

STORM WATER MANAGEMENT REQUIREMENTS

Procedures:

General design procedures are outlined in *Storm Water Management* (David L. Daughtery, P.E., 1976) available from the Planning Commission (excerpts attached). Alternative design approaches from the *Omaha Metropolitan Area Storm Water Management Design Manual* are also acceptable. Other approaches will be considered; including those of the Kentucky Cabinet for Transportation.

Administrative Requirements:

The following design requirements are applied to all proposed developments. All improvements since 1976 not previously covered by an approved and implemented storm water management plan shall be cumulative for purposes of computation.

1. Net change in impervious area less than or equal to 1,700 square feet (and not in a designated critical watershed area): No storm water management plan required.
2. Net change in impervious area greater than 1,700 square feet and less than or equal to 3,400 square feet (and not in a designated critical watershed area): Storm water management at discretion of City Engineer, County Engineer or Planning Commission Staff Engineer.
3. Net change in impervious area greater than 3,400 square feet: Storm water management plan required.
4. Any construction which is proposed in an area of known hazard: Storm water management plan will be required

Criteria includes the following:

1. The submittal shall include a storm water management study. The study shall include a project description, all calculations, and maps clearly showing existing and proposed watershed delineation.
2. Maximum velocity of 2.5 fps without sod. Maximum velocity of 5 fps with sod. Higher velocities require appropriate channel liners.
3. Driveway culvert pipes shall be designed for a 10-year storm at 1 hour (2.2 inches/hour). Culverts at public streets shall be designed based on a 25-year storm. The minimum freeboard shall be one foot when the maximum headwater is achieved. Calculation for all pipes shall be shown and invert elevations assigned. Use energy dissipaters as necessary.

4. The spacing of inlets, for curb and gutter section, shall be designed as to not allow the spread to exceed one-half on the lane width. Inlets shall be placed as to not require surface drainage across city streets.
5. Rainfall for a 1-hour, 100-year storm is 2.95 inches, and for a 3-hour, 100-year storm is 4.0 inches. Peak (10 minute) intensity of 7.56 inches per hour for a 100-year storm may be used to assess the impact on conduits. (for other events see attached intensity-duration curves)
6. The minimum slope shall be 0.8% for open channel flow and 0.5% for pipes. Maximum ditch side slopes are 3:1. Open channel design shall be based on the time of concentration for the 25-year storm. The 100-year high water locations shall be delineated with a drainage easement.
7. Sinkholes and dry wells shall be assumed as having no outflow for purposes of computation.
8. The minimum velocity of storm pipes shall be 3 fps at full flow conditions. The maximum velocity shall be 15 fps.
9. Detention areas shall be sized based on 2.95 inches of precipitation. The maximum discharge shall not exceed the pre-development discharge. Discharge to areas of known flooding hazard shall be subject to approval by the City Engineer, County Engineer or Planning Commission Staff Engineer.
10. Retention basins shall be designed for the 3-hour 100-year storm. Computed high water elevation shall be recorded on the subdivision map. In areas where a proposed basin is connected with an existing basin, the recorded high water elevation shall be maintained.
11. Minimum finished floor elevations shall be eighteen inches above the 3 hour 100-year high-water elevation.

Additional Storm Water Management Plan Requirements:

1. Certified as-built plans must be submitted 3 working days in advance of request for temporary occupancy or approval.
2. Alternate methods must be submitted and approved in advance.
3. Use of existing storm sewers and other drainage facilities may be proposed provided impact of new development on those facilities is shown. Use of private (or state) facilities requires permission of owner (or state) and must be consistent with area wide drainage plans and existing storm water management plans.

Storm Water Management Plan/Study Checklist:

1. The plan must show and/or describe destination and direction of all run off.
2. Type, location, and characteristics of all existing and proposed impervious, surfaces, utilities, and structures
3. Type, location, and disposition of all existing and proposed drainage facilities, constructed or natural
4. Finished floor elevations and existing /proposed elevations at corners of structures
5. North arrow, scale, vicinity map, bench mark tied to USGS
6. Locations of all FEMA flood zones and other known flood elevations. Certification that all structures are outside designated flood areas.
7. Two-foot contours unless otherwise approved (existing and proposed).
8. Easements, property lines, set back lines, dimensions and bearings, etc.
9. Summary table for pipe and ditch calculations.
10. Subdivision name, plat book and page, lot number, block, section, etc (If not a subdivision of record, supply deed book and page number.
11. Location and elevation of existing structures on adjacent properties within 15 feet of property lines (and contours). Include names of adjacent owners.
12. Acreage or square footage.
13. Include all supporting calculations in a clear, methodical approach. List all assumptions, default values, and references.
14. Provide concise erosion control plan