Proposed Ordinance

Curb/Gutter and Storm Water Drainage Capacity Requirements

Curbs and gutters shall be required for all new streets within the City limits of Taylorsville, Kentucky and shall be designed in accordance with the City's Stormwater design manual.

STORMWATER DESIGN MANUAL

FOR

CITY OF TAYLORSVILLE

TAYLORSVILLE, KENTUCKY

CURB & GUTTER ORDINANCE

April 1, 2003

SME PROJECT CODE: 03003

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STORM WATER DESIGN MANUAL
CITY OF TAYLORSVILLE

INLETS / STORM SEWERS / MANHOLES

1.1 Design Criteria

The primary objective of street drainage design is to limit the amount of water flowing along the gutters or ponding at the low points of roadways to quantities which will not interfere with the passage of traffic for the design frequency storm. This is accomplished by placing inlets at such points and at such necessary intervals to intercept flows and control spread of stormwater.

Curb Inlets:

Curb inlets shall be used for street drainage except where curb cuts are used and shall be designed as follows:
. Space inlets on grade to limit the spread of water for the 10-year storm as follows:
- design speed 45 mph or less - 6' in driving lane
- design speed greater than 45 mph - 4' in driving lane
. Limit the depth of water to the top of the curb for the 10-year storm and to the back of the sidewalk for the 100-year storm for inlets at the low points.
. Space inlets to prevent concentrated water from flowing across the road.
. Place inlets on the upstream side of intersection radii.
. Design the inlet assuming flow only through the curb opening, if a grate is present.
. Provide an overflow channel assuming that inlets in low points are 50% obstructed. The channel shall be designed to carry the portion of the 100-year storm that does not enter the inlets.

Surface Inlets:

Surface inlets in grassed areas, parking lots, and roadside channels shall be designed as follows:
. Inlets in grass areas shall be constructed in a sump condition so that the top elevation of the berm around the inlet is at least 1 foot above the 100-year storm elevation.
. Limit the depth of water for the 100-year storm to at least 2 feet below the elevation of the lowest opening of adjacent structures.
. Provide a clear path for water to flow overland to a channel or the street assuming that inlets in low points are obstructed.
. For roadside channels, limit the depth of water to the edge of pavement or

sidewalk, whichever applies, for the 100-year storm.
Surface inlets shall not be used within a roadway for street drainage.

Storm Sewers:

Storm sewers shall be designed as follows:
. Size the pipes to flow under gravity (not under pressure) for the 10-year storm.
. Size the pipes so that surcharging at inlets and manholes does not occur for the 100-year storm.
. Use a minimum pipe size of 15 inches.
. Use open channels for flows greater than 100 cfs for the 100-year storm.
. Limit the cumulative discharge from storm sewers in a 200 foot section of channel to less than 100 cfs, calculated for the 100-year storm.
. Provide a minimum slope of 0.5%
. Provide a minimum velocity of 3 feet per second at full flow.
. Provide a minimum cover of 18 inches.
. Construct storm sewers of reinforced concrete pipe.
Outfalls shall be extended to the rear property line in residential developments where possible. The City must give waiver if proven impossible.
Streams that are part of the waters of Spencer County shall not be routed to flow through storm sewers.
Storm sewers shall not be used to channel flows from areas upstream of a development unless the 100-year peak flow is less than 100 cfs.

Manholes:

. Place manholes at the following locations:
- where 2 storm sewers intersect
- at changes in pipe size
- where the slope changes
- where horizontal alignment changes
. Space manholes no more than 300 feet apart.
. Match the crown line of the upstream pipe to the crown line of the downstream pipe.

Passthrough Drainage:

Runoff from off-site areas shall be evaluated based on future land use as shown in the Comprehensive Plan. Pass through systems shall be designed for the 100-year storm. The upstream area shall be assumed to have detention unless it is exempted.

1.2 Inlet Design Procedures

Curb Inlets on Grade:

One of the two following programs is recommended for computing the spread of water and the interception efficiency of curb inlets on a grade.
CURBIN – Kentucky Transportation Cabinet
QuickHEC12 – Haestad Methods

Curb Inlets in Low Points:

Use the weir flow equation for depths less than or equal to the curb opening.

$Q = CwLd^{1.5}$

where:
Q = flow in cfs
Cw = 2.3
L = curb opening length (ft)
d = depth of water at curb measured from the normal cross slope gutter flow line (ft)

Use the orifice equation for depths greater than the curb opening.

$Q = CoA\ [2g(di-h/2)]^{0.5}$

where:
Q = flow (cfs)
Co = 0.67
h = height of curb opening (ft)
A = clear area of opening (ft2)
di = depth at lip of curb opening (ft)
g = 32.2 (ft/sec)

Surface Inlets:

Use the weir flow and orifice flow equation to compute flow through the grate:

For $d \leq 0.4$', use the weir flow equation:

$Q = C\ Pd^{1.5}$

where:
Q = flow in cfs
C = 3.0
d = depth of water in feet
P = perimeter of the grate in feet

For $d \geq 1.0'$, use the orifice flow equation:
$Q = CA\sqrt{2gd}$

where:
$C = 0.67$
A = clear opening area of the grate (ft^2)
$g = 32.2$ ft/sec
d = depth of water in feet

For $0.4' < d < 1.0'$, compute the flow using both the weir flow and orifice flow equations. Use the smallest flow for a given depth.

1.3 Storm Sewer Design Procedures

One of the two following programs is recommended to compute the flow capacity and hydraulic grade lines of a proposed storm sewer system:
StormCAD – Haestad Methods
HYDRAIN – GKY and Associates

1.4 Construction Specifications

All storm drainage structures, including storm sewer pipe, curb box inlets, surface inlets, culvert pipe, and manholes, shall be installed in accordance with the City of Taylorsville Standard Drawings and the KTC Standard Specifications for Road and Bridge Construction, latest edition.