way shall be seven inch thick concrete minimum with four inches of Type 5 or 7 aggregate base.
3. All Residential driveways within City Right-of-Way shall be six inch thick concrete minimum with four inches of Type 5 or 7 aggregate base.
4. All driveways shall be constructed with an ADA Compliant sidewalk crossing whether or not a sidewalk connection is made.
5. Driveway grade within the City Right-of-Way shall not exceed twelve percent, excluding the sidewalk crossing surface.
6. Isolation joints of 3/4" preformed fiber expansion joint filler shall be provided between driveway slab and street and at the Right-of-Way line. See Standard Specifications for additional joint requirements at locations where "Street Creep" may be a potential issue. See APL for fiber filler and joint sealer.
7. Drill and epoxy #4 x 18" long deformed bars on 18" centers.

Commercial or Residential Driveway without Green Area

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**Notes:**

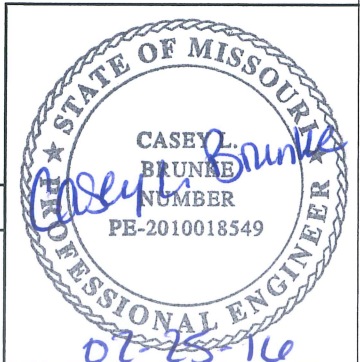
**SECTION A-A**

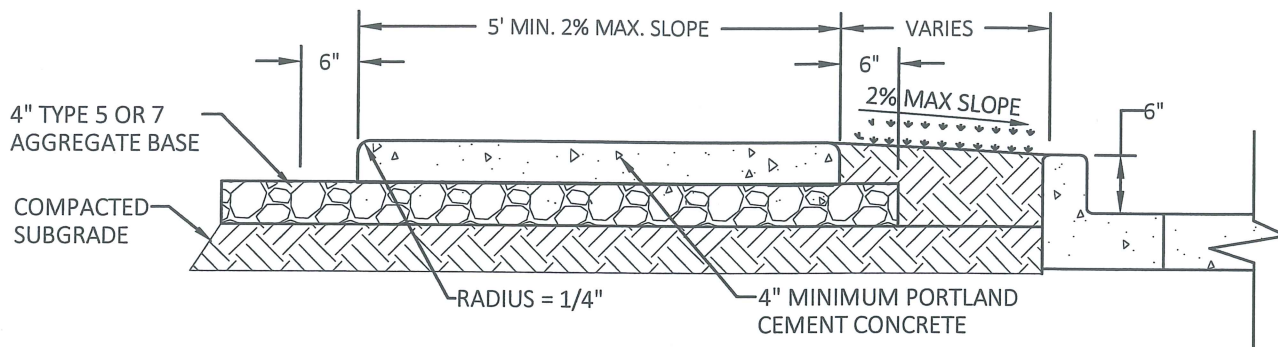
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All Residential driveways within City Right-of-Way shall be six inch thick concrete minimum with four inches of Type 5 or 7 aggregate base.
3. All driveways shall be constructed with an ADA Compliant sidewalk crossing whether or not a sidewalk connection is made.
4. Driveway grade within the City Right-of-Way shall not exceed twelve percent, excluding the sidewalk crossing surface.
5. Isolation joints of 3/4" preformed fiber expansion joint filler shall be provided between driveway slab and street and at the Right-of-Way line. See Standard Specifications for additional joint requirements at locations where "Street Creep" may be a potential issue. See APL for fiber filler and joint sealer.

**Driveway with 4" Lip Curb**

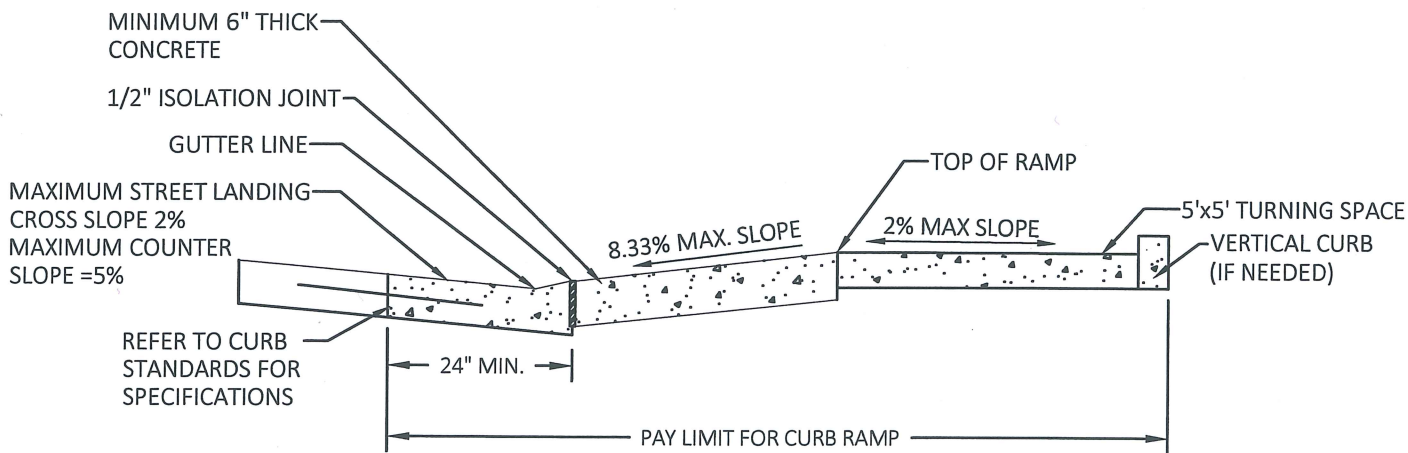
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CROSS SECTION



TYPICAL PROFILE

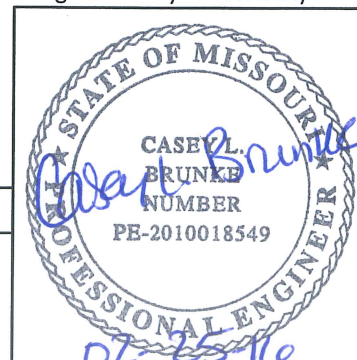
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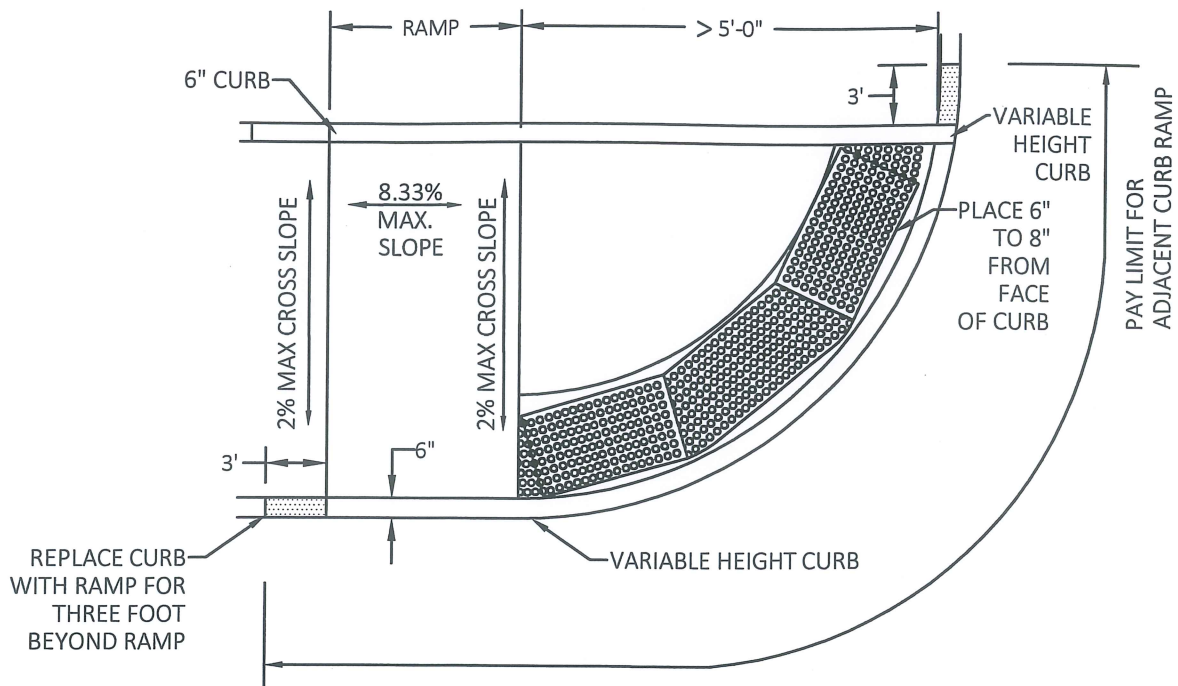
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Curb ramps shall be constructed to the dimensions and finished elevations as specified in the plans and/or contract documents and shall also conform to the requirements of the Americans with Disabilities Act (ADA) and Public Rights-of-Way Accessibility Guidelines (PROWAG).
3. Surface texture of the curb ramp shall be stable, firm, and slip-resistant. The surface shall be medium broomed finish transverse to the slope of the ramp.
4. Care shall be taken to assure an uniform grade on the curb ramp.
5. Longitudinal and transverse joint markings shall not be allowed on the landings or ramps.

**Sidewalk Cross Section and Profile**

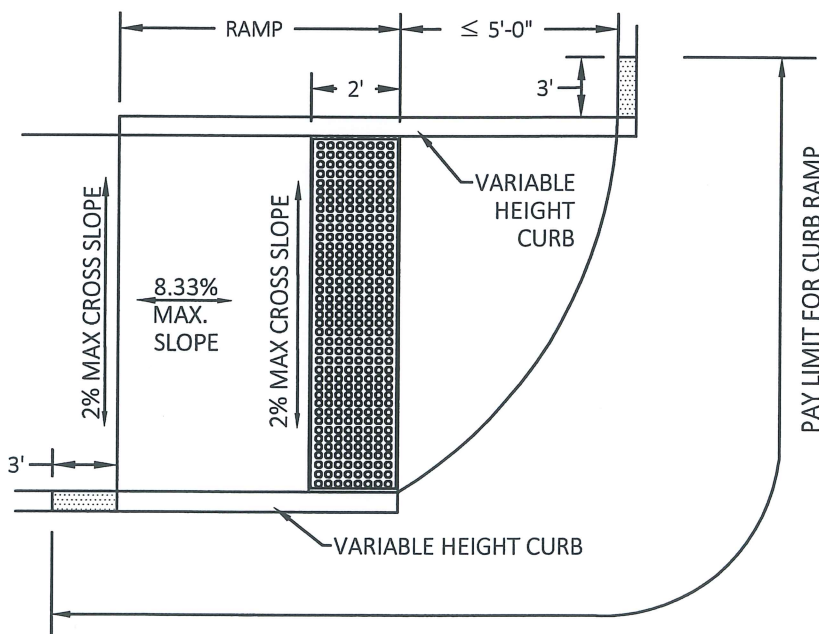
Prepared By: JH	Scale: NTS	Revisions:
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DETECTABLE WARNING LOCATION  
IF CURB RAMP MORE THAN FIVE FEET FROM CURB



DETECTABLE WARNING LOCATION  
IF CURB RAMP FIVE FEET OR LESS THAN FROM CURB

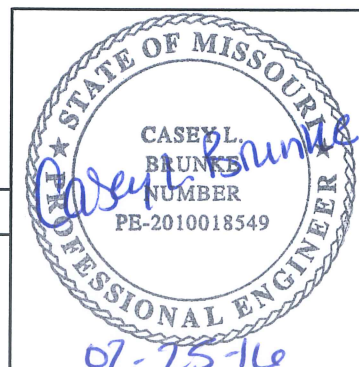
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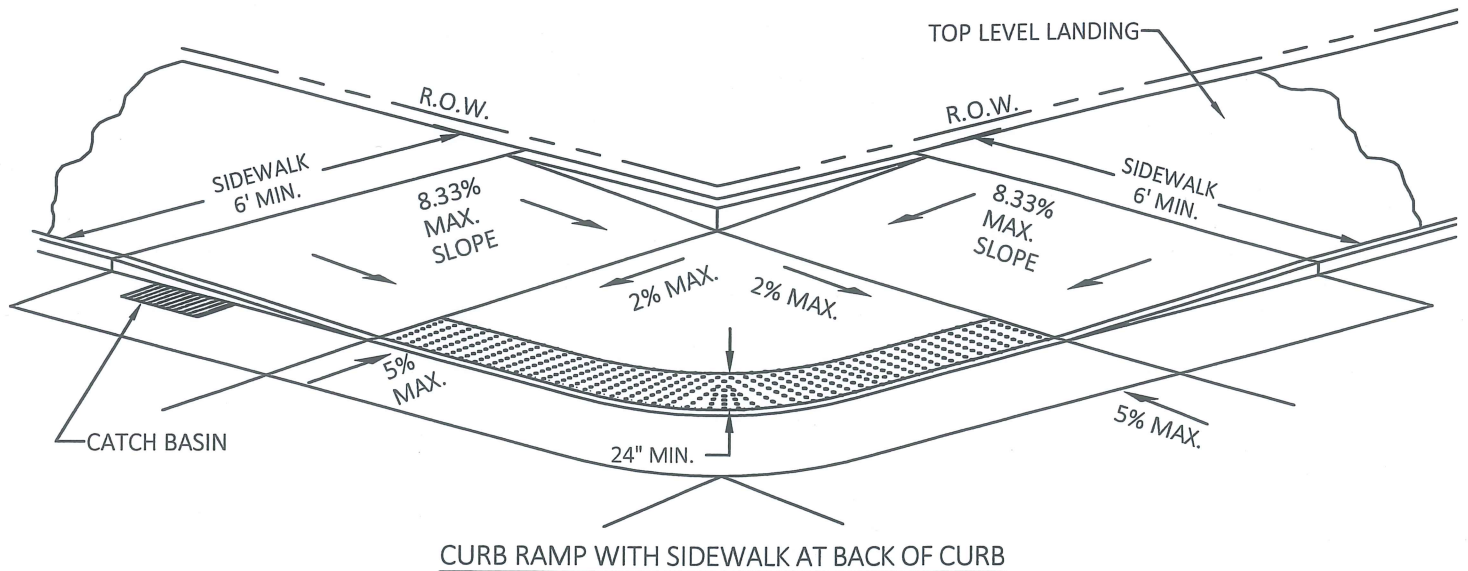
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Cross Slope of landing areas do not exceed two percent in any direction.
3. For retro-fit sidewalk, Pay limits for curb ramps will be the ramp, landing, flares, street curb and gutter replacement across the width of ramp plus three feet each side of the flare or curb limit, sidewalk curbs where necessary, and detectable warnings. All demolition, surface utility work and street filler are incidental to ramp price. Sidewalk transitions are paid as Sidewalk.

**Parallel Curb Ramps with Sidewalk at Back of Curb**

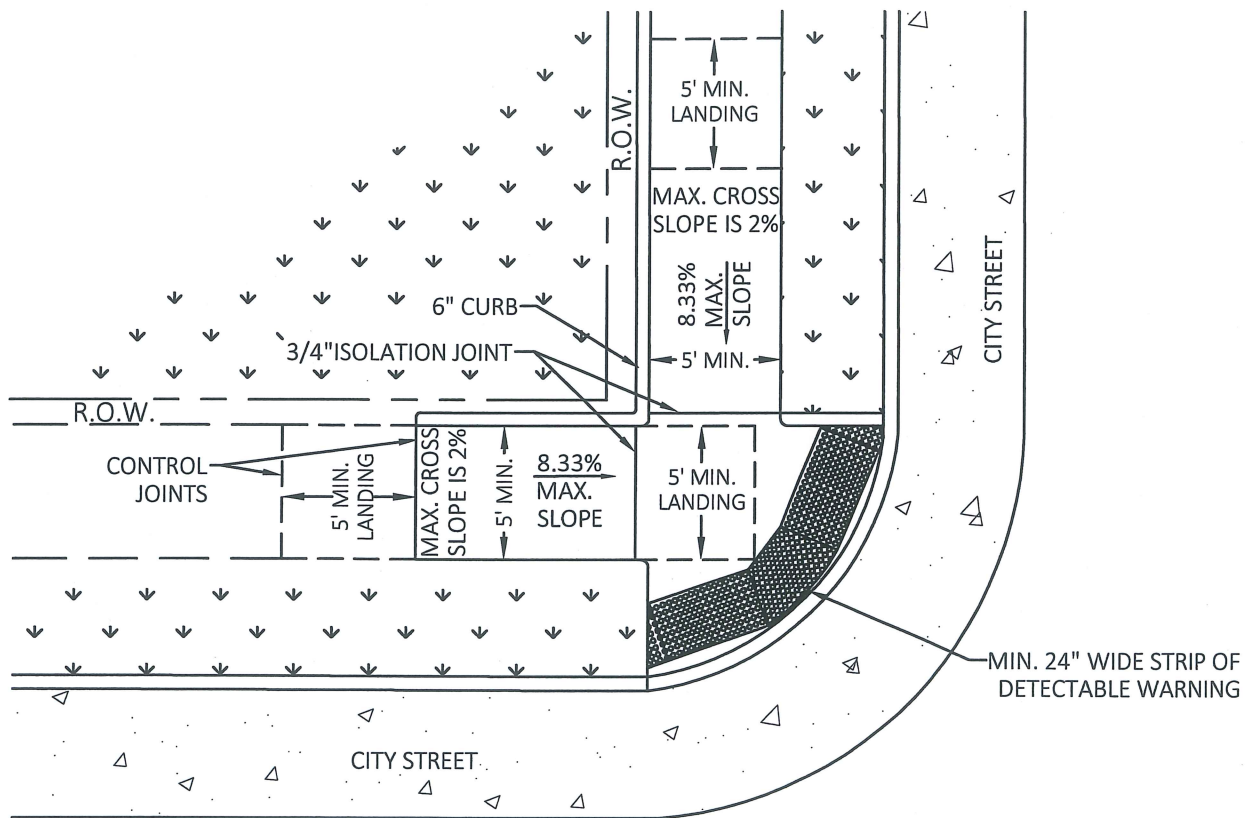
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**CURB RAMP WITH SIDEWALK AT BACK OF CURB**



**CURB RAMP WITH GREEN AREA**

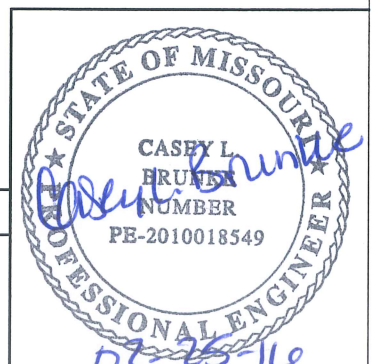
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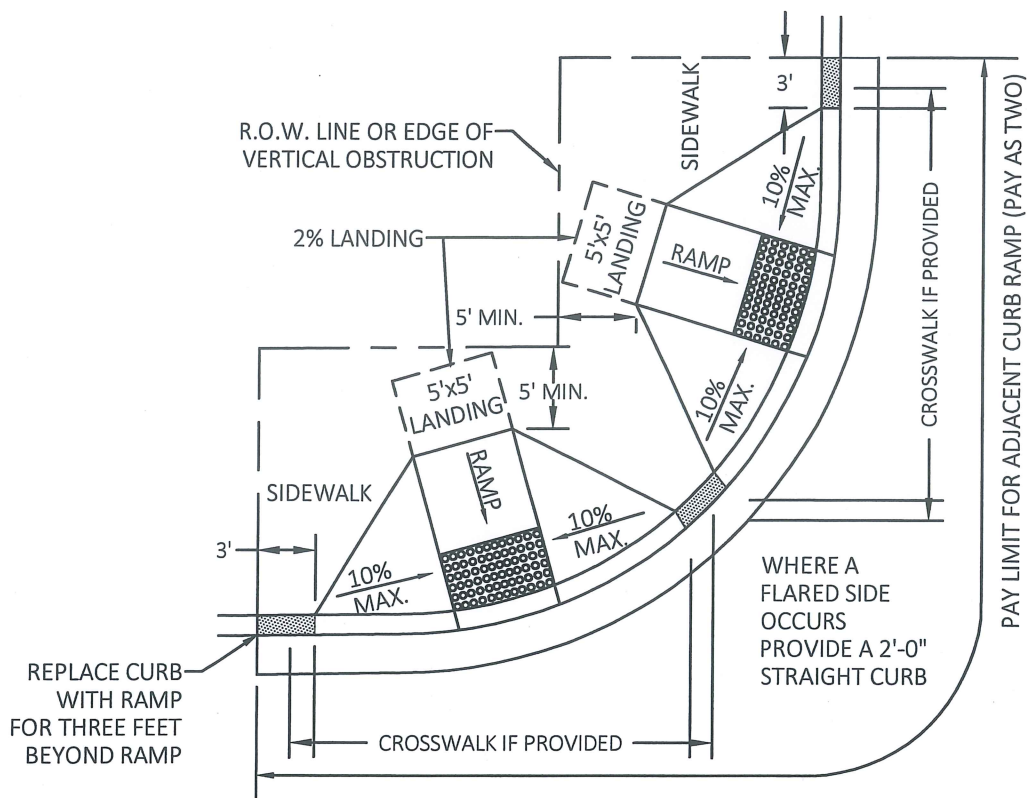
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Cross Slope of landing areas shall not exceed two percent in any direction.
3. For retro-fit sidewalk, Pay limits for curb ramps will be the ramp, landing, flares, street curb and gutter replacement across the width of ramp plus three feet each side of the flare or curb limit, sidewalk curbs where necessary, and detectable warnings. All demolition, surface utility work and street filler are incidental to ramp price. Sidewalk transitions are paid as Sidewalk.

**Parallel Curb Ramps**

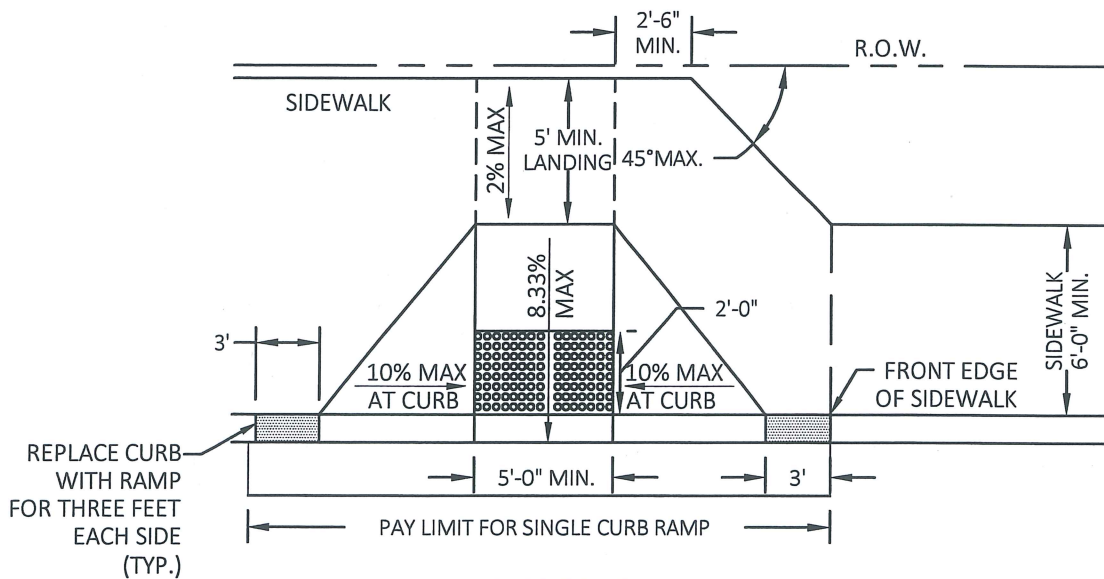
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TYPICAL INSTALLATION AT CORNER



CURB RAMP

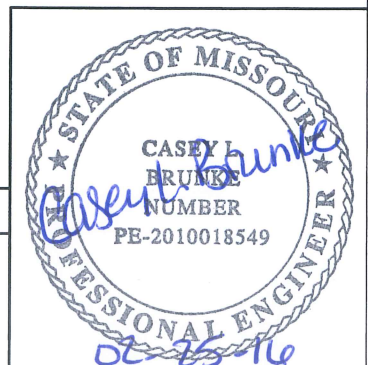
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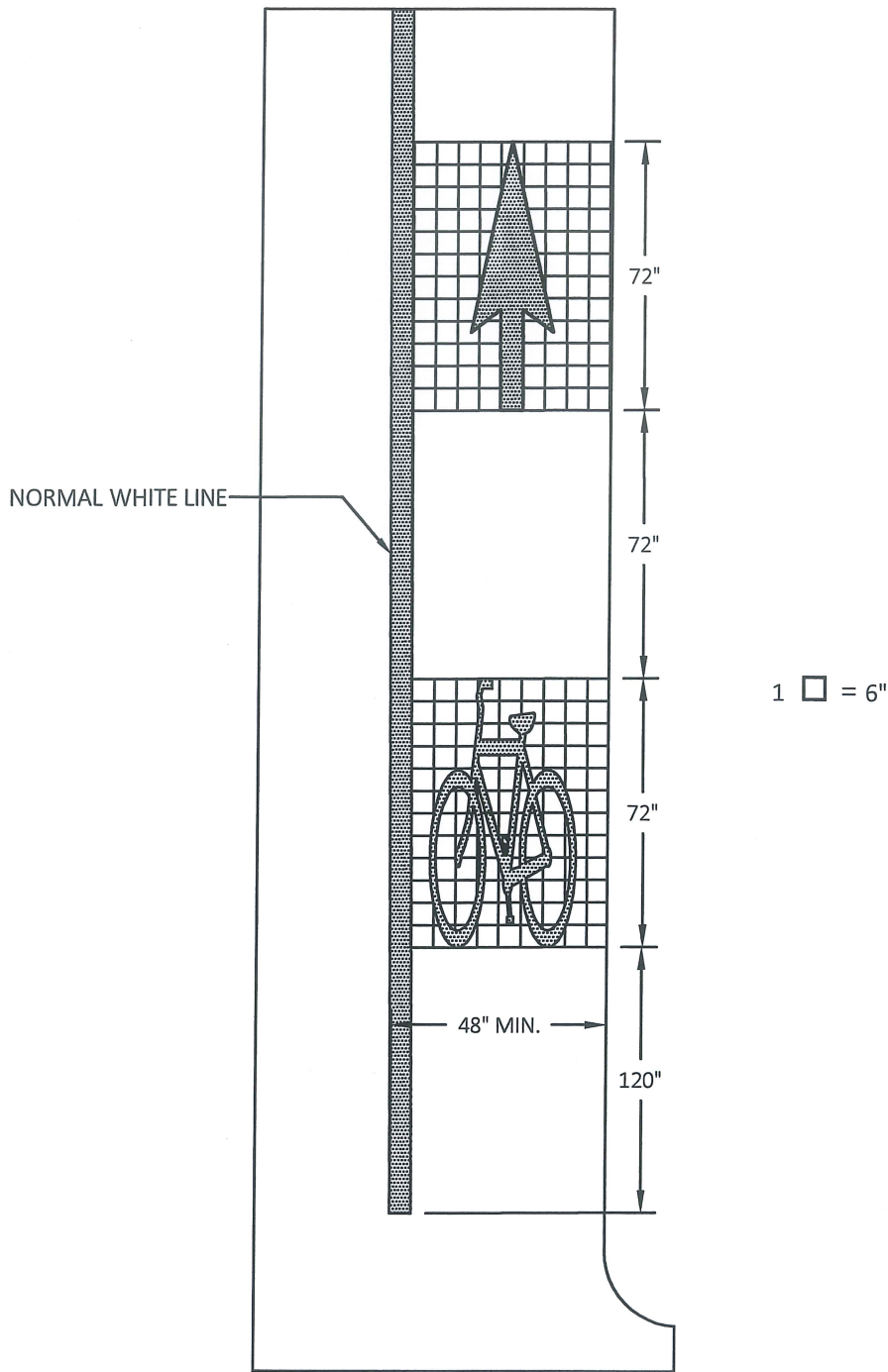
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Cross Slope of landing areas shall not exceed two percent in any direction.
3. For retro-fit sidewalk, Pay limits for curb ramps will be the ramp, landing, flares, street curb and gutter replacement across the width of ramp plus three feet each side of the flare or curb limit, sidewalk curbs where necessary, and detectable warnings. All demolition, surface utility work and street filler are incidental to ramp price. Sidewalk transitions are paid as Sidewalk.

Perpendicular Curb Ramps

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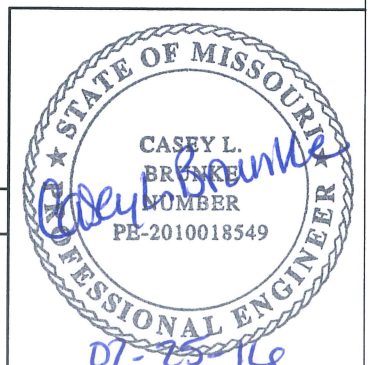
**Notes:**

1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All pavement markings shall be epoxy paint and conform to the *Missouri Standard Specifications for Highway Construction*, latest edition.
3. Bicycle and arrow are considered one marking.
4. Markings shall be placed ten feet after an intersection and spaced at intervals approximately 500 feet thereafter.
5. Bicycle lane markings shall not be placed in a driveway. If a marking falls in a driveway, the marking shall be moved to the nearest edge of the driveway.
6. Normal white line shall be six inches wide, solid white.
7. Dotted line for bus stops shall be striped white with dashes six inches wide and two feet long with six feet of space between dashes.

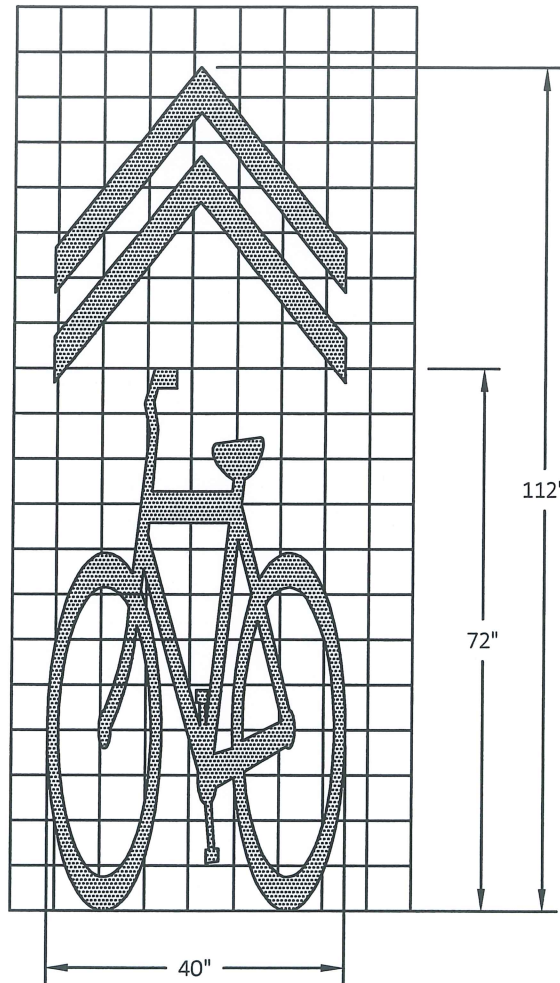
**Bicycle Lane Striping**

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1  = 6"

SHARROW

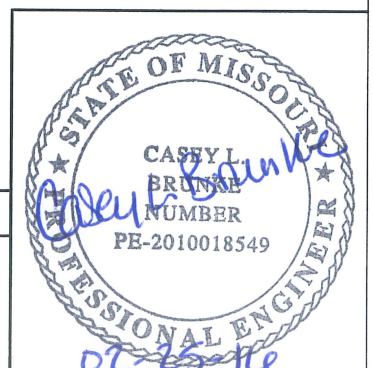
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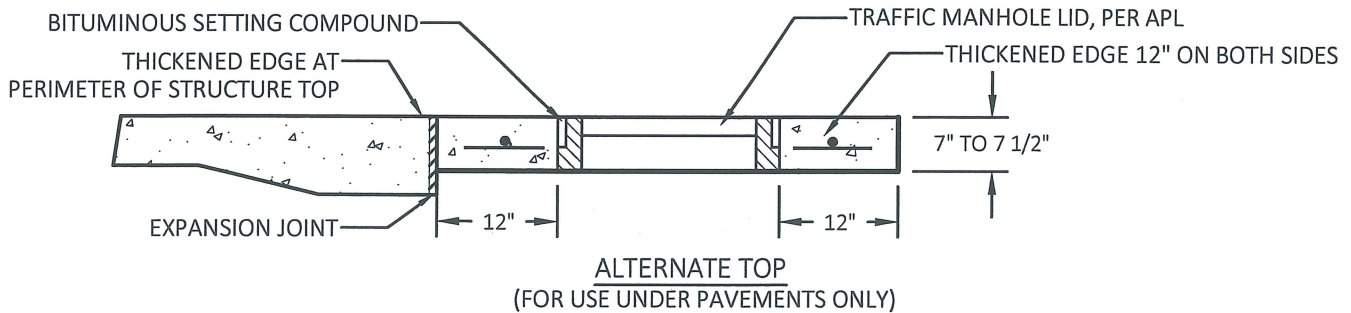
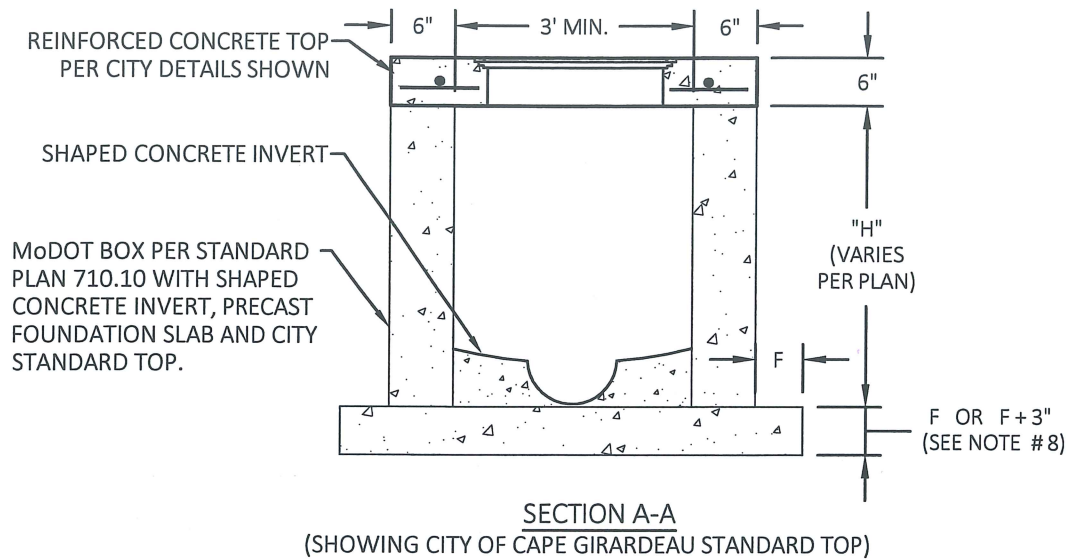
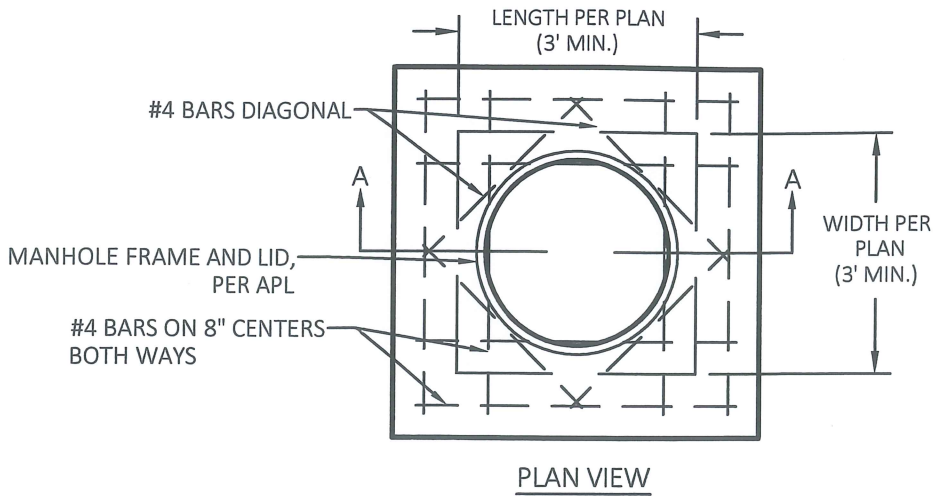
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. All pavement markings shall be epoxy paint and conform to the *Missouri Standard Specifications for Highway Construction*, latest edition.
3. Bicycle and chevrons are considered one marking.
4. Markings shall be placed ten feet after an intersection and spaced at intervals approximately 250 feet thereafter.
5. Sharrow markings shall not be placed in a driveway. If a marking falls in a driveway, the marking shall be moved to the nearest edge of the driveway.
6. Sharrows shall be positioned so that the centers of the markings are placed in the center of the travel lane.

**Shared Use Arrow (Sharrow)**

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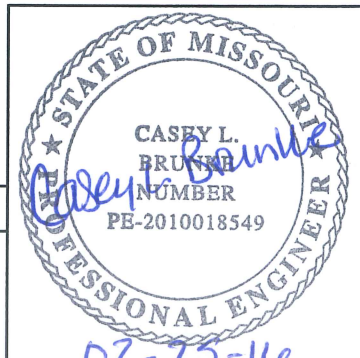
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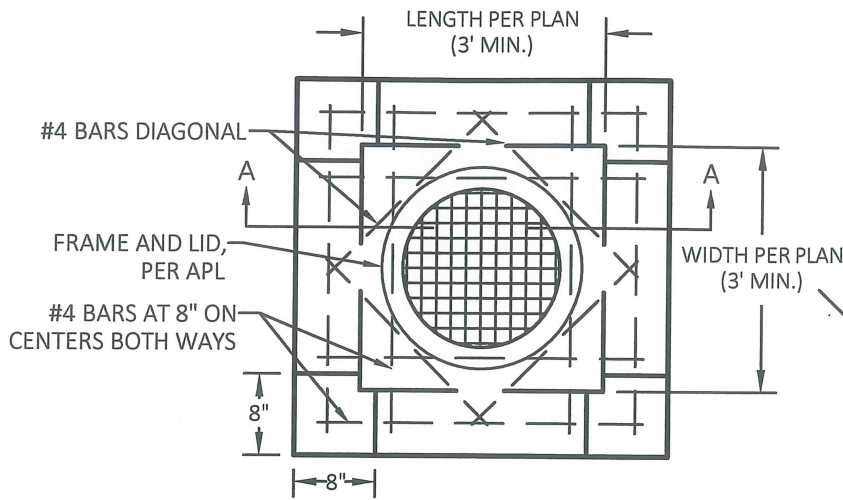
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Concrete shall have 28 day minimum strength of 4000 PSI.
3. Reinforced steel shall be Grade 60.
4. Structures where H is greater than eight feet shall be reinforced concrete. (#4 bars at 12" centers, both ways and #4 bars diagonal at pipe openings.)
5. Other than details shown above, the barrel and base sections are to be constructed according to MoDOT Standard Drawing No. 731.10. Do not include steps.
6. All Junction box lids shall have the language "Do Not Dump, Drains to River" or similar language located on a plaque on the lid. See the APL for approved plaques.
7. F = 6" for H <= 6' and 12" for H > 6'. When field placed foundation is used, depth "F" shall be increased by three inches above bottom of box.

**Stormwater Junction Box**

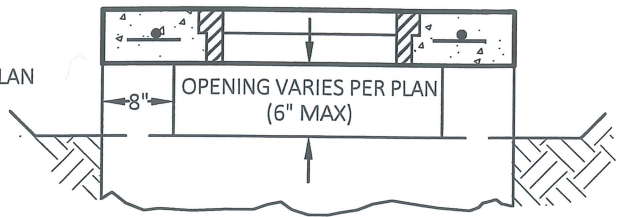
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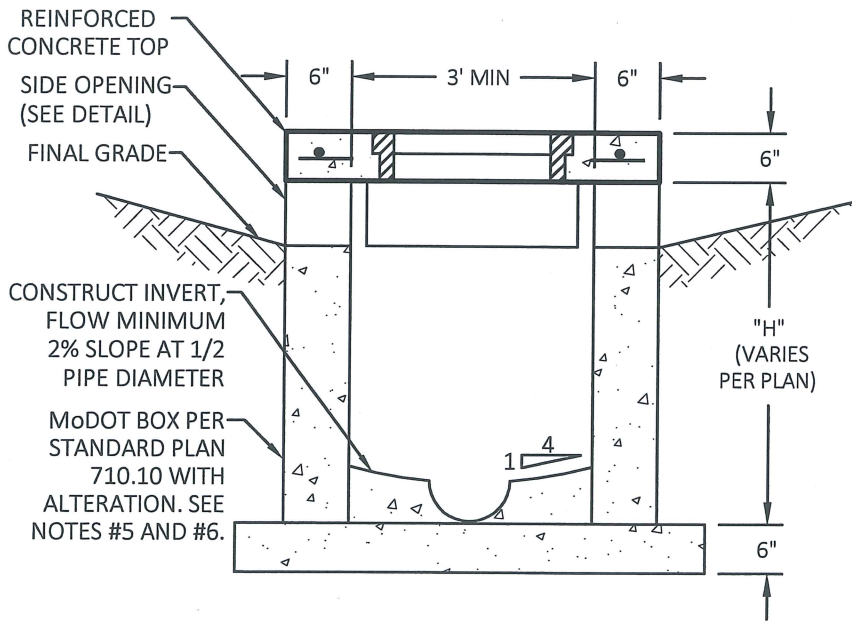




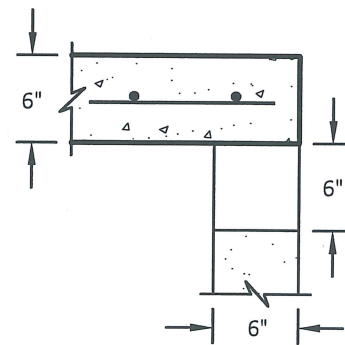
PLAN VIEW



SIDE OPENING DETAIL



SECTION A-A



OPENINGS 6"

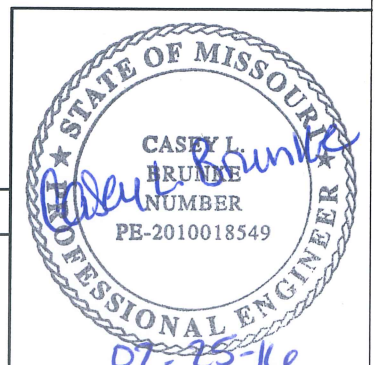
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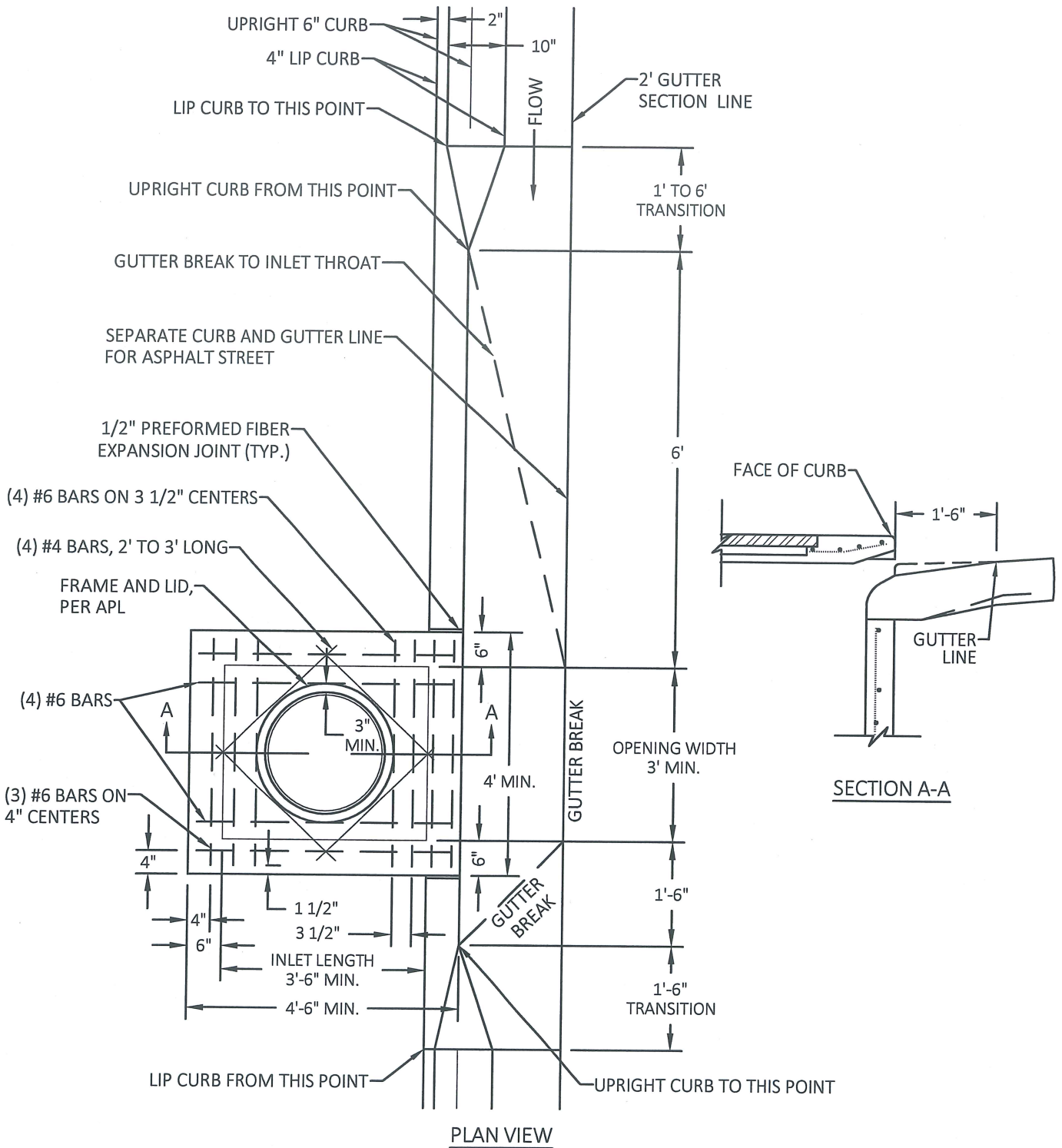
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Concrete shall have 28 day minimum strength of 4000 PSI.
3. Structures where "H" is greater than eight feet shall be reinforced concrete (#4 bars at 12" centers, both ways and #4 bars diagonal at pipe openings).
4. Other than details shown above, the barrel and base sections are to be constructed according to MoDOT Standard Drawing No. 731.10.
5. Side openings shall be on all four sides per dimensions shown unless noted otherwise on the plan.
6. Steps shall be omitted. Shaped concrete invert shall be added.
7. All box lids shall have the language "Do Not Dump, Drains to River" or similar language located on a plaque on the lid. See the APL for approved plaques.

Area Inlet - Weir Opening

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PRECAST DROP INLET (CURB INLET- TYPE T) PER MoDOT STANDARD PLAN 701.10 FOR 4" LIP CURB

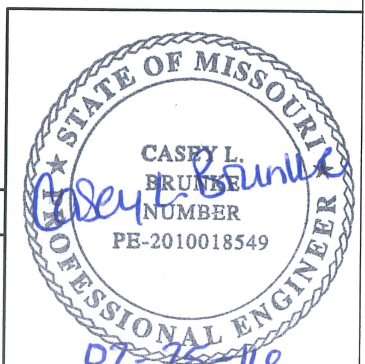
**Notes:**

1. Inlets shall be designed to intercept the gutter flow capacity according to the latest edition of the City of Cape Girardeau Standard Specifications.
2. Inlets shall be constructed according to the plan location and the details shown on this sheet.
3. All inlet pay limit concrete shall have 28 day minimum strength of 4000 PSI.
4. All box lids shall have the language "Do Not Dump, Drains to River" or similar language located on a plaque on the lid. See the APL for approved plaques.

**Inlet Detail with 4" Lip Curb**

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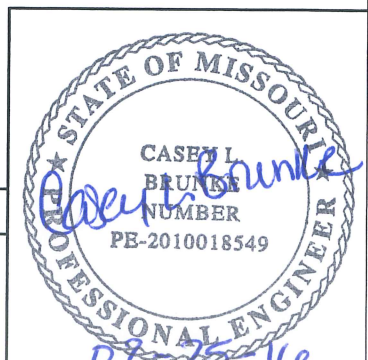


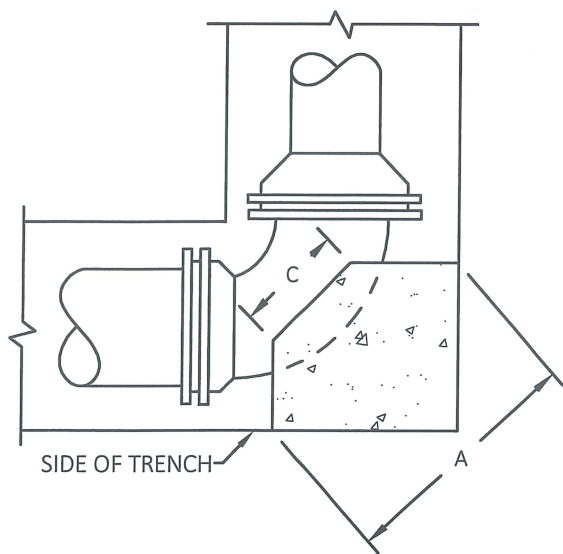
Thrust Blocks Dimensions							
<b>Tee</b>							
<b>Main</b>	2" to 6"	8" to 12"	8" to 10"	12"	12"	12"	18"
<b>Branch</b>	2" to 6"	2" to 6"	8" to 10"	2" to 6"	8" to 10"	12"	16" to 18"
A	26"	26"	43"	26"	43"	52"	70"
B	26"	26"	43"	26"	43"	52"	70"
C	12"	12"	12"	12"	12"	12"	30"
D	13"	13"	21"	13"	21"	26"	24"
<b>11 1/4° Bend</b>							
<b>Size</b>	2"	4"	6"	8"	10"	12"	18"
A	9"	9"	11"	13"	16"	18"	30"
B	9"	9"	11"	13"	16"	18"	30"
C	8"	8"	10"	12"	14"	16"	15"
D	4"	4"	5"	6"	8"	9"	16"
<b>22 1/2° Bend</b>							
<b>Size</b>	2"	4"	6"	8"	10"	12"	18"
A	9"	9"	13"	18"	23"	26"	40"
B	9"	9"	13"	18"	23"	26"	40"
C	8"	8"	10"	12"	14"	16"	15"
D	4"	4"	6"	9"	11"	13"	16"
<b>45° Bend</b>							
<b>Size</b>	2"	4"	6"	8"	10"	12"	18"
A	12"	12"	18"	24"	31"	37"	52"
B	12"	12"	18"	24"	31"	37"	52"
C	8"	8"	10"	12"	14"	16"	14"
D	6"	6"	9"	12"	15"	18"	18"
<b>90° Bend</b>							
<b>Size</b>	2"	4"	6"	8"	10"	12"	18"
A	16"	16"	26"	33"	40"	50"	70"
B	16"	16"	24"	33"	40"	50"	70"
C	9"	9"	12"	12"	15"	16"	22"
D	8"	8"	12"	16"	20"	25"	24"

**Horizontal Thrust Block Dimensions**

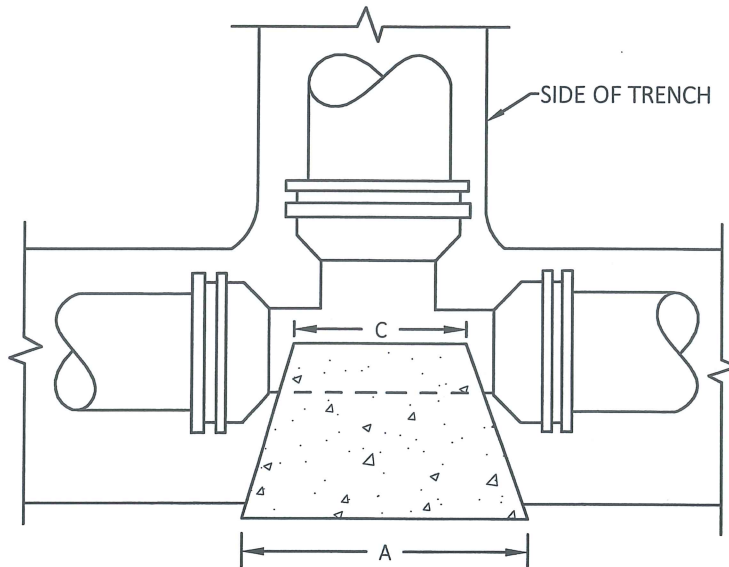
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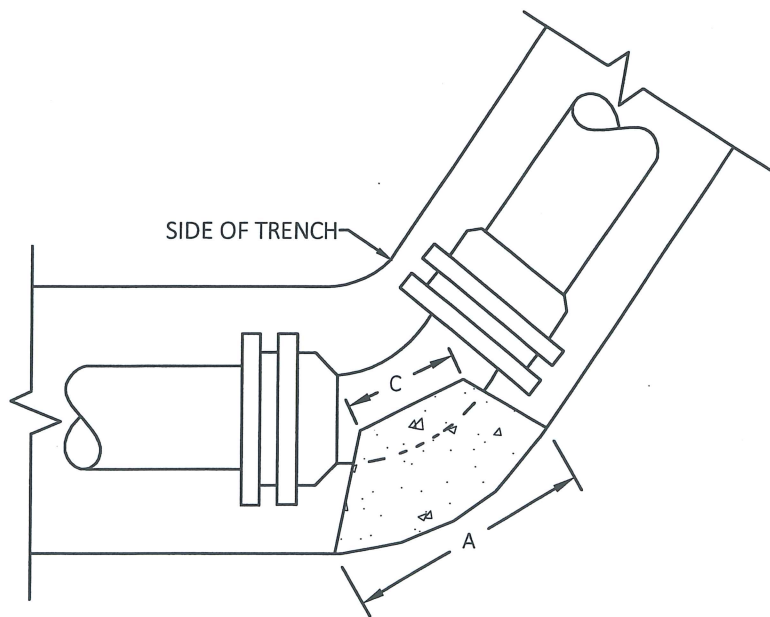




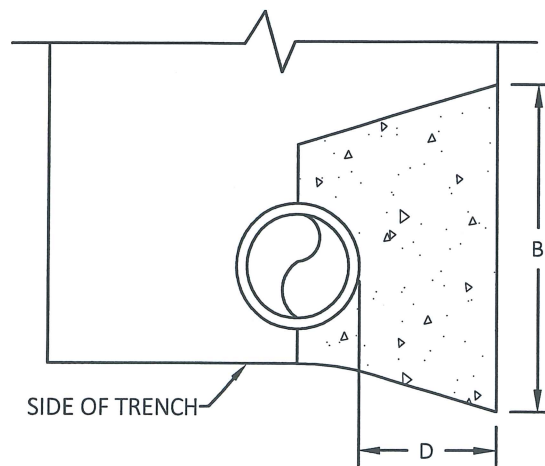
90° BEND



TEE



45° OR 22 1/2° OR 11 1/4° BENDS



TYPICAL SECTION

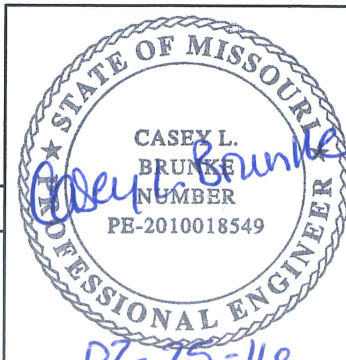
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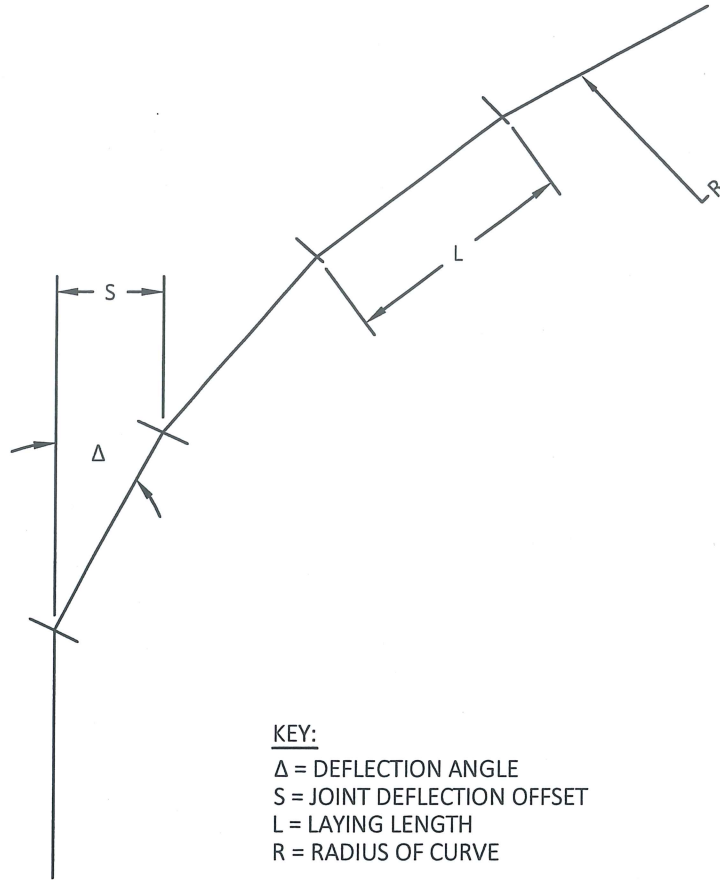
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Concrete shall have 28 day minimum strength of 4000 PSI.
3. Thrust blocks to be poured against undisturbed earth.
4. Pipe joints shall remain accessible.

**Horizontal Bend and Thrust Block**

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**KEY:**

- Δ = DEFLECTION ANGLE
- S = JOINT DEFLECTION OFFSET
- L = LAYING LENGTH
- R = RADIUS OF CURVE

$$R = L / (2 \tan (\Delta / 2))$$

**Specification for Water Main Construction - C900 PVC and DIP**

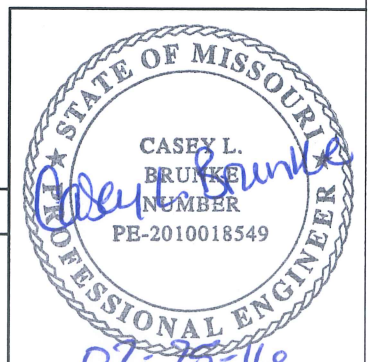
Nominal Pipe Size	Deflection Angle - $\phi$	Maximum Offset -S L= 18 Feet	Maximum Offset -S L= 20 Feet	Approximate Radius of Curve -R Produced by Succession of Joints L=18 Feet	Approximate Radius of Curve -R Produced by Succession of Joints L=20 Feet
8"	5°	19"	21"	205'-0"	230'-0"
12"	5°	19"	21"	205'-0"	230'-0"
16"	3°*	11"	12"	340'-0"	380'-0"
20"	3°*	11"	12"	340'-0"	380'-0"
24"	3°*	11"	12"	340'-0"	380'-0"

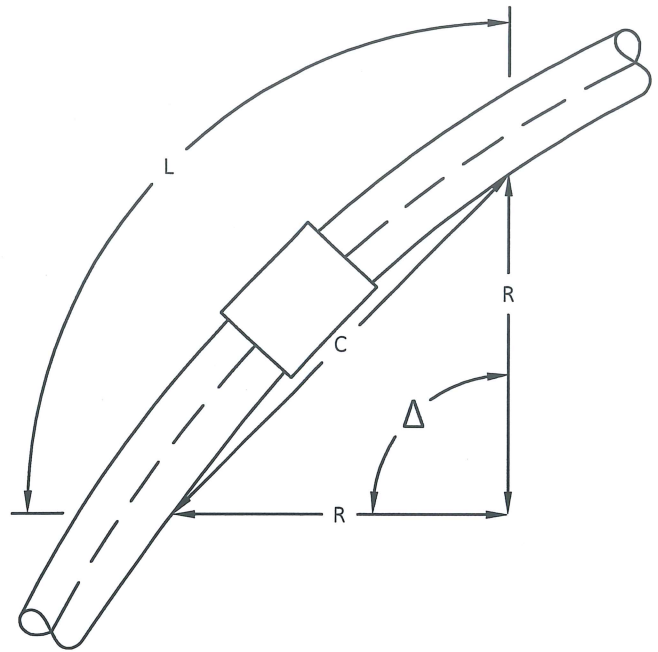
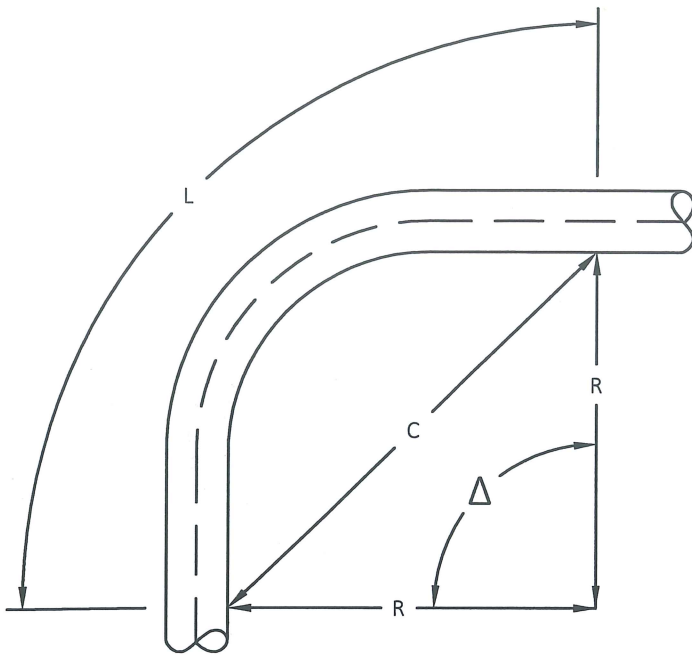
*\*For 16" and Larger Push-on Joints, Maximum Deflection Angle may be larger than shown above. Consult the Manufacturer.*

**Maximum Joint Deflection - C900 PVC and DIP**

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**KEY:**

- $D_o$  = OUTSIDE DIAMETER PIPE (DIP SIZE)
- R = MINIMUM RADIUS
- L = MINIMUM CURVE LENGTH, IF  $\Delta = 90^\circ$
- C = MINIMUM CHORD LENGTH, IF  $\Delta = 90^\circ$

Without Fittings			
Nominal "D <sub>o</sub> "	R = 25 D <sub>o</sub>	L	C
8"	18'-10"	29'-7"	26'-6"
12"	27'-6"	43'-2"	38'-11"
14"	31'-10"	50'-1"	45'-1"
16"	36'-3"	56'-11"	51'-3"

With Fittings			
Nominal "D"	R = 100D <sub>o</sub>	L	C
8"	75'-4"	118'-6"	106'-8"
12"	110'-0"	172'-10"	155'-6"
14"	127'-6"	200'-3"	180'-4"
16"	145'-0"	227'-9"	205'-0"

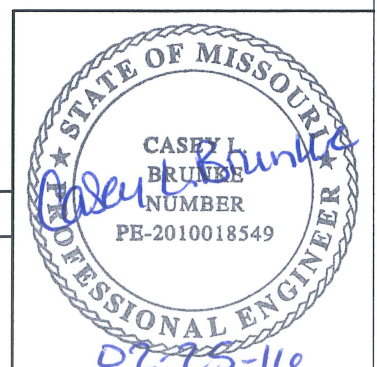
**Notes:**

Table values apply to DR=11 and DR=13.5 only.

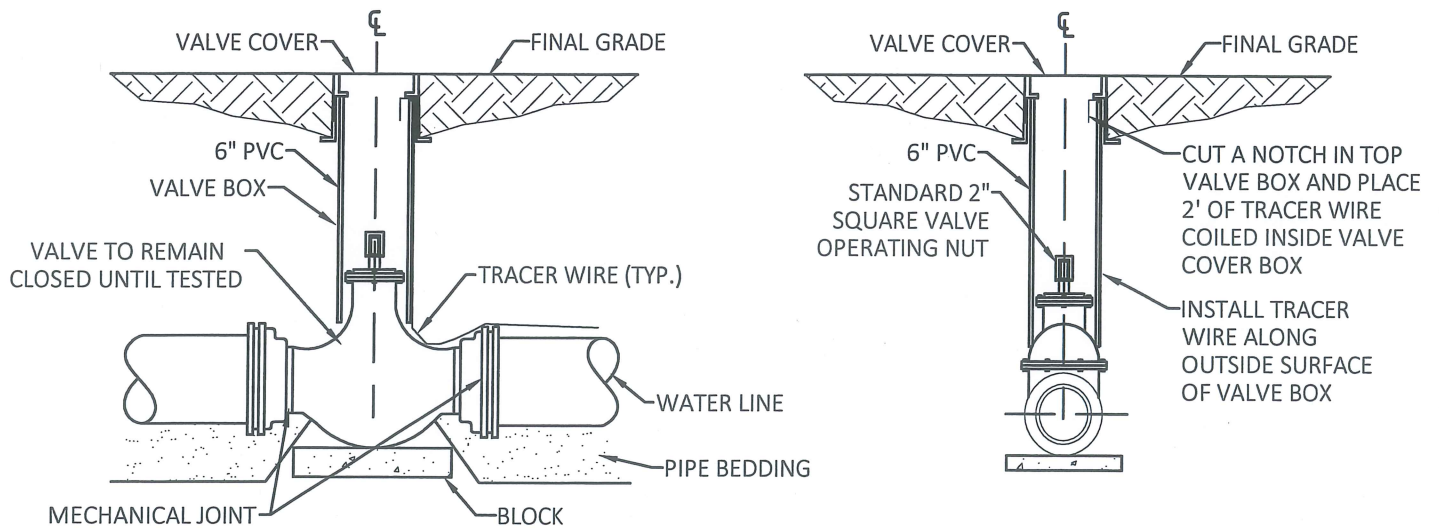
**Minimum Bending Radius for Polyethylene Water Pipe**

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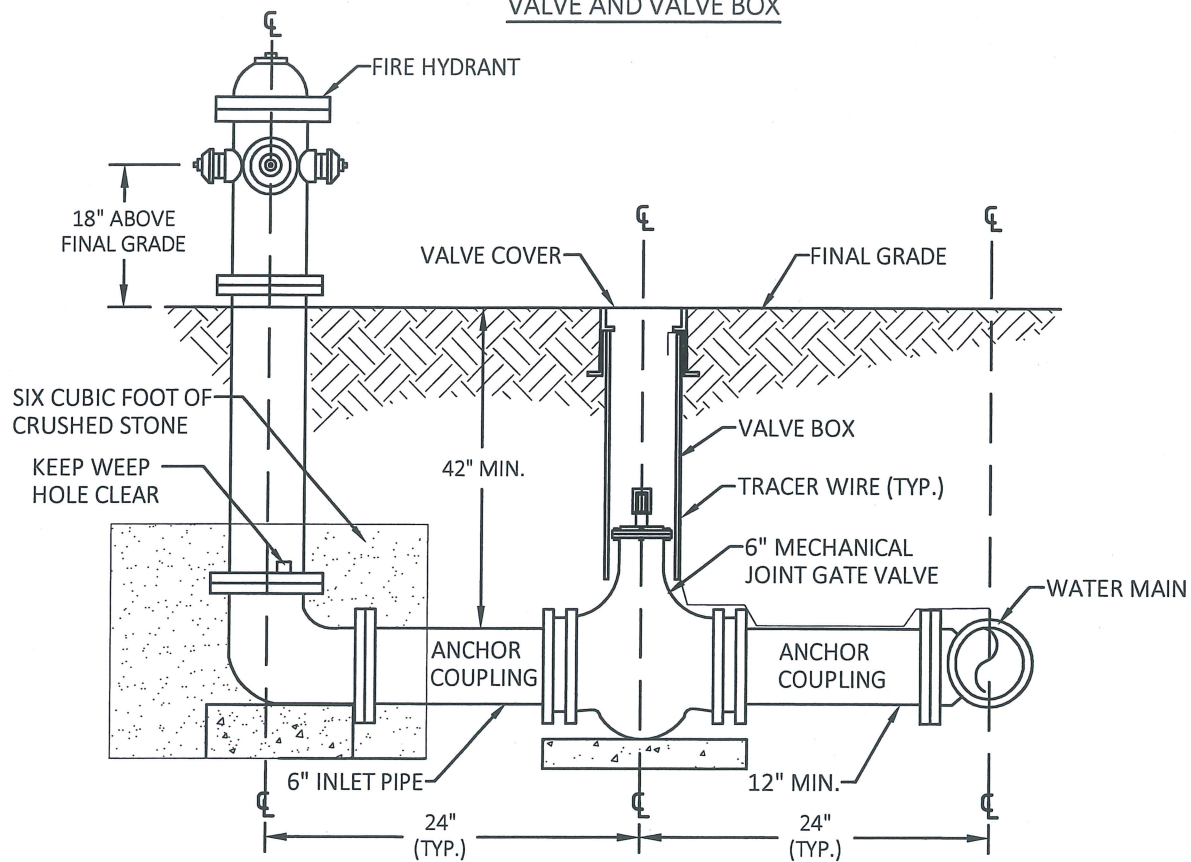
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**VALVE AND VALVE BOX**



**FIRE HYDRANT INSTALLATION**

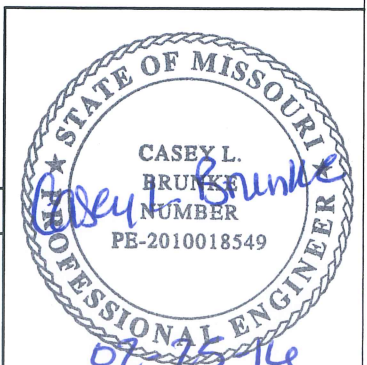
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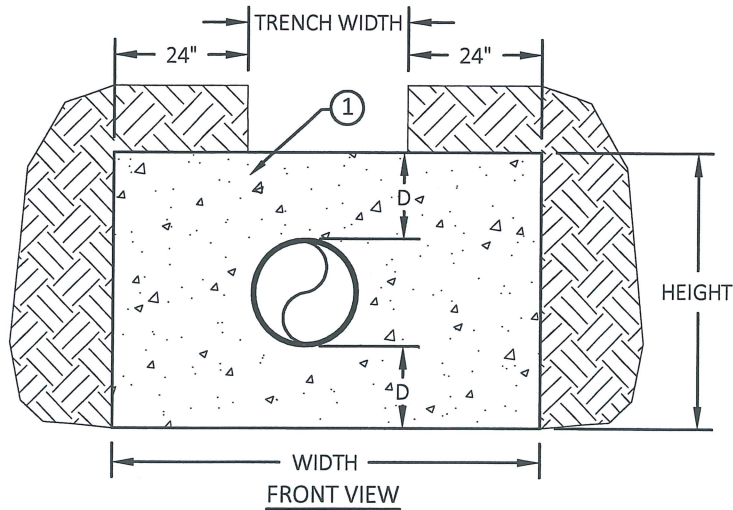
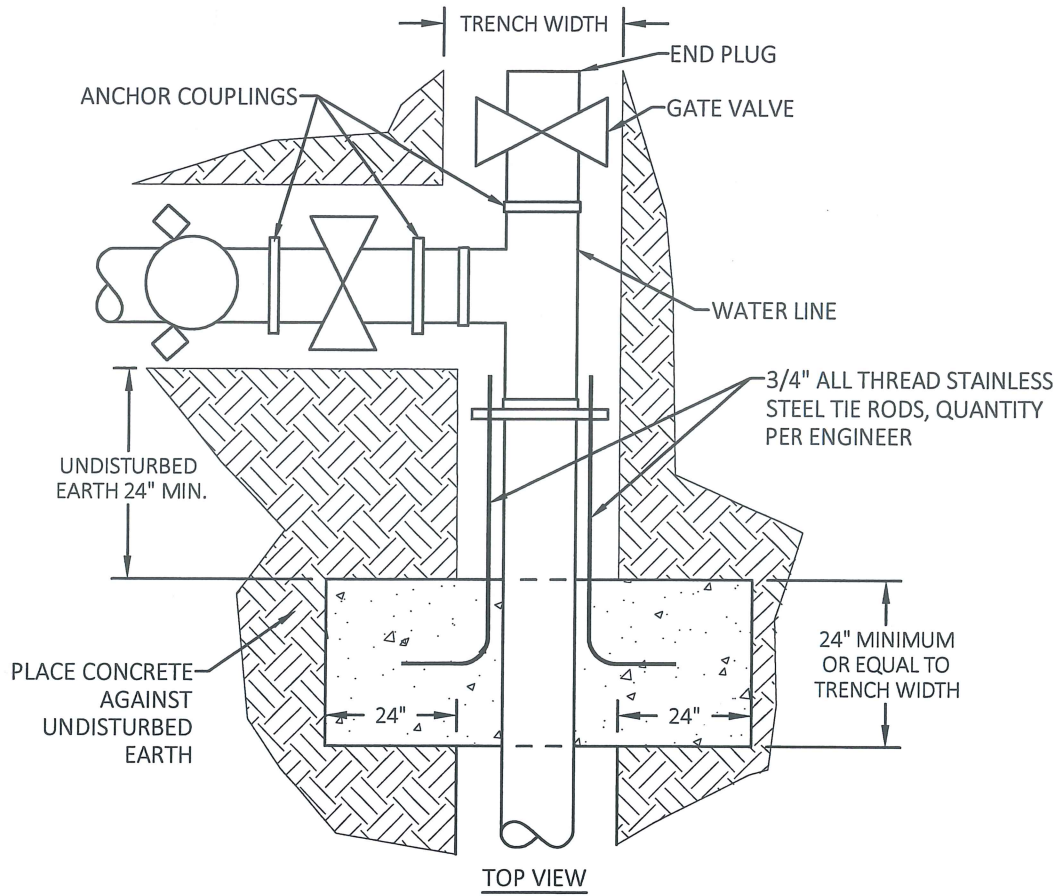
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Hydrants shall be oriented with the pumper outlet perpendicular to the curb which faces the street.
3. The center of a hose outlet shall not be less than 18 inches above final grade and so that the final hydrant installation is compatible with the final grade elevation and plumb.
4. A clearance space of at least three feet (3 ft.) surrounding the hydrant body shall be provided around every hydrant.
5. Utility poles, vaults, walls, plants, and other landscape materials shall be kept outside the hydrant's clearance space.
6. Bedding for DI, PVC, and HDPE Pressure Pipe to be flat bottom trench, backfill as shown (except for special backfill areas designated by specifications; i.e. driveways, streets, sidewalks, etc.).

**Fire Hydrant Connection**

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**Material:**

1. Concrete Straddle Block

Pipe Size (IN)	D MIN.(IN)
8	7
12	15

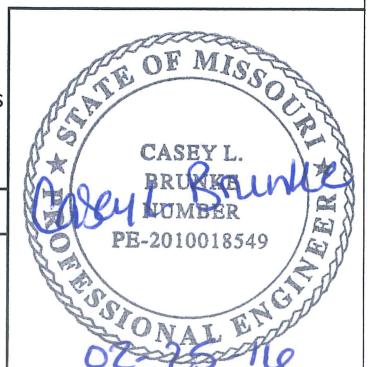
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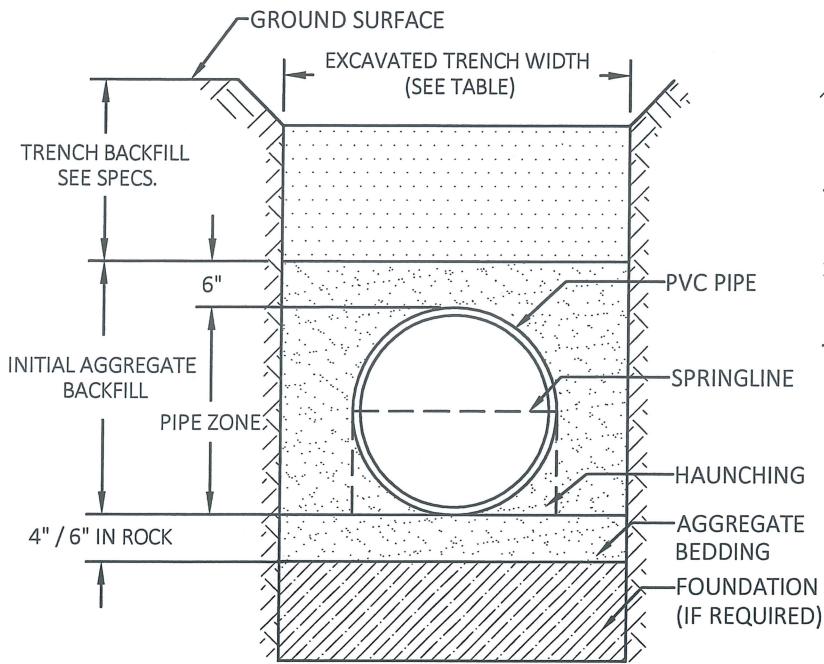
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Concrete shall have 28 day minimum strength of 4000 PSI.
3. For pipe sizes larger than 12 inches straddle blocks shall be designed individually by the Engineer and shall be based on the following:
  - a. 200 PSI Water pressure
  - b. Soil bearing capacity, steel size, and spacing by the Engineer.
4. Bearing area of block shall be against undisturbed soil.
5. Straddle Block and pipe shall have a minimum of 18" cover.
6. All fittings within the concrete shall be wrapped in plastic.
7. Joint restraint devices shall be used in lieu of thrust blocks at all vertical bend locations (down bends and up bends). The devices shall extend a minimum of three pipe joints (57 feet) each direction for the bend or as otherwise directed in the manufacturer's recommendations.

**Standard Straddle Block**

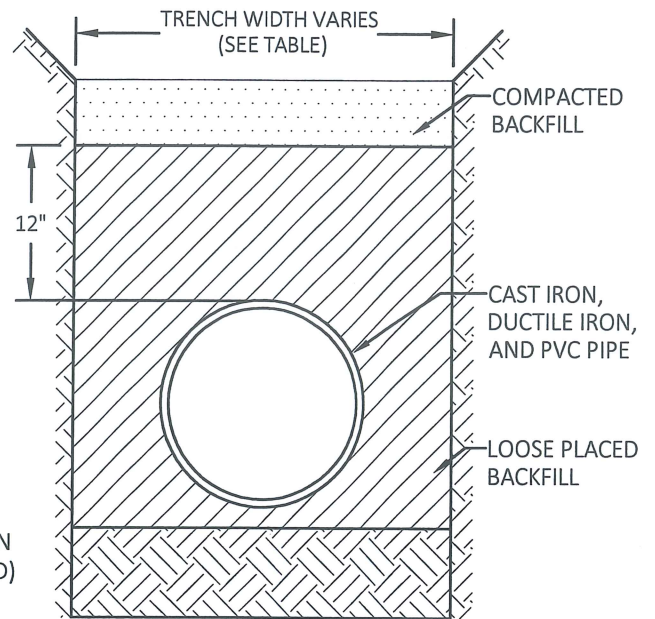
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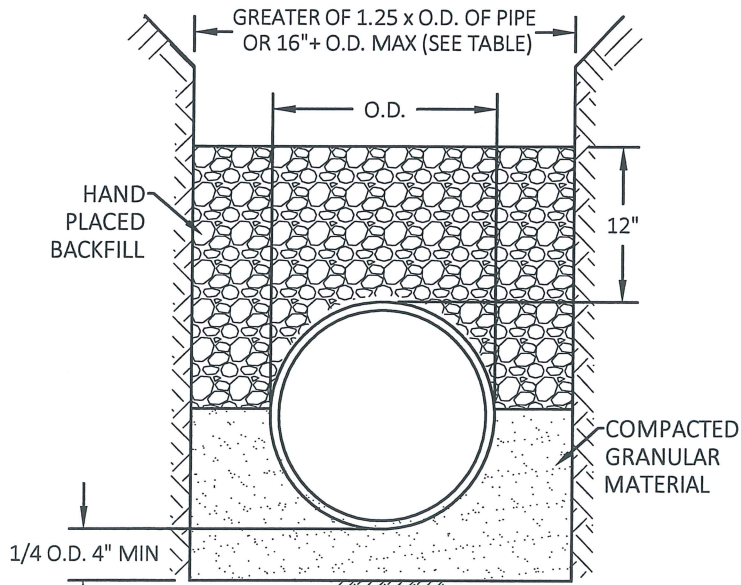




GRAVITY SEWER BEDDING



PRESSURE PIPE BEDDING



RIGID PIPE BEDDING (CLASS B)

Flexible Pipe	
Pipe Size (IN)	Trench Width (IN) MIN.
4	20
6	22
8	24
10	26
12	28
15	31
18	35
21	39
24	42

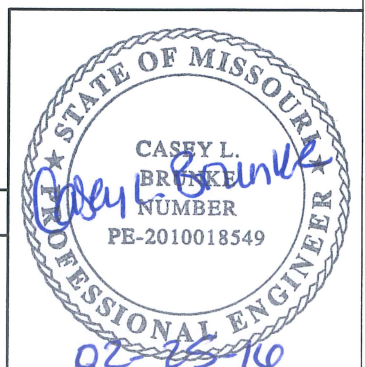
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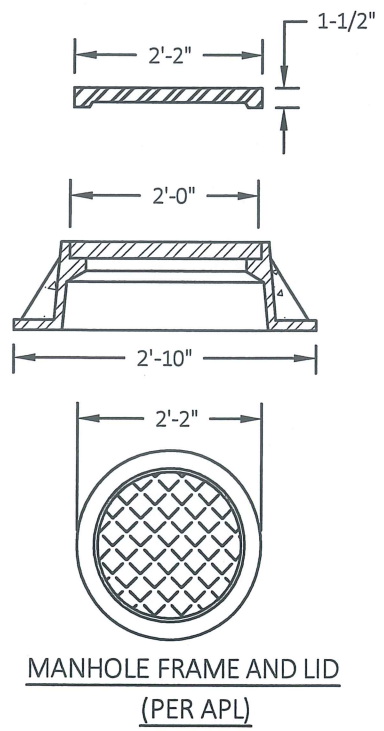
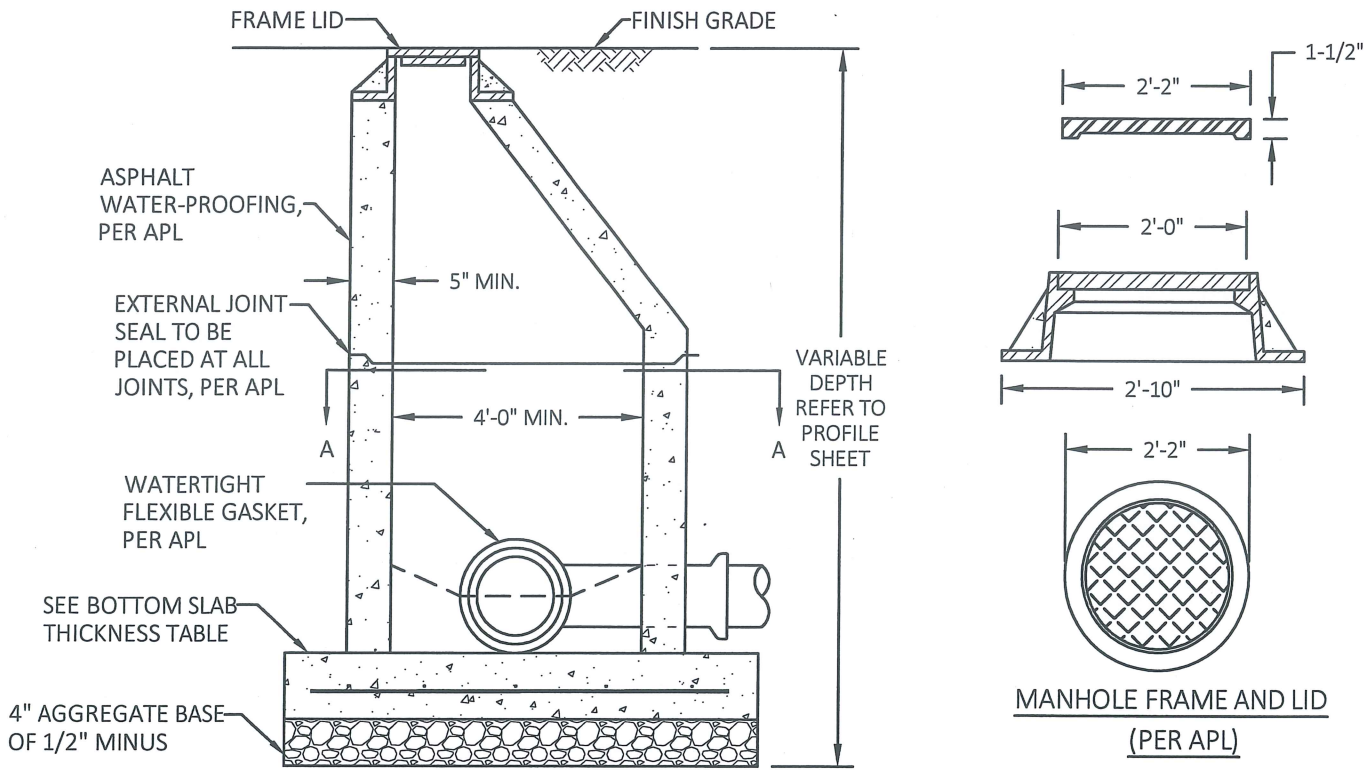
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. See specifications for aggregate, initial backfill, and trench backfill.

**Pipe Bedding - Sewer, Pressure, and Rigid Pipe**

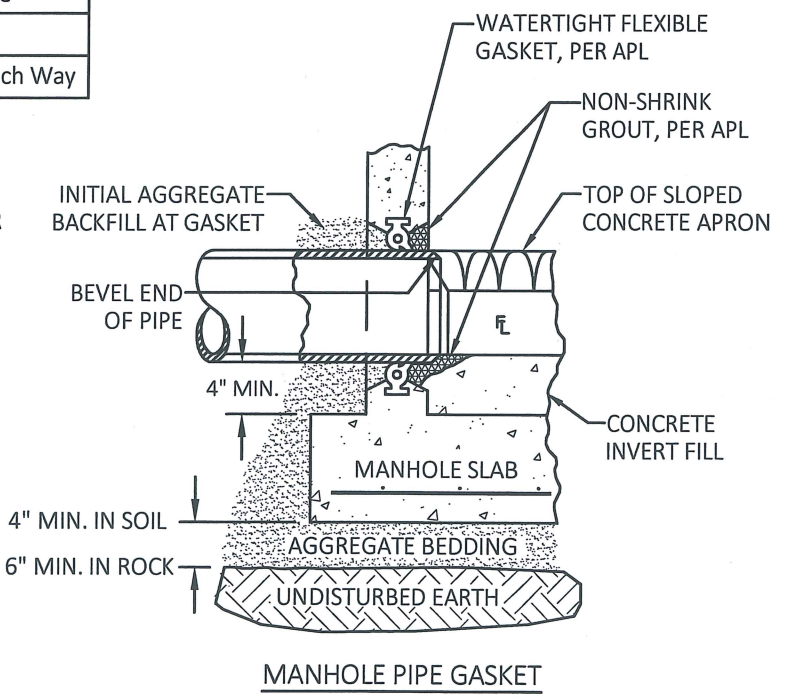
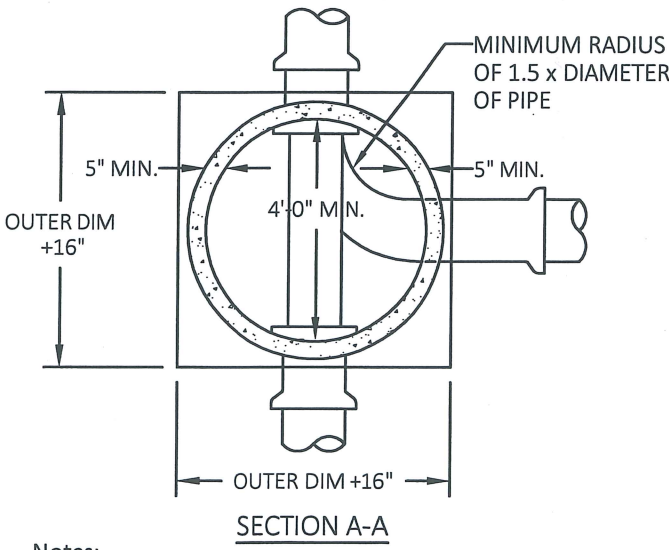
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Bottom Slab Concrete	
Thickness	Steel
8"	#4 - 12" O.C. Each Way



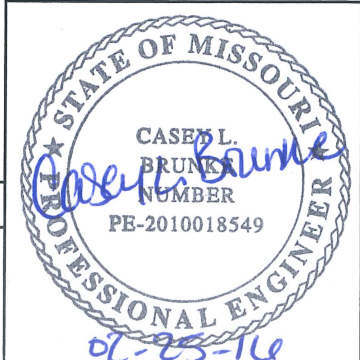
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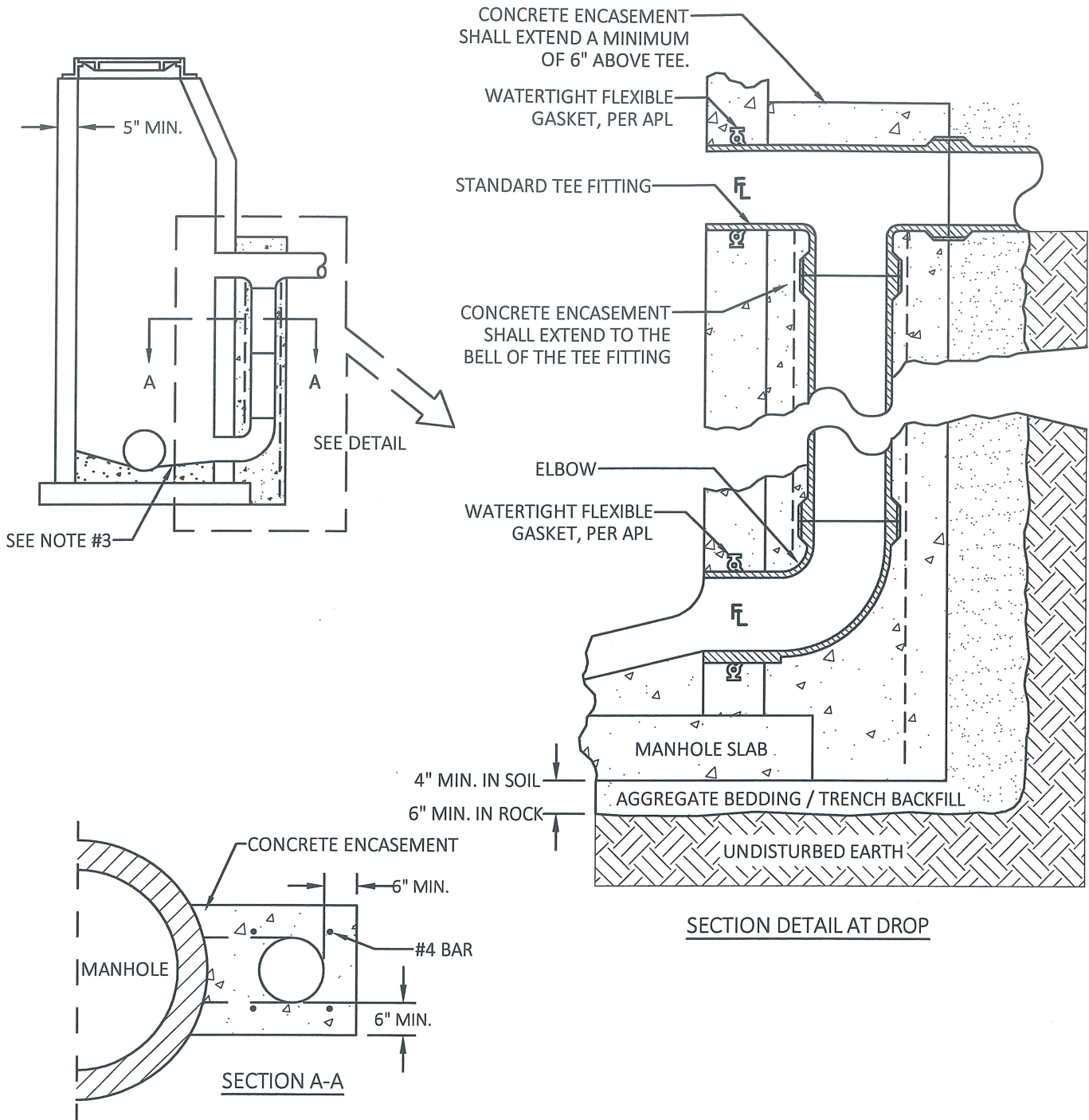
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Manhole structures shall be precast and conform to ASTM C478, except as modified by the specifications.
3. The pipe gasket for precast manholes with boxouts shall be watertight flexible rubber gasket or a waterstop between pipe and wall completely grouted with non-shrinking grout, per APL.
4. Asphalt waterproofing on exterior surface of manhole shall not come in contact with pipe gasket.
5. When a manhole is used for storm sewer a watertight flexible rubber gasket is not required.
6. Outlet pipe invert shall be 0.1 foot lower than the lowest inlet pipe.
7. Pipe may project one inch maximum past inside wall of manhole.

**Standard Sanitary Manhole with Frame and Lid**

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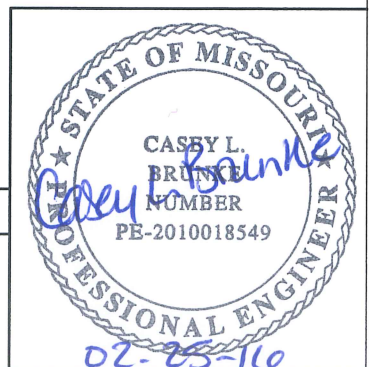
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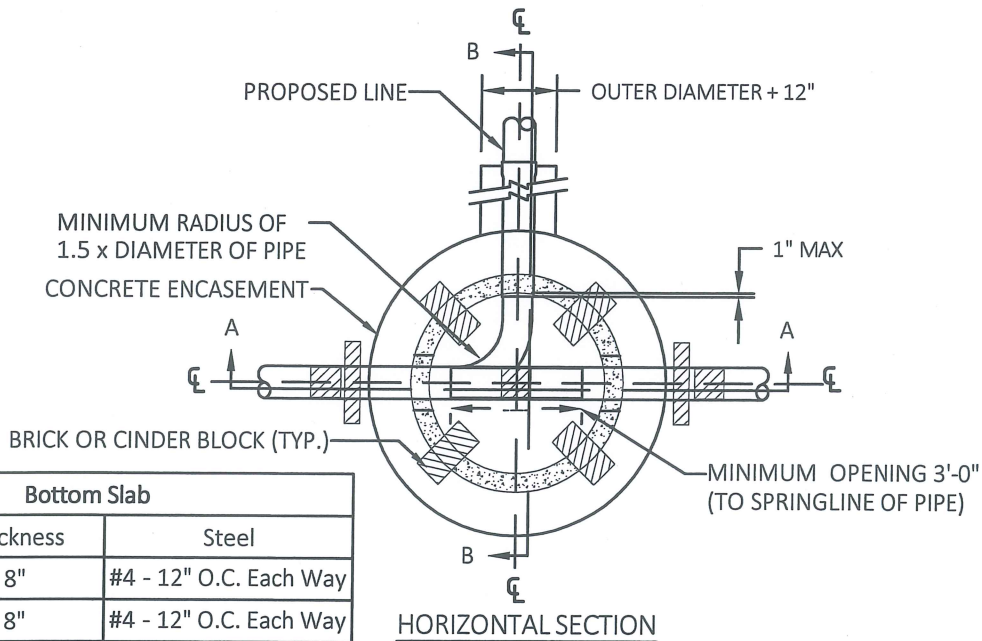
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Manhole structures shall be precast and conform to ASTM C478, except as modified by the specifications.
3. Use Drop Manhole if elevation difference of inflow and outflow is greater than two feet.
4. Outlet pipe invert shall be 0.1 foot lower than the lowest inlet pipe.
5. Drop inlet pipe to be same size and material as sewer main.
6. Alignment of tee: Drop inlet pipe and elbow may be adjusted to maximum of 5% deflection to compensate for slope of sewer line.

**Drop Manhole**

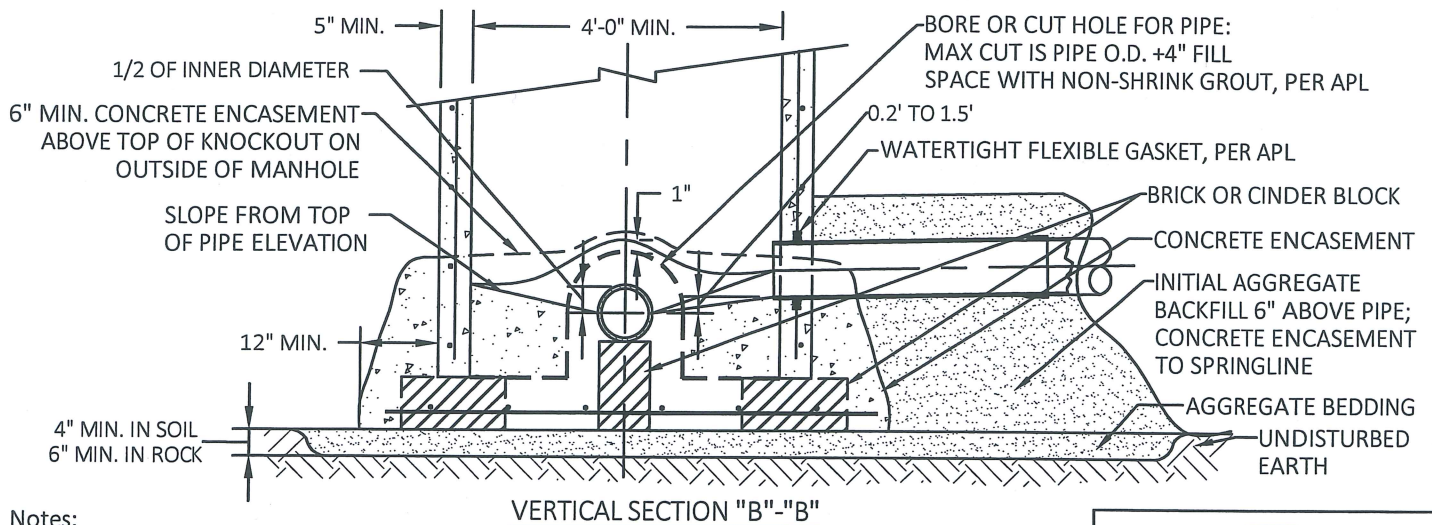
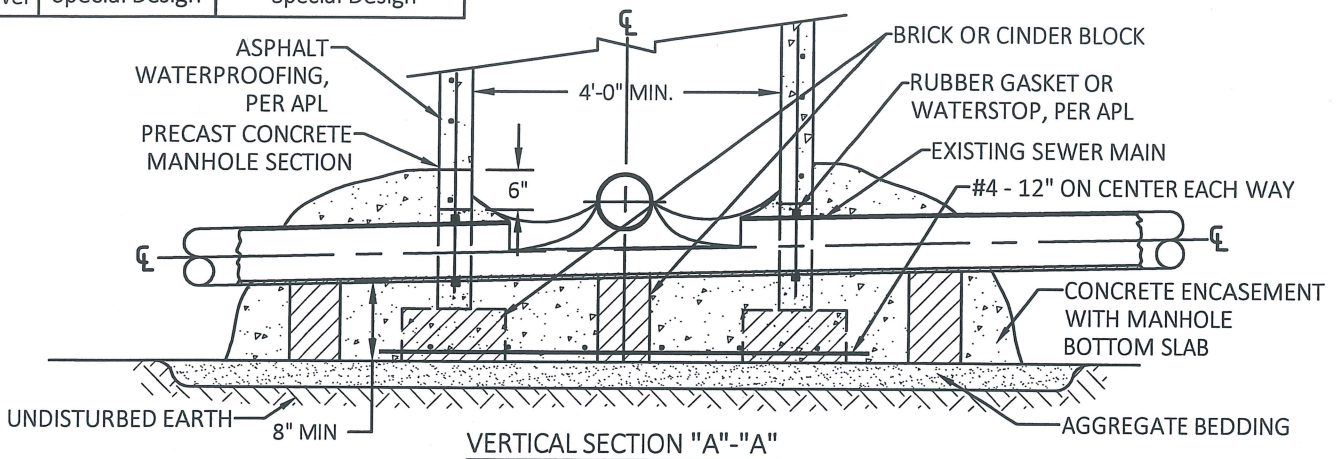
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Bottom Slab		
Depth	Thickness	Steel
0'-10'	8"	#4 - 12" O.C. Each Way
10'-16'	8"	#4 - 12" O.C. Each Way
16'- Over	Special Design	Special Design



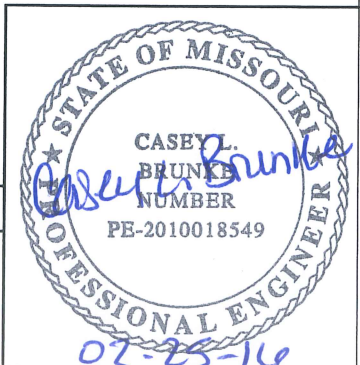
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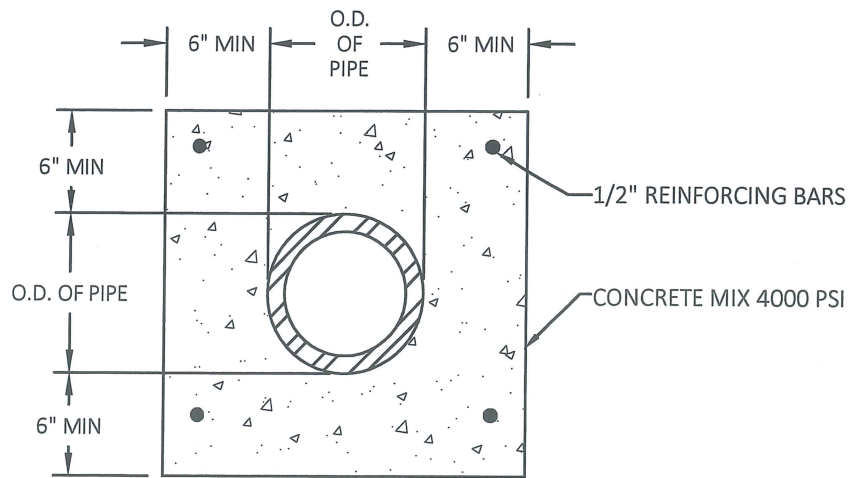
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Manhole structures shall be precast and conform to ASTM C478, except as modified by the specifications.
3. Existing main segment replacement at discretion of Engineer.

**Doghouse Manhole**

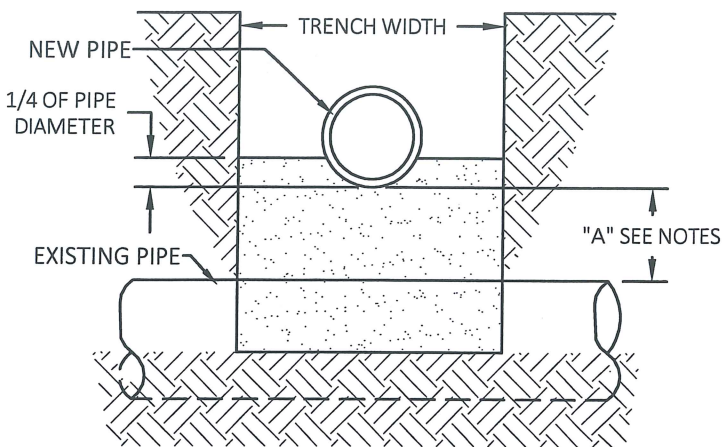
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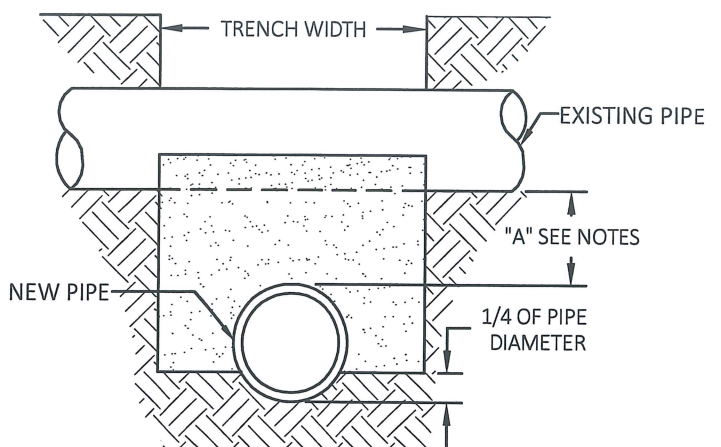




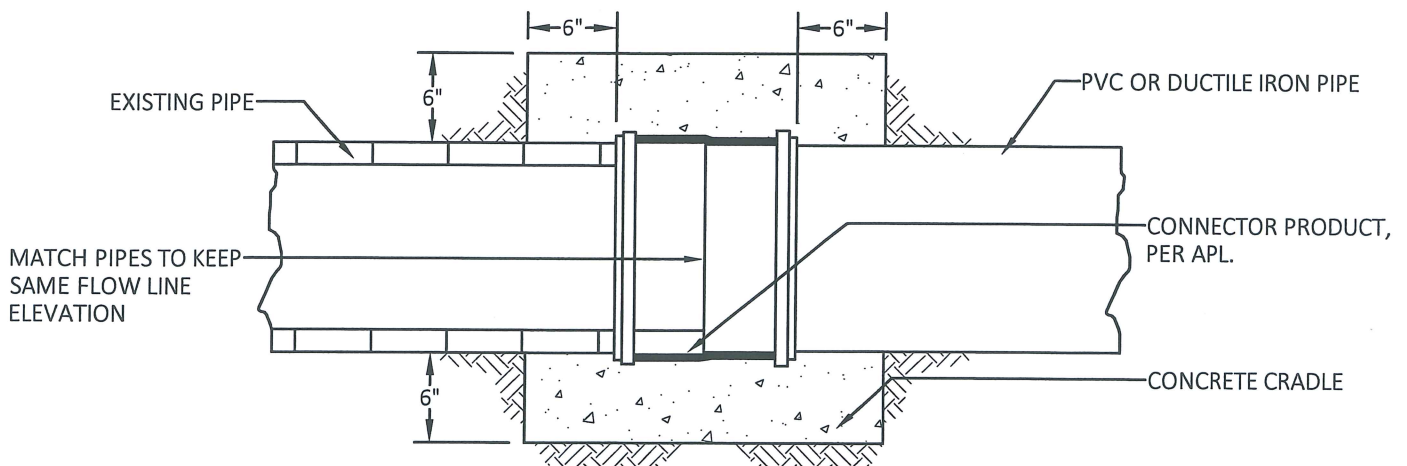
**CONTINUOUS CONCRETE ENCASEMENT**



**ABOVE EXISTING PIPE**



**BELOW EXISTING PIPE**



**JOINT ENCASEMENT**

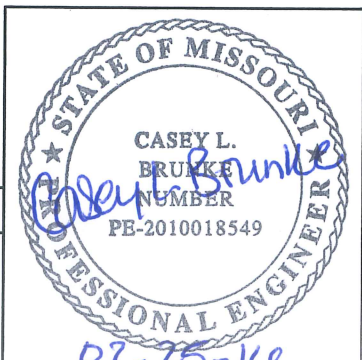
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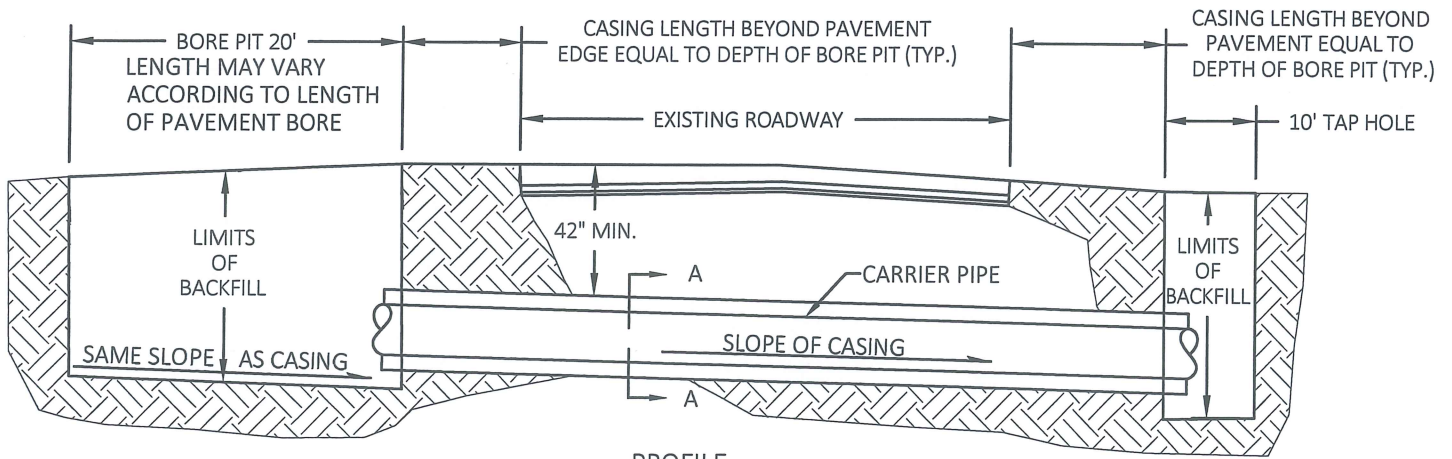
1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Where "A" is greater than 12" no concrete encasement is required use Type 5 compacted base between pipes per specs.
3. Where "A" is 12" or less use standard concrete sewer cradle on existing sewer pipe.
4. All pipe are sewer carriers. If any pipe is a water carrier see Water Main specifications.

**Pipe Crossing and Continuous Encasement**

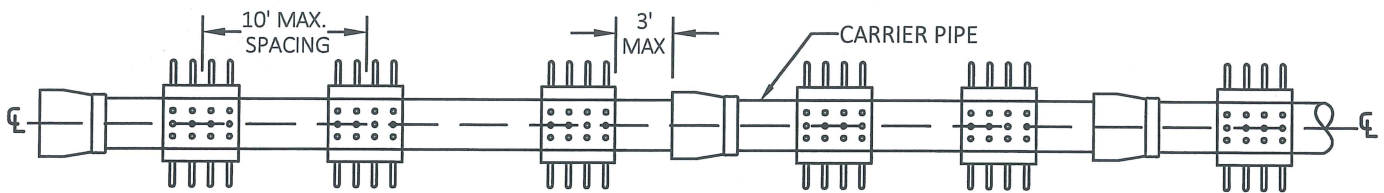
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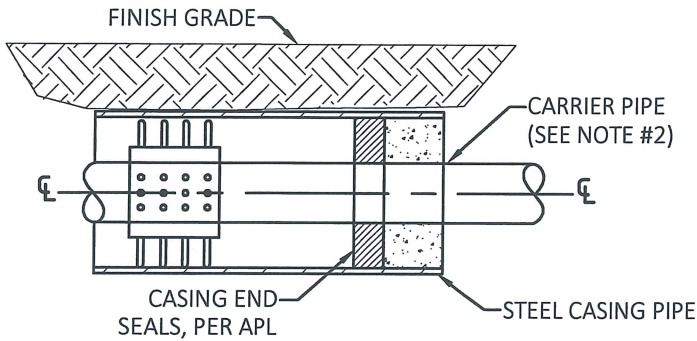




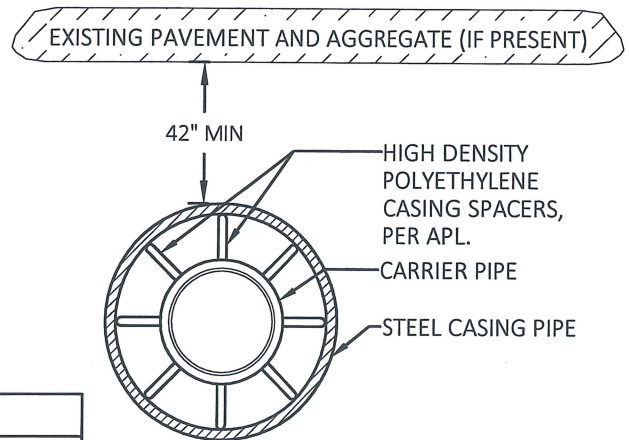
PROFILE



SPACING DETAILS



CASING END SEALS



SECTION A-A

Steel Casing Pipe	
Diameter $\varnothing$	Minimum Wall Thickness
6" Thru 12"	0.188"
14" Thru 22"	0.250"
24" & 26"	0.281"
28" Thru 34"	0.312"
36" Thru 48"	0.344"

Notes:

1. All work shall be done in accordance with the latest edition of the City of Cape Girardeau Standard Specifications.
2. Do not scale drawing, follow dimensions.
3. Carrier pipe material shall be SDR 35 PVC or DIP.
4. Steel casing pipe used in the installation must have a minimum yield strength of 36,000 PSI.
5. Steel casing pipe shall have a minimum wall thickness as indicated on the table.
6. All joints in the casing pipe shall be welded and coated with bituminous based product, per APL.
7. Polyethylene spacers shall be placed every ten feet along the carrier pipe and two at every joint or as otherwise specified by the manufacturer.

Sanitary Sewer Bore

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