

## **A. General Standards for Storm Water Detention**

The intent of the City to apply storm water drainage policies and practices on a total watershed area basis so as to prevent or alleviate, to the greatest extent possible, downstream flooding problems and resulting property damage. It is the policy of the City to encourage the developer to locate and design streets, blocks, lots, parks and open space in such a manner as to reduce the velocity of overland flow; allow the maximum opportunity for infiltration of storm water into the ground; and to preserve existing streams, channels, detention basins and flood plain areas as open space.

The Drainage plan, as approved by the City Engineer, shall include the design of storm drainage improvements for both permanent detention facilities and interim facilities to control erosion and runoff during the construction process to lessen the impact of construction work at the site.

**The Detention Basin and associated interim erosion facilities or the permanent outlet structure shall be installed prior to any other work on the development.**

## **B. Runoff Determination**

The proposal and all drainage calculations required hereunder shall be prepared by a professional engineer licensed in the State of Texas. The rational method shall be used in calculating runoff for all developments less than 200 acres in size. For developments exceeding 200 acres in area, the applicant shall submit a proposed method of evaluation for the calculation of runoff to the City Engineer for approval.

When the proposed development abuts, includes or encompasses a portion of a flood plain, as defined herein, the professional engineer, preparing the Drainage plan, shall review and in all ways comply with requirements of other City ordinances regarding construction of buildings and other development in the flood plain areas of the City. The engineer shall also consult the flood insurance study as previously prepared for the City by the Federal Insurance Administration.

## **C. Storm water Detention**

### **1. General**

Unless otherwise authorized in writing by the City Engineer, storm water detention facilities, when required by the approved Drainage plan, shall be designed to comply fully with the following requirements. Such facilities shall be designed to detain the differential runoff from the project site under the design conditions so stated so that the **post-development rate of runoff is equal to or less than the pre-development rate of runoff**. Differential runoff shall be defined as the increase in volume of runoff generated by the proposed development or redevelopment of a parcel of land as compared to the runoff volume which occurred prior to said development or redevelopment.

### **2. Storage Volume**

The volume of storage provided in detention basins shall be sufficient to control the differential runoff from a 50-year storm return-frequency of 24-hour duration. The rate of runoff from the project following development, including discharge from the detention basin, shall not exceed the

rate of runoff that occurred prior to development.

### **3. Freeboard**

Detention storage areas shall include adequate capacity to contain maximum volume of tributary runoff with sufficient freeboard or as otherwise required by State or Federal Regulations.

### **4. Outlet Control Works**

a. Outlet works shall be designed to limit peak outfall rates so that the rate of runoff from the proposed development, including discharge from the detention basins, shall not exceed the rate of runoff that occurred prior to the development. The outlet works shall not include any mechanical components or devices.

b. Size and hydraulic characteristics shall be such that all water and detention storage is released to the downstream storm drainage system within 24 hours following the end of the design rainfall.

c. The minimum pipe size for an outlet or flow control orifice pipe shall be 12 inches in diameter.

d. Emergency overflows or spillways shall be provided to permit safe passage of runoff for a storm with a return frequency of at least 100 years.

### **5. Design Data Submittal for Detention**

In addition to complete plans, the following design data shall be submitted for the City Engineer's approval for all projects including temporary detention facilities:

a. Depth-capacity **table and** curve for the proposed detention facility showing accumulated volume of storage with varying depth of water in the proposed facility.

b. Discharge characteristics **table and** curve for the outlet works of the detention facility.

c. Combined storage-outflow curve showing inflow and discharge of runoff volume starting at the beginning of the design storm. Curves shall be arranged so that the vertical distance between the accumulated storage and the accumulated discharge will indicate the net volume of storage required at any time. Curves shall be extended to include the time required for complete discharge of all runoff stored within the detention facility.

### **6. Dry Bottom Basins:**

#### **a. Multi purpose Features**

They shall be designed to serve secondary purposes for recreation, open space or other types of use which will not be adversely affected by occasional or intermittent flooding. **The maximum depth for residential developments shall be 3 feet and the side slopes shall be 6:1 or less except at the outlet structure. Commercial developments with depths greater than 5 feet including freeboard shall be fenced. Commercial development side slopes shall be 4:1 minimum.**

#### **b. Minimum Bottom Slope**

The minimum bottom slope shall be **two percent**. An approved paved concrete swale can be provided in the bottom of the detention basin where the two percent slope is not maintained.

Provisions must be incorporated to facilitate interior drainage, to include the provisions of natural grades to outlet structures, longitudinal and transverse grades to perimeter drainage facilities, or the installation of subsurface drains.

#### **D. Land Requirements**

Permanent easements shall be dedicated to the City of Sulphur Springs over all lands, structures and facilities to be used for the detention and conveyance of storm drainage. Easements shall include all necessary provisions and land necessary for the City's right of entry for purposes of inspection or maintenance of such facilities. All such easements and pertinent documents shall be subject to the approval of the City Engineer.

The following statement shall be placed on the plat or easement.

“The owner whose property includes all or a portion of an open drainage swale, channel or detention basin shall be held responsible for the mowing of grass and removal of debris or obstructions to the flow of water in or through such facilities.”

#### **E. Inspections and Acceptance**

1. Prior to the issuance of an occupancy permit on any lot, the Building Official shall make a final inspection of the grading of said lot to determine if the developer or builder has complied with lot grading requirements as shown on the approved plans.
2. Upon satisfactory completion of drainage systems, including storm water channels, detention facilities, outlet works, and related appurtenances, the City Engineer shall make a final inspection of such facilities and shall recommend to the City Council that such facilities be accepted subject to provisions of maintenance bonds issued in accordance with the Development Manual.

#### **F. Maintenance**

Maintenance of drainage facilities and systems, shall hereafter be considered as a joint responsibility of both the homeowner and the City of Sulphur Springs. The homeowner whose property includes all or a portion of an open drainage swale, channel or detention basin shall be held responsible for the mowing of grass and removal of debris or obstructions to the flow of water in or through such facilities. The City shall be responsible for other maintenance work including, but not necessarily limited to, the repair and cleaning of storm drainage conduits, outlet structures, curb inlets, junction boxes and other major drainage facilities, all as determined by policies as may be adopted by the City Council.