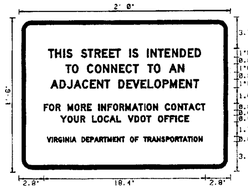
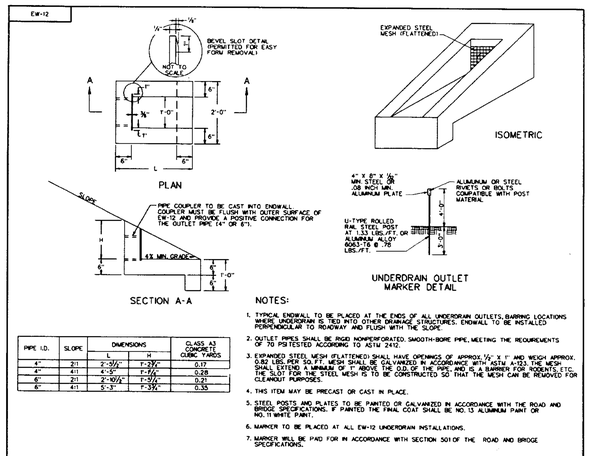
December 2011

Stub Out Street Sign Specifications

Normal Stub Street:



Border Radius: 1.125"
Border Thickness: 0.5"



PIPE I.D.	SLOPE	DIMENSIONS L	DIMENSIONS H	CLASS A3 CONCRETE CUBIC YARDS
4"	2:1	2'-3½"	1'-2½"	0.17
4"	4:1	4'-5"	1'-2½"	0.28
6"	2:1	2'-10½"	1'-3½"	0.21
6"	4:1	5'-3"	1'-3½"	0.35

NOTES:

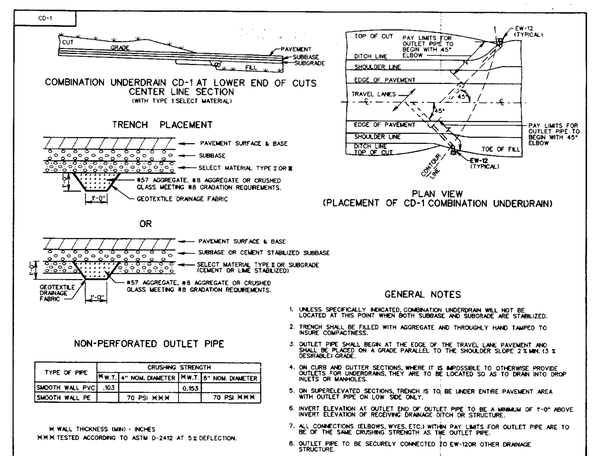
1. TYPICAL ENDWALL TO BE PLACED AT THE ENDS OF ALL UNDERDRAIN OUTLETS, BARRING LOCATIONS WHERE UNDERDRAIN IS TIED INTO OTHER DRAINAGE STRUCTURES. ENDWALL TO BE INSTALLED PERPENDICULAR TO ROADWAY AND FLUSH WITH THE SLOPE.
2. OUTLET PIPES SHALL BE RIGID NONPERFORATED, SMOOTH-BORE PIPE, MEETING THE REQUIREMENTS OF TO PS TESTED ACCORDING TO ASTM 2412.
3. EXPANDED STEEL MESH (FLATTENED) SHALL HAVE OPENINGS OF APPROX. ½" X ½" AND WEIGH APPROX. 0.92 LBS./PER SQ.FT. MESH SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123. THE MESH SHALL EXTEND A MINIMUM OF 1" ABOVE THE O.D. OF THE PIPE AND IS A BARRIER FOR RODENTS, ETC. THE SLOT FOR THE STEEL MESH IS TO BE CONSTRUCTED SO THAT THE MESH CAN BE REMOVED FOR CLEANOUT PURPOSES.
4. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
5. STEEL POSTS AND PLATES TO BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS. IF PAINTED THE FINAL COAT SHALL BE NO.13 ALUMINUM PAINT OR NO.1 WHITE PAINT.
6. MARKER TO BE PLACED AT ALL EW-12 UNDERDRAIN INSTALLATIONS.
7. MARKER WILL BE PAID FOR IN ACCORDANCE WITH SECTION 501 OF THE ROAD AND BRIDGE SPECIFICATIONS.

VDOT ROAD AND BRIDGE STANDARDS | SHEET 1 OF 1 | REVISION DATE 4/09 | 101,32

STANDARD ENDWALL FOR PIPE UNDERDRAIN

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE: 105, 233, 302, 501



NON-PERFORATED OUTLET PIPE

TYPE OF PIPE	M.W.T.	CRUSHING STRENGTH 4" NOM. DIAMETER	M.W.T.	CRUSHING STRENGTH 6" NOM. DIAMETER
SMOOTH WALL PVC	.103		0.153	
SMOOTH WALL PE		70 PSI MMM		70 PSI MMM

M WALL THICKNESS (MIN) - INCHES
MMM TESTED ACCORDING TO ASTM D-2412 AT 5% DEFLECTION.

GENERAL NOTES

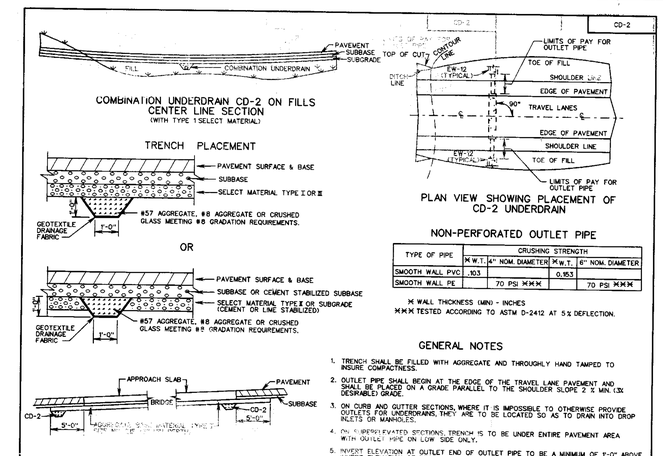
1. UNLESS SPECIFICALLY INDICATED, COMBINATION UNDERDRAIN WILL NOT BE LOCATED AT THIS POINT WHEN BOTH SUBBASE AND SUBGRADE ARE STABILIZED.
2. TRENCH SHALL BE FILLED WITH AGGREGATE AND THROUGHLY HAND TAMPED TO INSURE COMPACTNESS.
3. OUTLET PIPE SHALL BEGIN AT THE EDGE OF THE TRAVEL LANE PAVEMENT AND SHALL BE PLACED ON A GRADE PARALLEL TO THE SHOULDER SLOPE 2% MIN. TO DESIRABLE GRADE.
4. ON CURB AND GUTTER SECTIONS, WHERE IT IS IMPOSSIBLE TO OTHERWISE PROVIDE OUTLETS FOR UNDERDRAINS, THEY ARE TO BE LOCATED SO AS TO DRAIN INTO DROP INLETS OR MANHOLES.
5. ON SUPERELEVATED SECTIONS, TRENCH IS TO BE UNDER ENTIRE PAVEMENT AREA WITH OUTLET PIPE ON LOW SIDE ONLY.
6. INVERT ELEVATION AT OUTLET END OF OUTLET PIPE TO BE A MINIMUM OF 1'-0" ABOVE INVERT ELEVATION OF RECEIVING DRAINAGE DITCH OR STRUCTURE.
7. ALL CONNECTIONS (ELBOWS, WYES, ETC.) WITHIN PAY LIMITS FOR OUTLET PIPE ARE TO BE OF THE SAME CRUSHING STRENGTH AS THE OUTLET PIPE.
8. OUTLET PIPE TO BE SECURELY CONNECTED TO EW-12OR OTHER DRAINAGE STRUCTURE.

VDOT ROAD AND BRIDGE STANDARDS | SHEET 1 OF 1 | REVISION DATE | 108.04

STANDARD COMBINATION UNDERDRAIN
(AT LOWER END OF CUTS)

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE: 232, 501, 701



NON-PERFORATED OUTLET PIPE

TYPE OF PIPE	M.W.T.	CRUSHING STRENGTH 4" NOM. DIAMETER	M.W.T.	CRUSHING STRENGTH 6" NOM. DIAMETER
SMOOTH WALL PVC	.103		0.153	
SMOOTH WALL PE		70 PSI MMM		70 PSI MMM

M WALL THICKNESS (MIN) - INCHES
MMM TESTED ACCORDING TO ASTM D-2412 AT 5% DEFLECTION.

GENERAL NOTES

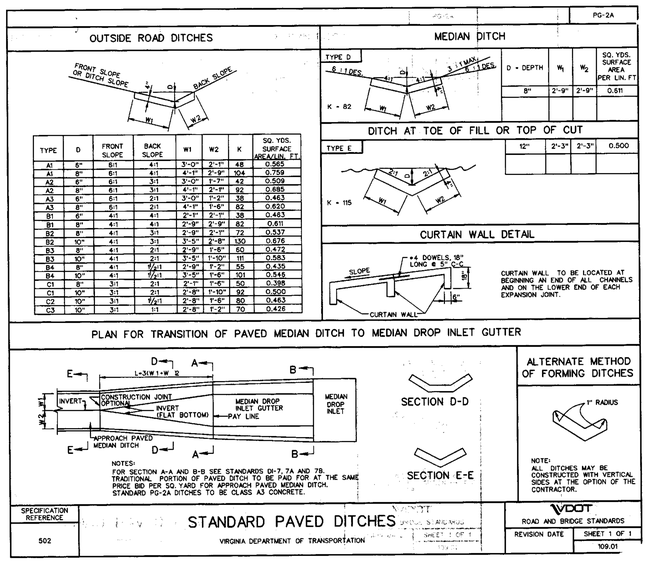
1. TRENCH SHALL BE FILLED WITH AGGREGATE AND THROUGHLY HAND TAMPED TO INSURE COMPACTNESS.
2. OUTLET PIPE SHALL BEGIN AT THE EDGE OF THE TRAVEL LANE PAVEMENT AND SHALL BE PLACED ON A GRADE PARALLEL TO THE SHOULDER SLOPE 2% MIN. TO DESIRABLE GRADE.
3. ON CURB AND GUTTER SECTIONS, WHERE IT IS IMPOSSIBLE TO OTHERWISE PROVIDE OUTLETS FOR UNDERDRAINS, THEY ARE TO BE LOCATED SO AS TO DRAIN INTO DROP INLETS OR MANHOLES.
4. ON SUPERELEVATED SECTIONS, TRENCH IS TO BE UNDER ENTIRE PAVEMENT AREA WITH OUTLET PIPE ON LOW SIDE ONLY.
5. INVERT ELEVATION AT OUTLET END OF OUTLET PIPE TO BE A MINIMUM OF 1'-0" ABOVE INVERT ELEVATION OF RECEIVING DRAINAGE DITCH OR STRUCTURE.
6. ALL CONNECTIONS (ELBOWS, WYES, ETC.) WITHIN PAY LIMITS FOR OUTLET PIPE ARE TO BE OF THE SAME CRUSHING STRENGTH AS THE OUTLET PIPE.
7. OUTLET PIPE TO BE SECURELY CONNECTED TO EW-12OR OTHER DRAINAGE STRUCTURE.

SPECIFICATION REFERENCE: 232, 501, 701

STANDARD COMBINATION UNDERDRAIN
(AT GRADE SAGS AND BRIDGE APPROACHES)

VIRGINIA DEPARTMENT OF TRANSPORTATION

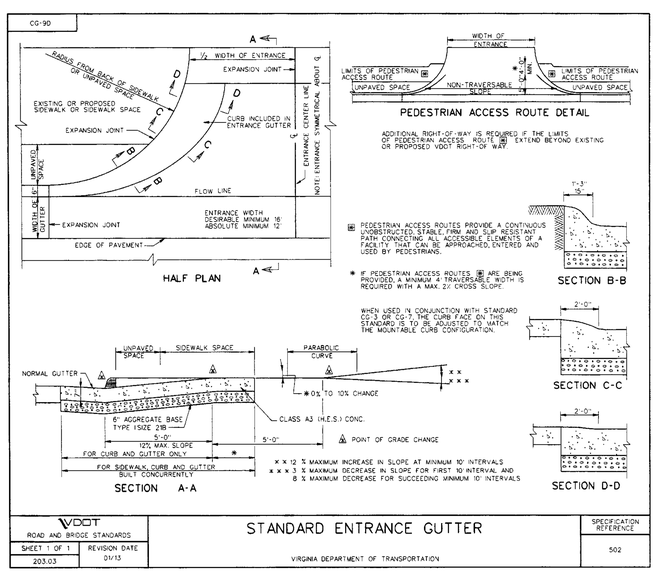
VDOT ROAD AND BRIDGE STANDARDS | REVISION DATE | SHEET 1 OF 1 | 108.05



TYPE	D	FRONT SLOPE	BACK SLOPE	W1	W2	K	SQ. YDS. SURFACE AREA/LIN. FT.
A1	8"	6:1	4:1	3'-0"	2'-9"	48	0.565
A1	8"	6:1	4:1	4'-1"	2'-9"	104	0.759
A2	6"	6:1	3:1	3'-0"	1'-7"	42	0.509
A2	8"	6:1	3:1	4'-1"	2'-9"	92	0.685
A3	6"	6:1	2:1	3'-0"	1'-2"	38	0.463
A3	8"	6:1	2:1	4'-1"	1'-6"	82	0.620
B1	6"	4:1	4:1	2'-1"	2'-1"	38	0.463
B1	8"	4:1	4:1	2'-9"	2'-9"	82	0.61
B2	8"	4:1	3:1	2'-9"	2'-1"	72	0.537
B2	10"	4:1	3:1	3'-5"	2'-8"	130	0.676
B3	8"	4:1	2:1	2'-9"	1'-6"	60	0.472
B3	10"	4:1	2:1	3'-5"	1'-10"	111	0.583
B4	8"	4:1	5/4:1	2'-9"	1'-2"	55	0.435
B4	10"	4:1	5/4:1	3'-5"	1'-6"	101	0.545
C1	8"	3:1	2:1	2'-1"	1'-6"	50	0.398
C1	10"	3:1	2:1	2'-8"	1'-10"	92	0.500
C2	10"	3:1	5/4:1	2'-8"	1'-8"	80	0.463
C3	10"	3:1	1:1	2'-8"	1'-2"	70	0.426

TYPE	D	W1	W2	SQ. YDS. SURFACE AREA PER LIN. FT.
	8"	2'-9"	2'-9"	0.611

12"	2'-3"	2'-3"	0.500

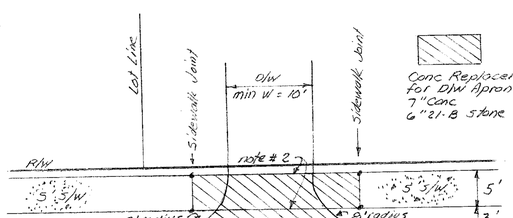


VDOT ROAD AND BRIDGE STANDARDS | SHEET 1 OF 1 | REVISION DATE 01/13 | 203.03

STANDARD ENTRANCE GUTTER

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE: 502



Notes:

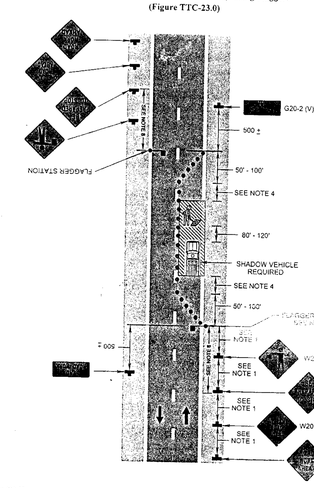
1. Contractor shall apply a VDOT approved joint sealant and expansion material between the proposed entrance and the roll face curb & gutter
2. Contractor shall insure with appropriate spot shots to insure the placement of the heavyduty sidewalk replacement matches the sidewalk removed.

Note: Lots not fronting sidewalk shall pave similar D/W curve (8') with similar apron design (7" conc/6" base)

Driveway Construction
1" = 10'

August 2011

Lane Closure on a Two-Lane Roadway Using Flaggers
(Figure TTC-23.0)



Page 6H-52 August 2011

Typical Traffic Control
Lane Closure on a Two-Lane Roadway Using Flaggers
(Figure TTC-23.0)

NOTES

Guidance:

1. *Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph.*
2. *Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the flagger station and transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. Generally speaking, motorists should have a clear line of sight from the graphic flagger symbol sign to the flagger.*

Option:

3. Where Right-of-Way or geometric conditions prevent the use of 48" x 48" signs, 36" x 36" signs may be used.

Standard:

4. **Flagging stations shall be located far enough in advance of the work space to permit approaching traffic to reduce speed and/or stop before passing the work space and allow sufficient distance for departing traffic in the left lane to return to the right lane before reaching opposing traffic (see Table 6H-3 on Page 6H-5).**
5. **All flaggers shall be state certified and have their certification card in their possession when performing flagging duties (see Section 6E.01, Qualifications for Flaggers).**
6. **Cone spacing shall be at the following:**

Location	Posted Speed Limit (mph) 0 – 35	36 +
Transition Spacing	20'	40'
Traveway Spacing	40'	80'

7. **A shadow vehicle with at least one high intensity amber rotating,** oscillating, or strobe light shall **be parked 80'-120' in advance of the first work crew.**

Option:

8. A supplemental flagger may be required in this area to give advance warning of the operation ahead by slowing approaching traffic prior to reaching the flagger station or queued traffic.

Guidance:

9. *If the queue of traffic reaches the BE PREPARED TO STOP (W3-4) sign, then the signs should be readjusted at greater distances.*
10. *When a highway-rail crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the highway-rail grade crossing, the temporary traffic control zone should be extended so that the transition area precedes the highway-rail crossing (see Figure TTC-36 for additional information on highway-rail crossings).*

Standard:

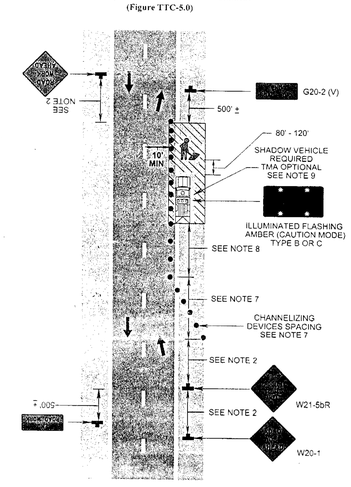
11. **At night, flagger stations shall be illuminated, except in emergencies** (see Section 6F.08).

Option:

12. Cones may be eliminated when using a pilot vehicle operation or when the total roadway width is 20 feet or less.
13. For low-volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6F).

Page 6H-16 August 2011

Shoulder Operation with Minor Encroachment
(Figure TTC-5.0)



Typical Traffic Control
Shoulder Operation with Minor Encroachment
(Figure TTC-5.0)

NOTES

Standard

1. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.** See Note 1, **TTC-4 for addition sign information.**

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*
3. *When work takes up part of a lane on a high volume roadway, vehicular traffic volumes, vehicle mix, speed and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment analysis permits a remaining lane width of 10 feet, the lane should be closed. If the closure operation is on a Limited Access highway, the minimum lane width is 11 feet.*

Option:

4. The ROAD WORK AHEAD (W20-1) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.

Standard:

5. **A shadow vehicle with either an arrow board operating in the caution mode, or at least one high-intensity amber rotating, flashing, oscillating, or strobe light shall be parked 80' - 120' in advance** of the first work crew.
6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber** rotating, flashing, oscillating, or strobe lights. **Vehicle hazard warning signals can be used to** supplement high-intensity amber rotating, flashing, oscillating, or strobe lights.
7. **Taper length (L) and channelizing device spacing shall be at the following:**

Taper Length (L) Speed Limit (mph)	Lane Width (Feet) 9	10	11	12
25*	95	105	115	125
30	125	135	150	165
35	155	205	225	245
40	240	270	295	320
45	435	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum taper lengths for Limited Access highways shall be 1000 feet. Shoulder Taper = 3/1 Minimum				

Channelizing Device Spacing Location	Speed Limit (mph) 0 - 35	36 +
Transition Spacing	20'	40'
Traveway Spacing	40'	80'
Construction Access*	80'	120'

* Spacing may be increased to this distance, but shall not exceed one access per ½ mile.

On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

8. The buffer space length shall be as shown in Table 6H-3 on **Page 6H-5 for the posted speed limit.**
9. A truck-mounted attenuator (TMA) **shall be used on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.**
10. **When a side road intersects the highway within the temporary traffic control zone, additional** traffic control devices shall be placed **as needed.**

REVISIONS	BY
12-4-13	
2-3-14	
4-24-14	

Architectural Graphics
6676 LAKESHORE DRIVE
QUINTON, VIRGINIA 23141
804-551-6944

ROAD AND DRAINAGE DETAILS
EAGLE PRESERVE
AT JORDAN ON THR JAMES

SEAL: COMMONWEALTH OF VIRGINIA — Walter A. Matta II — No. 11039 — 4/24/14 — PROFESSIONAL ENGINEER

DRAWN	CHECKED
PBM	WMA

DATE : 12/4/13
SCALE : AS NOTED
JOB NO. :
SHEET C208
OF 35 SHEETS