SECTION III
ARTICLE 8
STORMWATER CONVEYANCE AND EROSION CONTROL

A. PURPOSE

Stormwater management is vital in promoting the health, safety and general welfare of the public. It is the intent of this chapter, in an effort to minimize the dangers of flooding to life and property, and to assist in the preservation and protection of the Murray water quality and natural environment by regulating the alteration of land and topography, regulating the removal of vegetation, requiring revegetation, and reducing erosion and sedimentation through control requirements. The design criteria for stormwater conveyance structures and erosion control are outlined in this ordinance.

B. DEFINITIONS

For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

REVIEW STAFF. The City Engineer and/or other designated officials.

CONTROLLED RELEASE STRUCTURE. A facility constructed to regulate the volume of stormwater runoff that is conveyed during a specific length of time.

CONVEYANCE STRUCTURES. Water carrying devices or improvements such as channels, ditches, storm sewers, culverts, inlets, and the like.

CULVERTS AND CROSS DRAINS. A short, closed (covered) conduit that passes stormwater runoff under an embankment.

DETENTION* or *RETENTION. Delaying the rate of stormwater runoff in a controlled manner, typically by using temporary storage areas and a man-made outlet device.

DEVELOPED. Conditions after construction or other manmade change to improved or unimproved (land), including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, or drilling operations.

ERODED. Weathered or worn away outer layers of soil by the action of water.

INLET (STORM DRAIN). An opening leading to an underground pipe or open ditch for carrying surface runoff.

EXCESS STORMWATER. That portion of stormwater runoff, which exceeds the capacity of the storm sewers or natural drainage channels serving a specific watershed.

IMPERVIOUS SURFACE. Asphalt, concrete or any other surface, which does not allow measurable infiltration.

NATURAL DRAINAGE. Water which follows by gravity in channels formed by the surface topography of the earth prior to changes made by the efforts of man.

OFF-SITE. External to the boundary of a development.

ON-SITE. Internal to the boundary of a development.

POINT DISCHARGE (OUTFALL). Release of stormwater at a specific location.

RUNOFF. Rainfall excess after natural losses from infiltration, evaporation, transportation or incidental poundage.

STORM SEWER. Two or more inlets connected by pipes.

STORMWATER RUNOFF RELEASE RATE. The rate at which stormwater runoff is released from dominate to servient land.

STORMWATER STORAGE AREA. An area designed to temporarily accumulate excess stormwater.

SWALE. Surface-type conveyance for stormwater usually designated to carry incidental, localized runoff.

C. STORMWATER CONVEYANCE AND MANAGEMENT FACILITIES REQUIRED

All development occurring within the city and its area of extraterritorial jurisdiction for subdivision regulations shall provide for properly sized stormwater conveyance facilities and shall contain on-site, or provide off-site stormwater management facilities capable of controlling increased runoff relative to its pre-developed condition (See Section E.4). Unless included in exemptions listed in Section E, no application for a preliminary or final plan of subdivision shall be approved unless it includes either a plan describing the manner in which stormwater erosion and sediment resulting from the development will be controlled or managed or a documented request for a waiver thereof. Similarly, unless exempt, no building permit shall be issued for any parcel or lot until either an adequate stormwater management plan addressing erosion, sediment and stormwater, or a documented request for a waiver thereof, has been approved.

D. STORMWATER CONVEYANCE FACILITIES DESIGN CRITERIA

The following criteria shall control when designing stormwater conveyance facilities:

1. Open channels and roadside ditches. The design storm for the design of open channels and roadside ditches shall be a storm with a recurrence frequency of ten year/ 24-hour duration. The time of concentration for open channel and roadside ditch design should be assumed to be 15 minutes.

2. Storm sewers and inlets. The design storm for the design of storm sewers and inlets shall be the twenty-five year storm/24-hour duration (TR-55 Method and Rational Method). The duration of the peak rainfall event shall be assumed to be equal to the calculated time of concentration. Storm sewers and inlets shall be checked under twenty-five year storm/24-hour duration (TR-55 Method and Rational Method) loading conditions for ponding limits. The ponding limit for streets with curb and gutter shall be an eight-foot spread measured from gutter to driving lane. Spread calculations shall be based upon an intensity of four inches per hour. Pipes should be sized based upon the actual time of concentration. The minimum time of concentration should be assumed to be 8 minutes.

3. Entrance pipes and cross drains. The design storm for the design of entrance pipes and cross drains shall be the twenty-five year storm/24-hour duration (TR-55 Method and Rational Method). The duration of the peak rainfall event shall be assumed to be equal to the calculated time of concentration. The minimum time of concentration shall be assumed to be eight minutes. Entrance pipes and cross drains shall be checked for overtopping of roadways and flood damage to affected areas. Situations requiring pipes larger than 36 inches shall be designed using the culvert criteria in division (4) of this section.

4. Culverts and cross drains. The design storm for the calculation of runoff for culvert design shall be the 25-year storm. The duration of the peak rainfall event shall be assumed to be equal to the calculated time of concentration. The recommended check storm is the 100- year storm. The maximum headwater under 100-year storm conditions should not be allowed to overtop roads or increase the flooding potential in the affected areas.

5 Erosion control. Plans for stormwater conveyance systems shall include appropriately designed temporary and permanent erosion-control measures both for the open channel conduits and all disturbed land draining to both open and closed conduits within the system. (*Best Management Practices for Construction Activities* prepared by the Kentucky Natural Resources and Environmental Protection Cabinet and section F of this ordinance should be used as design guides for erosion and sediment control).

6. Design certification. Design of all stormwater conveyance facilities shall be prepared and stamped by a licensed professional engineer (Kentucky registration required). Design methods shall be in accordance with the Kentucky Department of Highways' *Manual of Instructions for Drainage Design,* latest edition.

E. STORMWATER MANAGEMENT FACILITIES DESIGN CRITERIA

As a minimum, the following criteria shall be followed when designing a stormwater management facility.

1. The rainfall events shall be analyzed using the Soil Conservation Service TR-55 method, Rational Method or other methods only as pre-approved by the City..

2. The stormwater discharge point onto adjoining property may not be relocated without the permission of the affected adjoining landowner and the City of Murray.

3. If the stormwater discharge onto adjoining property is of a sheet flow nature before development, the stormwater discharge onto adjoining property after development of the property may not be changed to a concentrated discharge point without the written agreement of the affected adjoining landowner.

4. The initial reference conditions for an undeveloped site shall be the conditions that existed on that site as of April 1, 1998. This date refers to the aerial photography on file at the City Engineering Department and available on request.

5. When a property to be developed experiences upstream stormwater runoff onto the property the effects of that runoff under current conditions shall be included in the stormwater analysis. If the off-site runoff onto the property is not isolated from the detention system, the effects of routing the off-site runoff through the detention facilities shall be included in the analysis (Routed Through Design).

6. Design storm- Stormwater management facilities shall be designed to retain the difference in the pre-development and post-development 10-year and 25-year, 24- hour storm event.

7. Emergency spillways- Emergency spillways shall be designed to pass the 100-year storm. The effect of the 100-year storm must be accommodated and documented in the design of all stormwater management facilities.

8, Design Calculations. Design calculations submitted must include, but not be limited to, the following:

(A) Contributing drainage area, in acres. Indicate if pre-development and post-development areas differ.

(B) A breakdown of surface type for pre-development and post-development conditions (such as grassed, paved, roofed, and the like).

(C) Stage-storage curve for the proposed stormwater management facility.

(D) Stage-discharge curve for the outlet structure of the proposed stormwater management facility.

(E) Inflow and outflow hydrographs for pre-development and post-development conditions.

(F) Emergency spillway design calculations.

(G) Embankment design criteria as it relates to slope stability and compaction requirements during construction.

9. Stormwater management plan. The final stormwater management plan shall include, but not be limited to, the following:

(A) All calculations, assumptions and criteria used in the design of the stormwater management facility.

(B) All plans and profiles of proposed storm sewers and open channels including horizontal and vertical controls, elevations, sizes, slopes and materials.

(C) All plans will depict all contributing areas on the plans.

(D) Location, dimensions and design details required for the construction of all facilities.

(E) A description of the operation and maintenance needs for the stormwater management facilities.

(F) All information relative to the design and operation of emergency spillways.

(G) Project specifications relative to erosion and sedimentation control. (Refer to *Best Management Practice for Construction Activities* prepared by the Kentucky Natural Resources and Environmental Protection Cabinet for design guidelines associated with erosion and sediment control.)

(H) All deed restrictions, easements and rights-of-way.

(I) The ownership and maintenance responsibilities for all stormwater management control structures during and after development. The identity of the responsible individual, corporation, association or other specific entity and the specific maintenance must be outlined on the plan.

(1) Stormwater detention facilities that are not maintained in proper working condition will be subject to corrective action by city forces along with appropriate fees and fines.

(2) The property owner shall be responsible for maintaining the stormwater detention facilities on the property, unless a maintenance agreement exists with multiple property owners for a regional detention facility.

10. Exemptions. Exemptions from the Stormwater management requirement contained herein shall be granted to the following:

(A) All existing residentially subdivided property developments excluding sites to be used or developed as a residential planned development project.

(B) Residential subdivisions or residential planned development projects where minimum lot size is greater than five acres.

(C) Any nonresidential development for which the area paved and under roof is less than 7,500 square feet.

(D) Waivers may also be granted if, in other cases, the developer can provide sufficient documentation that the proposed development will not result in an adverse impact either upstream or downstream of the proposed site. Waivers shall be granted solely at the discretion of the city plan review staff, based upon interpretation of the documentation presented by the developer in conjunction with staff knowledge of the relationship of the proposed development to the adjacent property.

11. Design certification. Design of all stormwater management and conveyance facilities shall be prepared and stamped by a licensed professional engineer (Kentucky registration required).

12. Construction certification. Prior to final approval of the development or issuance of certificate of occupancy, the licensed professional engineer must submit certification that the stormwater management and conveyance facilities were constructed in accordance with the approved plan. Final approval shall also provide evidence of the recording of all stormwater conveyance and management facilities deed restrictions, easements and rights-of-way. Any request for deviation from the approved plan during construction shall be submitted to the city plan review staff in writing for approval.

13. Ownership, operation and maintenance of detention systems:

(A) For commercial, industrial and multifamily residential developments, ownership and maintenance responsibilities remain with the property owner/developer.

(B) For single family residential subdivisions, the city may at its discretion accept ownership and maintenance responsibilities; provided, that:

(1) Construction and certification is in accordance to the approved plan; and

(2) Appropriate land dedication and easements are provided, including adequate public ingress and egress from the facility to a public street.

F. EROSION CONTROL

1. *Permit required.* Prior to any person engaging in a land disturbance activity within the corporate boundaries of Murray they shall possess a City issued permit for the land disturbance activity. A permit will be issued by the City once a sedimentation and erosion control plan has been submitted and approved.

2. *Contents of sedimentation and erosion control plan.* Contents of sedimentation and erosion control plan shall include:

(A) The size, finished and existing slope, and location of any cut or fills.

(B) A general description of the predominant soil types to be disturbed as indicated by the area soil and water conservation district or other reliable sources.

(C) The general location and size of the land area to be disturbed and the extent to which the vegetation and topsoil will be removed.

(D) The general location, volume and type of soil or other materials to be used for fill in areas other than the roadway.

(E) Location and description of existing natural features on the site such as contours, vegetation, and drainage ways.

(F) Measures that will be taken to contain the sedimentation to the subject property, both during and after construction.

(G) Measures that will be taken to limit erosion of the subject property both during and after construction.

(H) The approximate length of time that specific portions of the proposed development will lie unvegetated, including the approximate date it will be disturbed and the approximate date it will be reseeded or planted.

(I) The type of plant material that will be planted, the approximate time frame for planting and the persons who will be responsible for the planting.

3. *Review of plan.* The City Engineer shall review the sedimentation and erosion control plan. The plan will be approved and a permit issued if he finds that it complies with the following land disturbance activity standards.

(A) Land disturbance activities shall be done in a manner which will minimize soil erosion:

(1) The extent of the disturbed area and the duration of its exposure shall be kept within reasonable limits.

(2) Cut and fill operations shall be kept to a minimum. Developments calling for excessive cutting and filling may be refused a permit if it is determined that the land use proposed for the site can be reasonable constructed with less alteration of the natural terrain.

(B) Land shall be developed in increments of workable size, which can be completed during a single construction season. Erosion and sedimentation control measures shall be coordinated with the sequence of grading, development and construction operations.

(C) When feasible, natural vegetation shall be retained, protected and supplemented.

(D) Topsoil shall be saved where practical and reapplied to the site after grading has been finished.

(E) Provisions shall be provided which minimize the damage from surface water to the cut face of excavations or the sloping surface of fills.

(F) Disturbed soils shall be stabilized as quickly as possible; however, no area shall be left disturbed for more than thirty (30) days.

(G) Temporary seeding, mulching or other suitable methods of stabilization shall be used to protect exposed areas which have been disturbed longer than thirty (30) days.

(H) Water runoff shall be minimized and retained on-site, wherever possible, to facilitate groundwater recharge and reduce erosion.

(I) Measures shall be taken to contain as much sedimentation as practical on-site:

(1) Sedimentation shall be trapped by the use of debris, basins, sediment basins, silt traps or similar measures approved by the City Engineer until the area has been stabilized.

(2) All required sedimentation and erosion reduction measures and structures shall be in place prior to any land disturbance.

(3) Sedimentation shall be kept out of sinkhole throats/outlets.

(4) All necessary soil erosion and sedimentation control measures installed shall be adequately maintained by the developer until the land has been completely stabilized as verified by the City Engineer.

(5) Techniques shall be employed to prevent the blowing of dust or sediment from the site.

(6) No mud, gravel, debris, etc., shall be allowed to accumulate or collect, or be deposited onto public streets or washed into storm drains.

(J) The type of stabilization or revegetation shall be appropriate for the slope and soil type of the site.

(K) Provisions shall be made for reseeding areas which do not vegetate the first time.

(L) Difficult areas, such as ditch lines and other slopes may have to be sodded or stabilized in some other approved manner.

The City Engineer shall review the plan within thirty (30) days of its receipt and notify the applicant of his action. In the case of a denial, the reasons for the denial shall also be given. An applicant may appeal a denial of a permit to the Planning Commission. All appeals shall be made in writing within ten (10) days of the denial and the applicant shall be entitled to a hearing before the Planning Commission within thirty (30) days of the date of appeal.

A land disturbance/development permit will be issued on the basis of approved plans. No fee will be charged for the permit.

4. Exemptions from this permit.

The following land disturbance activities are specifically exempt from this article:

(A) Land disturbance associated with existing one and two family dwelling.

(B) Use of land for home gardening

(C) Agricultural use of land which is used in accordance with a farm conservation plan approved by the local soil conservation service or which has been determined by said service that such use will not cause excessive erosion or sedimentation.

(D) Land disturbance activities covered under an approved subdivisions sedimentation and erosion control plan. (NOTE: Often these plans will cover only the land disturbance associated with lot arrangement and street development and not the individual lot development.)

5. Existing unvegetated and eroded areas.

All existing unvegetated areas within the city shall submit and have approved a sedimentation and erosion control plan and possess a land disturbance permit. All areas of the city shall be vegetated or stabilized in accordance with this article. The existing unvegetated areas shall institute measures to keep their sedimentation on-site and out of sinkhole outlet areas while the erosion control and revegetation measures are in progress.

G. ISSUANCE OF CERTIFICATE OF OCCUPANCY

No certificate of occupancy shall be issued for any development, which is subject to the regulations of this chapter unless, and until all requirements and criteria of this chapter are fully complied with.

H. PENALTY

Any person who is subject to the regulations of this chapter shall be liable to the city for a civil penalty of $250 per violation per day for as long as the violation continues. In addition to such penalty, the city may recover from the person reasonable attorney fees, court costs and other expensed incurred in any enforcement proceedings.