

ORDINANCE NUMBER – 2010-_____

**AN ORDINANCE ESTABLISHING STORMWATER CONTROL
IN THE CITY OF STARKVILLE**

WHEREAS, there is a need to diminish threats to public health and safety caused by the runoff of excessive storm water; and

WHEREAS, the Mayor and Board of Aldermen wish to reduce the economic losses to individuals and the community at large caused by excessive runoff of storm water; and

WHEREAS, the Mayor and Board of Aldermen believe that it is in the best interest of the City of Starkville and to promote the health, safety and welfare of its citizens and to protect, conserve and promote the orderly development of land and water resources to amend the ordinance establishing Storm Water Control;

NOW THEREFORE, BE IT ORDAINED, by the Mayor and the Board of Aldermen of the City of Starkville:

A. PURPOSE – STORM WATER MANAGEMENT ORDINANCE

The purpose of this ordinance is to diminish threats to public health and safety caused by the runoff of excessive storm water; reduce economic losses to individuals and the community at large; and protect, conserve and promote the orderly development of land and water resources.

The provisions of this ordinance further regulate, guide and control:

1. The subdivision layout, redevelopment and improvement of lands located within the City of Starkville.
2. The construction of buildings and drainage of the sites on which structures are located, including parking and other paved areas.
3. The design, construction and maintenance of storm water drainage facilities and systems.

B. DEFINITIONS

CFS – Cubic Feet per Second

Design Year Storm – The Design Year Storm is a statistical definition of the percent chance that a storm has of occurring in any given year. That year should not be considered as an actual number of years between occurrences. For example, the “100-year flood” is not the flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1-percent chance or greater of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most Federal and State agencies, is used by the National Flood Insurance Program as the standard for floodplain management and to determine the need for flood insurance.

FEMA - Federal Emergency Management Agency

Impervious Surface Area – Impervious surface area means a surface composed of any material that significantly impedes or prevents the natural infiltration of water into soil. Impervious surfaces are defined as those having a runoff coefficient greater than 0.5 and include, but are not limited to, rooftops, buildings, streets and roads, and any concrete or asphalt surface.

Land disturbance/Land disturbing activities – Any activity involving the clearing, cutting, excavating, filling, or grading of land or any other activity that alters land topography or vegetative cover.

MDOT – Mississippi Department of Transportation

New development – New development is defined as land disturbing activities, structural development (construction, installation or expansion of a building or other structure), and/or creation of impervious surfaces on a previously undeveloped site.

NRCS – Natural Resource Conservation Service is the Federal Agency that works in partnership with private landowners to conserve and sustain natural resources on private lands. It was previously known as the Soil Conservation Service.(SCS).

Post-development – Post-development refers to the time period, or the conditions that may reasonably be expected or anticipated to exist based on the proposed project, after completion of the land development activity on a site.

Pre-development - Pre-development refers to the time period, or the conditions that exist, on a site prior to the commencement of a land development project and at the time that plans for the land development of a site are approved by the plan approving authority. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first item being approved or permitted shall establish pre-development conditions.

Redevelopment - Redevelopment is defined as structural development (construction, installation or expansion of a building or other structure), creation or addition of impervious surfaces, replacement of impervious surface not part of routine maintenance, and land disturbing activities associated with structural or impervious development. Redevelopment does not include such activities as exterior remodeling.

SCS – Soil Conservation Service is the original organization developed in 1935 by the Federal Government to work to conserve and sustain natural resources on private land through education and partnership and it is now known as the Natural Resource Conservation Service (NRCS).

Stormwater Management Facilities – Devices, construction methods, fixtures, that are designed to diminish threats to public health and safety caused by the runoff of excessive storm water; reduce economic losses to individuals and the community at large; and protect, conserve and promote the orderly development of land and water resources, i.e. retention and detention ponds, rain barrels, swales, etc.

100-Year/24 hour storm – see MDOT frequency/duration curve.

10-Year / 24 hour Storm – see MDOT frequency/duration curve.

5-Year / 24 hour Storm – see MDOT frequency/duration curve.

2-Year / 24 hour Storm – see MDOT frequency/duration curve.

100-Year Floodplain – The 100-Year floodplain shall be determined to be that area which is inundated by water during the 100-year / 24- hour rainfall event.

NRCS (or SCS) TR-55 – United States Department of Agriculture, Natural Resources Conservation Service, Engineering Division, Technical Release 55, dated June 1986, *Urban Hydrology for Small Watersheds*.

TABLE 1: Runoff Coefficient Values – Rational Method			
Runoff Coefficients indicated in Column 2 should only be used for conceptual planning and watershed planning. For individual sites and developments, a weighted runoff coefficient should be calculated using the values in column 4. Design professional may submit calculations and performance testing reports to justify runoff coefficients for surfaces not listed.			
Land Use	C	Land Use	C
Business: Downtown areas	0.95	Lawns: Sandy soil, flat, 2% Sandy soil, average, 2 - 7% Sandy soil, steep, > 7% Clay soil, flat, 2% Clay soil, average, 2 - 7% Clay soil, steep, > 7%	0.10 0.15 0.20 0.17 0.22 0.35
Residential Zoning: R-1 R-2A R-3, R-3A, R-4, R-4A R-5, R-6	0.50 0.60 0.70 0.70	Graded or no plant cover Sandy soil, flat, 0 - 5% Sandy soil, flat, 5 - 10% Clayey soil, flat, 0 - 5% Clayey soil, average, 5 - 10%	0.30 0.40 0.50 0.60
Industrial: Light areas Heavy areas	0.70 0.80	Streets: Asphalt and Concrete Brick	0.95 0.85
Parks, Cemeteries	0.25	Drives, Walks, and Roofs	0.95
Playgrounds	0.35	Gravel Areas	0.50

Table 2: Runoff Curve Numbers¹		
Cover description <i>Cover type and hydrologic condition</i> ²	<i>Average percent impervious area</i>	Curve Number
Cultivated land: without conservation treatment		88
with conservation treatment		78
Pasture or range land: poor condition		86
good condition		74
Wood or forest land: thin stand, poor cover		77
good cover		70
Open space (lawns, parks, golf courses, cemeteries, etc.)³		
Poor condition (grass cover <50%)		86
Fair condition (grass cover 50% to 75%)		79
Good condition (grass cover > 75%)		74

Impervious areas:		
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98
Streets and roads:		
Paved; curbs and storm drains (excluding right-of-way)		98
Paved; open ditches (including right-of-way)		92
Gravel (including right-of-way)		89
Dirt (including right-of-way)		87
Urban districts:		
Commercial and business	85%	94
Industrial	72%	91
Residential districts by average lot size:		
1/8 acre or less (town houses)	65%	90
1/4 acre	38%	83
1/3 acre	30%	81
1/2 acre	25%	80
1 acre	20%	79
2 acres	12%	77
Developing urban areas and Newly graded areas (pervious areas only, no vegetation)		91

1 Average runoff condition, and $I_a = 0.2S$

2 The average percent impervious area shown was used to develop the composite curve numbers (CNs). Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. If the impervious area is not connected, the SCS method has an adjustment to reduce the effect.

3 CNs shown are equivalent to those of pasture. Composite CNs may be computed for other combinations of open space cover type.

C.GENERAL CRITERIA AND STANDARDS

1. Applicability

This ordinance shall be applicable within the City of Starkville's jurisdictional area and shall apply to:

- i. New development or redevelopment that is 2 acres or greater;
- ii. New development or redevelopment that is at least 1 acre, but less than 2 acres and having 50 percent or greater impervious surface; and
- iii. Land development activities that are smaller than the minimum applicability criteria established in C(1)(i.-ii.) above, if such activities are part of a larger common plat (plan of development), even though multiple separate and distinct land development activities may take place at different times on different schedules (such as a phased residential subdivision).

The following development activities are exempted from this article:

- i. Individual single family residential lots. Provided, however, that single family lots that are part of a new subdivision or phased development project are not exempt from this article.);
- ii. Additions or modifications to existing single family structures;
- iii. Developments or redevelopments that are less than an acre, provided they are not part of a larger common development plan;
- iv. Any logging and agricultural activity.
- v. Land disturbing activities conducted for the purpose of restoration of streams, stream banks, riparian zones, or other environmentally protected areas;
- vi. Repairs and/or construction deemed emergency in nature; and
- vii. Repairs to any stormwater management facility deemed necessary by the city engineer.

2. Mitigation of Excess Stormwater Runoff

The increased stormwater runoff resulting from the proposed development meeting the minimum applicability criteria of section C.1. shall be mitigated by proper stormwater management facilities;

~~3.4. Storage Capacity~~

Stormwater Management facilities shall be designed with sufficient capacity to accommodate all runoff caused by the development in excess of that runoff which would occur from the site if left in its pre-development state. This storage shall be sufficient to store all excess flows for the 2 year and 10 year storms of 24-hour duration. The stormwater management facilities shall be designed so that the peak flow rate at any exit point in the post-developed condition shall be less than or equal to the peak flow rate for that exit point in the pre-developed condition for the 2- and 10-year storms.

4. *Stormwater Management Facilities in Floodplains*

If stormwater storage is provided within any floodplain, no facility or storage volume may be provided below the 100-year base flood elevation (BFE) established for that floodplain. If not established, a study prepared by a design professional registered or licensed in the state of Mississippi utilizing standard engineering practices approved by FEMA may be submitted to determine the base flood elevation.

5. *Stormwater Bypass*

Drainage systems shall have adequate capacity to bypass, through the development, the existing flow from all upstream areas. Bypass conveyance should be designed to accommodate the 100-year flow rates. Bypass flow should not be conveyed through stormwater management facilities.

6. *Drainage Maintenance*

It shall be unlawful to dump trash, debris, landscape waste and other deleterious materials in any and all drainage ways in the City.

D. IMPROVEMENT REGULATION

1. *Required Information*

The following information and data prepared and certified by a registered landscape architect or a professional engineer licensed in the State of Mississippi that shall be furnished with the plans of each proposed development.

a) Contour Map: : A topographic map with two (2) foot minimum interval contours, meeting National Map Accuracy Standards, of the land to be developed and such adjoining land whose topography may affect the layout or drainage of the developed. On such a map, the following shall be shown:

- i. The banks and centerline of streams and channels;
- ii. The normal shoreline of lakes, ponds and retention/detention basins, and lines of in-flow and outflow;
- iii. The locations, size and slope of stormwater conduits and drainage swales;
- iv. Storm, sanitary and combined sewers and outfalls of record;
- v. Delineation of upstream and downstream drainage features, watersheds, and existing flow calculations (including area, runoff coefficient, and time of concentration) which might be affected by the development;
- vi. Base flood (100-year) elevation (BFE) and floodways for the property, established pursuant to the City of Starkville Flood Plain Ordinance.
- vii. Environmental features including the limits of wetland areas and any designated natural areas.

b) Pre-Development Conditions Calculations – Calculations shall be provided which show the pre-development rate of runoff for the 2- and 10-year storms. These calculations shall use either the rational or the SCS/NRCS curve number method. Recommended runoff coefficient values are at Table 1 (rational method) and Table 2 (SCS method). Other runoff coefficients may be used if the design professional provides supporting calculations.

c) *Post-Development Calculations (without mitigation)* – Calculations shall be provided which show the post-development rate of runoff for the 2- and 10-year storms. These calculations shall use the same methodology that was used to calculate the existing peak flow rates.

d). *Drainage Plan*: a comprehensive drainage plan shall be designed to safely and completely accommodate existing stormwater runoff, handle the proposed stormwater runoff and to manage increased stormwater runoff. This plan shall provide and be accompanied by maps and/or other descriptive aerial showing the following:

- i. The extent of area of each sub-basin in the development;
- ii. The storm sewers and other storm drains to be built, the basis of their design, the outfall and outlet locations and elevations, receiving stream or channel and its high water elevation, and the functioning of the drains during high water conditions;
- iii. Existing streams and floodplains to be maintained and new channels to be constructed including their locations, cross-sections and profiles;
- iv. Proposed culverts and bridges to be built including their materials, elevations, waterway opening and basis of design;
- v. Existing stormwater management facilities to be maintained, enlarged or altered and new facilities to be built including their design;
- vi. The estimated location and percentage of impervious surfaces existing and expected to be constructed when the development is completed;
- vii. The slope, type, size, and 25-year storm peak flow and velocity of storm sewers, and other waterways;
- viii. Any proposed environmental enhancement or mitigation features;
- ix. Stormwater management facilities to be built including a plot or tabulation of storage volumes with corresponding water surface elevation and of the basin outflow rates for those water surface elevations;
- x. For all stormwater management facilities, design hydrographs of inflow and outflow for the 2- and 10- year peak flows from the site under pre- and post-development conditions;
- xi. The formula for determining the storage for a stormwater management facility basin is: The storage capacity of the proposed detention basin shall be computed in cubic feet (in conjunction with its proposed spillway if applicable) so that the Q-2 and Q-10 post-development runoff in cfs shall be reduced to no more than the Q-2 and Q-10 pre-development runoff in cfs.
- xii. Time of concentration path including length, slope and type (overland, channel, closed conduit) of flow. Calculation method for time of concentration shall be performed in accordance with the Mississippi Department of Transportation current roadway design manual.
- xiii. The existing and proposed runoff coefficient (rational method) or curve number (SCS method) for type of surface within each sub-basin;

2. *Stormwater management facilities*: Acceptable stormwater management facilities may be designed by reference to such creative methods as are provided in the Georgia Stormwater Management Manual (latest version) or reference manuals or texts utilizing

the most current methods of design and construction or in accordance with the detention basins and retention basins described below. Utilization of such optional methods will in no way alter the intent and spirit of the requirements for stormwater management and will continue to be subject to the calculations necessary to meet the intent of the ordinance.

a) *Detention Basins:* Detention basins shall be constructed to temporarily detain the stormwater runoff in excess of the volumes of runoff occurring on the site before development and will conform to the following standards:

i. Storage Volumes

The volume of storage provided in these basins, together with such storage as may be authorized in other detention facilities, shall be sufficient to control the excess runoff from the 2- and 10-year storm of any duration;

ii. Maximum Depth

The maximum planned depth of stormwater shall not exceed four feet unless approved by the City Engineer. When approved, ponds greater than 4 feet deep require a safety bench that is at least 5 feet wide and with a 5% slope.

iii. Approach Slopes

The approach slopes of the basin shall conform as closely as possible to natural land contours.

Re-grading is preferable if necessary to keep the slopes under 3:1. Erosion control measures shall be provided as well as devices or measures to insure public safety.

iv. Outlet Control Structures

Outlet control structures shall be designed as simply as possible and shall operate automatically. They will be designed to limit discharges into existing or planned downstream channels or conduits so as not to exceed predetermined safe capacities, and not in excess of flows which would have occurred with the land in its pre-development condition. If necessary, velocity dissipation measures shall be employed to ensure that the discharge does not increase downstream erosion. Such structures should be either a weir or a perforated riser with gravel type structures.

v. Spillway

Emergency overflow facilities that will accommodate the 100-year storm shall be provided.

vi. Appearance

Detention facilities shall, where possible, use natural topography and natural vegetation. In lieu thereof, these facilities shall have planted trees and vegetation such as shrubs and permanent ground cover on their borders. The purpose of said plantings will be for screening and absorption therefore both elements should be considered in the design phase.

vii. Fencing

Fencing of detention basins is not permitted unless written justification is submitted to and approved by the City Engineer. The preferred method is to manage the contours of the pond through the inclusion of a safety bench to eliminate drop-offs and reduce the potential for accidental drowning. In addition, the safety bench may be landscaped to deter access to the pool.

viii. Freeboard.

There shall be a freeboard of at least 12 inches from the maximum detention elevation to the top of levee and the spillway structure should be capable of passing the 100-year

Storm.

b) Retention Basins: Basins designed with permanent pools shall conform to the standards for detention basins as specified, unless modified or amended as follows:

i. Minimum Depths

The minimum normal depth of water before the introduction of excess stormwater shall be 3 feet.

ii. Facilities for Emptying

For emergency purposes, cleaning or shoreline maintenance, facilities shall be provided or plans prepared for the use of auxiliary equipment to permit emptying and drainage.

iii. Pollution Abatement

Aeration facilities may be required, dependent on the quality of the influent and detention time.

iv. Side Slopes

The side slopes shall be of non-erosive material with a slope of 3:1 or flatter. The ledge shall be four to six feet wide, three feet below normal water depth and sloping gently toward the shore to prevent people or objects from sliding into deep water. There shall be a freeboard of 12 inches above the high water elevation on all retention basins. Alternate designs for slide slopes may be considered under special circumstances where good engineering practice is demonstrated. Sediment Storage Adequate area for sediment storage shall be provided in all retention basins.

c) Maintenance of Facilities: All improvements, including landscaping, shall be maintained in perpetuity and cannot be developed for any other use which would limit or cause to limit the use of the improvements. In the case of shared stormwater management facilities, the improvements shall be owned and/or maintained by the Property Owner's Association of the development A special note to this effect shall appear on any final plat of subdivision or any plat of condominium and their declarations. The Property Owner's Association shall be formed by the Developer in perpetuity for the maintenance of the improvements. Membership shall be mandatory for all property owners. Articles of agreement of the Property Owner's Association must be approved by the Board of Aldermen of the City of Starkville before recording. When problems arise due to inadequate maintenance, the City Engineer or his designated agent of the City of Starkville may inspect the improvements and compel the correction of the problem by written notice and issue a written notice of violation to the owner of the property. If abatement of the violation and/or restoration of affected property is required, the notice shall set forth a deadline of 90 days within which such remediation or restoration must be completed. In accordance with the authority of the municipality granted by Mississippi Code of 1972 § 21-17-5, said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by a designated governmental agency or a contractor and the expense thereof shall be charged to the violator.

d) Inspection of Facilities: The City Engineer or his designated agent shall inspect all drainage facilities while under construction. Upon completion of a project or a phase of a phased project, the registered landscape architect or the licensed professional engineer is responsible for submitting a signed/stamped certification that the completed project is in accordance with the approved stormwater management plan. All applicants are required to submit actual "as built" plans for any stormwater management facilities or practices

after final construction is completed. The plan must show the final design specifications for all stormwater management facilities and practices and must be certified by a design professional registered and/or licensed in the State of Mississippi. A final inspection by the city engineer or his designated representative is required before the release of any performance securities can occur. When facilities are not constructed according to the approved plans, the City of Starkville has the explicit authority to compel compliance and have any situations corrected which are not according to the approved plans. All drainage facilities located on private property shall be accessible at all times for inspection by the City Engineer or other responsible public official.

E. MISCELLANEOUS

1. *Penalties for Violation* – Any responsible party found to be in violation of any of the terms and provisions of this ordinance shall be notified in writing of the violation. If abatement of the violation and/or restoration of affected property is required, the notice shall set forth a deadline of 90 days within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by a designated governmental agency or a contractor and the expense thereof and a civil penalty of not more than \$500.00 per day of continuing violation shall be charged to the violator.

2. *Validity* – If any term or provision of this Ordinance shall be held to be unconstitutional or otherwise unenforceable, the remainder thereof shall not be affected thereby and shall remain in full force and effect.

3. *Conflict* – All ordinances heretofore adopted on the subject which are in conflict herewith are hereby repealed and the application of this ordinance as will not be contrary to the public interest.

4. *Variance* - No variance from the strict application of any provision shall be granted unless it is found that:

a. Literal interpretation of the provision of this ordinance would deprive the owner of reasonable use of their land; and

b. Granting the variance would be in harmony with the general purpose and intent of this ordinance and will not be injurious to the neighborhood or otherwise detrimental to the public welfare.

F. STORMWATER HEARING BOARD AND APPEALS

There is hereby created a Stormwater Hearing Board (SHB) consisting of three (3) members who shall hear and decide all variance requests for stormwater related matters. A formal written application for a variance shall be filed with the City Engineer for submittal to the SHB.

1. Waivers to Stormwater Management Requirements

The Stormwater Hearing Board (SHB) shall sit in a quasi-judicial capacity to hear and decide all variance requests from the requirements of this article. A formal written application for a variance shall be filed with the City Engineer for submittal to the Stormwater Hearing Board.

(a) The following procedures shall apply to all applications for a variance:

(1) The application for variance shall state the specific variances sought and the reasons for the variance.

(2) It shall be the applicant's responsibility to provide sufficient justification for granting the variance.

(3) The City Engineer shall prepare an evaluation statement concerning each application for variance. The evaluation shall consider the circumstances and supporting documents supplied by the applicant and other generally available technical information pertaining to the variance request. The evaluation statement may include recommendations by the City Engineer concerning the variance to the SHB.

(4) In passing upon such applications, the SHB shall consider all technical evaluation and relevant factors presented by the applicant and city staff through the governing statutes and the standards specified in other sections of this article.

(5) After hearing and upon consideration of the application, evidence and applicable law, the SHB may attach such conditions to the granting of variances as it deems necessary to further the purpose of this article.

(b) If a variance is granted, it shall be granted upon findings by the SHB that the following standards have been met:

(1) That failure to grant the variance could result in exceptional hardship to the applicant; and

(2) That granting the variance will not result in increased stormwater runoff greater than 10%, increased flood elevations, additional threats to public safety, extraordinary public expense, or create nuisances, cause fraud on or victimization of the public;

(3) That the necessity for a variance is not the result of conditions on the property which have been self-imposed by the applicant; and

(4) That the variance is the minimum necessary, considering the adverse impacts of stormwater runoff.

(c) If a variance is not granted, the decision may be appealed to the Board of Aldermen for the City of Starkville. Said appeal shall be filed in writing by the aggrieved party within ten (10) working days of the denial by the Stormwater Hearing Board and shall be filed with the City Engineer. The appeal shall be heard at the next regularly scheduled Board of Aldermen meeting following the receipt of the notice of the appeal.

REPEALING CLAUSE

Ordinance 2006-7 is hereby repealed and replaced with Ordinance 2010- ____.

G. SEVERABILITY

If any provision of this Ordinance is determined by a court of competent jurisdiction to be invalid or otherwise unenforceable, such findings shall not effect the other provisions hereof, which shall remain in full force and effect.

H. EFFECTIVE DATE

This Ordinance shall become effective and be in force from and after its passage in the manner provided by law on or after the ____ day of _____ **2010**.

UPON MOTION of Alderman _____, duly seconded by Alderman _____ the aforesaid Ordinance was put to a roll call vote with the Aldermen voting as follows:

Ben Carver	Voted: _____
Sandra Sistrunk	Voted: _____
Eric Parker	Voted: _____
Richard Corey	Voted: _____
Jeremiah Dumas	Voted: _____
Roy A'. Perkins	Voted: _____
Henry Vaughn	Voted: _____

ORDAINED AND ADOPTED, this the 20th day of April, A.D., 2010 at the Recess Meeting of the Mayor and Board of Aldermen of the City of Starkville, Mississippi.

PARKER Y. WISEMAN, Mayor
City of Starkville, Mississippi

MARKEETA OUTLAW, Clerk
City of Starkville, Mississippi

(SEAL)