

May 8, 2002

INSTRUCTIONAL BULLETIN NO. 2002-1

SUBJECT: Trench Drain Applications

EFFECTIVE DATE: May 3, 2002

SUPERSEDES: None

RE: Special Provision “ Trench Drain – 4” or 8” Interior Dimension”

Trench drains should be considered when surface flows are suspected to interfere with traffic operations. Water draining from an adjacent property through a drive toward the roadway can be intercepted by a trench drain installed across the driveway and deposited into the parallel ditch or into a drainage box. In this case, the Trench Drain - 8” Interior Dimension (Driveway Application) may be used.

In curb and gutter sections, the typical section provides for water to get to the gutter. However, when rehabilitating and widening a section of roadway that was previously a ditch section but is now a curb and gutter section, grades, vertical curves and superelevation rotation can create obstacles in getting water to the desired catch basins and storm sewers. Typically, the minimum desired gutter grade is 0.5%; however, 0.3% may be used with adequate cross-slope. Under close scrutiny, 0.2% has been used on short distances and occasionally assisted by increasing the cross-slope. The length of curve can create relatively flat locations on a crest and in a sag vertical curve. Where feasible, catch basin spacing may be reduced to facilitate drainage.

When additional pipe and catch basins are not feasible or the area is not conducive to a catch basin, such as in a driveway, then trench drains may be installed in the gutters to enhance the drainage of the roadway. Trench drains in gutters will reduce potential ponding in the gutter area caused by inherent near flat grades occurring in areas being superelevated and in vertical curves. Typically, the flow line of a trench drain is fixed at 0.6%, but will vary according to the grade of the gutter. Trench drains can be placed in an opposing direction to the gutter grade, as long as the gutter grade does not exceed 0.2% in the opposite direction. For example, this would yield a trench drain flow line grade of 0.4% in a gutter with an opposing grade of 0.2%. This composite grade of the trench drain flow line should not be less than 0.4%.

The guidelines for trench drain use in gutters are:

1. When grades in the gutter are $\leq 0.1\%$. Actual elevations on profile must be checked to determine percent grade in vertical curves.
2. Drainage box within 96 LF to outlet the trench drain.

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3. Trench drain must be designed in 16 foot increments. Maximum length of trench drain in one run is 96 LF.
4. Place location and quantity information on “General Construction Note” Sheet as shown on the attached sheet.

Quantities for trench drain and curb and gutter will not overlap. When trench drain is extended through a driveway in the gutter, measurement of the trench drain will be made only where the curb and gutter normally is measured. This is typically in drives where the curb drops to the gutter elevation and does not turn away from the roadway on a radius to follow the edge of the driveway. In cases of a driveway where the curb follows a radius away from the roadway, and the trench drain extends into or through the driveway, then the trench drain that is not in the curb and gutter will be measured and paid for as Trench Drain (Driveway). The width of the trench drain including the standard concrete width for the drain will be deducted from the area measurement for concrete driveway.

The pay item for trench drains are:

7192091 Trench Drain - 4" Interior Dimension with 1.5' curb & gutter	LF
7192092 Trench Drain - 4" Interior Dimension with 2.0' curb & gutter	LF
7192093 Trench Drain - 4" Interior Dimension with 2.5' curb & gutter	LF
719209A Trench Drain - 4" Interior Dimension (Driveway Application)	LF
719209E Trench Drain - 8" Interior Dimension (Driveway Application)	LF

Approved: Original Signed by E. S. Eargle

E. S. Eargle
Road Design Engineer

ESE:afg

Attachments

cc:

Director of CRM Operations Walsh
Program Dev. Engr. Lester – Western Region
Program Dev. Engr. Kneece
CRM East
CRM West
CRM Manager Barwick
Contract Documents Facilitator Frick

bc:

Road Design

GENERAL CONSTRUCTION NOTE

CHANGES INVOLVING INCREASED COST OF PROJECT OR CHANGES IN ALIGNMENT MUST BE SPECIFICALLY AUTHORIZED BY THE STATE HIGHWAY ENGINEER. DISTRICT ENGINEERING ADMINISTRATOR MAY AUTHORIZE MINOR ALTERATIONS NOT IN CONFLICT WITH THE STANDARD PRACTICES OF THE DEPARTMENT AND NOT INVOLVING INCREASES IN COST. FORWARD INFORMATION ON ANY CHANGE IN ALIGNMENT TO THE COLUMBIA OFFICE AS SOON AS THE REVISION IS COMPLETED.

SEE INDIVIDUAL CURVES ON PLANS FOR SUPERELEVATION RATE AND DESIGN SPEED.

THE FOLLOWING QUANTITIES ARE NOT SHOWN IN DETAIL ON THE PLANS BUT ARE INCLUDED IN THE SUMMARY OF ESTIMATED QUANTITIES AND MAY BE VARIED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER:

CLEARING AND GRUBBING DITCHES _____	2.0 ACRE	FOR OUTFALL DITCHES
REMOVAL AND DISPOSAL OF EXISTING PAVEMENT _____	385 S.Y.	WHERE DIRECTED BY THE ENGINEER
REMOVAL AND DISPOSAL OF EXISTING ASPHALT PAVEMENT. _____	9240 S.Y.	ALL REMOVAL AND DISPOSAL OF EXISTING ASPHALT PAVEMENT WILL BE MEASURED AND PAID FOR AS DESCRIBED IN THE SPECIAL PROVISIONS
GEOGRID REINF. (BIAXIAL) _____	6000 S.Y.	WHERE DIRECTED BY THE ENGINEER
UNCLASSIFIED EXCAVATION _____	59,500 C.Y.	FOR REMOVAL AND DISPOSAL OF UNSTABLE MATERIAL
BORROW EXCAVATION _____	83,300 C.Y.	FOR REPLACEMENT OF UNSTABLE MATERIAL
FLOWABLE FILL _____	52 C.Y.	FOR PLUGGING ABANDONED PIPES
MAINTENANCE STONE _____	250 TON	FOR MAINTENANCE OF DRIVES
PORTLAND CEMENT _____	1241 TON	FOR CEMENT STABILIZED EARTH BASE (8" UNIF.)
ASHP. AGG. BASE COURSE _____	327 TON	FOR WIDENING 6' OR LESS
LIQUID ASPHALT BINDER PG.64-22 _____	242 TON	FOR DRIVES AND LEVELING
	14 TON	FOR WIDENING 6' OR LESS
MILLING EXISTING ASPHALT PAVEMENT (VAR.) _____	670 S.Y.	WHERE DIRECTED BY THE ENGINEER
ASPH. CONC. BINDER COURSE _____	4637 TON	FOR BUILD-UP AND LEVELING
ASPH. CONC. SURF. COURSE _____	189 TON	FOR DRIVES AND SIDE ROAD TIE-INS (@ 200 LBS/SY)
CONCRETE FOR STRUCTURES (CLASS 3000) _____	60 C.Y.	WHERE DIRECTED BY THE ENGINEER
CONCRETE FOR STRUCTURES (CLASS 2500) _____	1 C.Y.	WHERE DIRECTED BY THE ENGINEER
ARCH. FINISH FOR RET. WALL _____	4950 SF	FOR CONC. MEDIAN BARRIER AT U.S. RTE. I-95
REINFORCING STEEL FOR STRUCTURES (ROADWAY) _____	5543 LBS	WHERE DIRECTED BY THE ENGINEER
15" R.C. PIPE CULVERT _____	150 L.F.	FOR ADDITIONAL SIDE LINES
18" R.C. PIPE CULVERT _____	150 L.F.	FOR ADDITIONAL SIDE LINES
24" R.C. PIPE CULVERT _____	150 L.F.	FOR ADDITIONAL SIDE LINES
18"x15" R.C. PIPE CULVERT TEE _____	5 EA.	WHERE DIRECTED BY THE ENGINEER
TYPE 16 CATCH BASIN _____	1 EA.	WHERE DIRECTED BY THE ENGINEER
DROP INLET (24"x36") _____	5 EA.	WHERE DIRECTED BY THE ENGINEER
TRENCH DRAINS 4" ID (GUTTER) _____	192 L.F.	TO ENHANCE DRAINAGE
MANHOLE _____	6 EA.	WHERE DIRECTED BY THE ENGINEER
CONCRETE DRIVEWAY (6" UNIFORM) _____	2050 S.Y.	FOR DRIVES
AGGREGATE UNDERDRAIN _____	65 C.Y.	FOR ADDITIONAL UNDERDRAIN TRENCH BACKFILL
6" PERFORATED PIPE UNDERDRAIN _____	500 L.F.	FOR SUBSURFACE DRAINAGE
RIP-RAP (CLASS B) _____	100 TON	WHERE DIRECTED BY THE ENGINEER
GEOTEX./EROS. CONTROL UNDER RIP-RAP (UNPROTECTED)-CL2 _____	200 S.Y.	TO BE PLACED UNDER RIP-RAP
ADDITIONAL LENGTH GUARDRAIL POST _____	210 L.F.	WHERE DIRECTED BY THE ENGINEER
RESET FENCE _____	2080 L.F.	FOR RESETTING EXISTING FENCE
RESET CHAIN LINK FENCE _____	1500 L.F.	FOR RESETTING EXISTING FENCE
RESET RIGHT OF WAY MARKER _____	4 EA.	WHERE DIRECTED BY THE ENGINEER

EROSION CONTROL ITEMS

SEEDING (UNMULCHED) _____	46,160 M.S.Y.	FOR ALL DISTURBED AREAS
TEMPORARY SEEDING _____	23,080 M.S.Y.	FOR ALL DISTURBED AREAS
FERTILIZER (10-10-10) _____	5,966 TON	FOR ALL DISTURBED AREAS
LIME _____	9,547 TON	FOR ALL DISTURBED AREAS
NITROGEN _____	458 LBS.	FOR ALL DISTURBED AREAS
MOWING _____	69,240 M.S.Y.	WHERE DIRECTED BY THE ENGINEER
SODDING _____	50 S.Y.	FOR TEMPORARY EROSION CONTROL
BALED STRAW _____	579 EA.	FOR TEMPORARY EROSION CONTROL
SILT FENCE _____	2000 L.F.	FOR TEMPORARY EROSION CONTROL
SILT BASINS _____	1000 C.Y.	FOR TEMPORARY EROSION CONTROL

FED. RD. DIV. NO.	STATE	COUNTY	FILE NO.	NO.	SHEET NO.
3	S.C.				

TRENCH DRAIN 4" ID (GUTTER) LOCATIONS

STATION	STATION	LT. OR RT.	LF
84+96	50' R	RT.	64
85+36	50' R	RT.	80
86+54	87+50	RT.	96
87+54	88+50	RT.	96
112+35	112+83	LT.	48
112+35	112+83	RT.	48
140+97	40' R	LT.	64
141+11	141+75	RT.	64
141+75	142+23	RT.	48
142+16	40' R	LT.	64
150+04	151+00	LT.	96
151+00	151+32	LT.	32
151+36	151+52	LT.	16
151+00	151+32	RT.	32
151+36	151+50	RT.	16
156+53	157+33	RT.	80
156+62	157+42	LT.	80
169+19	40' R	RT.	64
169+25	169+41	LT.	16
190+60	191+08	RT.	48
190+54	191+18	LT.	64
SUBTOTAL			1216
INCLUSION			192
TOTAL			1408

NOTE:
TO BE PLACED IN MULTIPLES OF 16' UP TO 96' MAX. LENGTH.

4				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION ROAD DESIGN COLUMBIA, S.C.
3				
2				
1				
REV. NO.	BY	DATE	DESCRIPTION OF REVISION	
TOPO.		DATE		
DWG.		DATE	SQUAD	
R/W		DATE		