

## STORMWATER MANAGEMENT STANDARD

### STORMWATER MANAGEMENT

These regulations shall hereafter be known, cited and referred to as specific design standards for the Storm Water Management Code of the City of St. Joseph, Missouri

- 1. APPLICABILITY** The provisions of this ordinance shall extend and apply to all land within the corporate limits of the City. Any person, firm, corporation, or business proposing to construct buildings, develop land or redevelop land within the above-described area shall make application to the Director of Public Works for approval of a Storm Water Management Plan and issuance of a of a drainage permit as specified in this ordinance.
- 2. INTERPRETATIONS** The provisions of this ordinance are intended to supplement existing zoning and land use ordinances of the City of St. Joseph. In their interpretation and application, the provisions herein shall be held to be the minimum requirements for the promotion of the public health, safety and general welfare.
- 3. OBJECTIVES** To promote the public health, safety and general welfare of the citizens of St. Joseph, this Storm water Management Code is enacted for the general purpose of assuring the proper balance between man's use of land and the preservation of a safe and beneficial environment. More specifically, the provisions of these regulations, as amended from time to time, are intended to reduce property damage and to minimize the hazards of personal injury and loss of life due to flooding
- 4. RELATIONSHIP TO OTHER LAWS** These regulations shall not be construed as abating any action now pending under, or by virtue of, prior existing regulations, or as discontinuing, abating, modifying or altering any penalty accruing or about to accrue, or as affecting the liability of any person, firm or corporation, or as vacating or annulling any rights obtained by any person, firm, or corporation, by lawful action of the City, except as shall be expressly provided for in these regulations.
- 5. DISCLAIMER OF LIABILITY** The performance standards and design criteria set forth herein establish minimum requirements which must be implemented with good engineering practice and workmanship. Use of the requirements contained herein shall not constitute a representation, guarantee or warranty of any kind by the City, or its officers and employees, of the adequacy or safety of any storm water management structure or use of land. Nor shall the approval of a Storm water Management Plan and the issuance of a drainage permit imply that land uses permitted will be free from damages caused by storm water runoff. The degree of protection required by these regulations is considered reasonable for regulatory purposes and is based on historical records, engineering, and scientific methods of study. Larger storms may occur, or storm water runoff heights may be increased by man-made or natural causes. These regulations, therefore, shall not create liability on the part of the City or any officer with respect to any legislative or administrative decision lawfully made hereunder.

- 6. SEPARABILITY** If any part or provision of these regulations or application thereof to any person or circumstances is adjudged invalid by any court of competent jurisdiction, such judgment shall be confined in its operation to that part, provision, or application directly involved in the controversy in which such judgment shall have been rendered and shall not affect or impair the validity of the remainder of these regulations or the application thereof to other persons or circumstances. The governing body hereby declares that it would have enacted the remainder of these regulations even without any such part, provision, or application found to be unlawful or invalid.

## **STORM WATER MANAGEMENT SYSTEMS**

- 1. GENERAL** This article establishes the Storm water Management System which shall be composed of a major system, a minor system, management controls, and management practices.
- 2. THE MAJOR SYSTEM** The major system shall be composed of the regulatory floodplain as shown on the National Flood Insurance Program maps as developed for the City of St. Joseph by Federal Emergency Management Agency. All components of the major system shall be designed to handle the system shall be designed to handle the 100-year rainfall event.
- 3. THE MINOR SYSTEM** The minor system shall consist of storm drainage facilities including, but not necessarily limited to, roadway curb and gutter, open channels, swales and enclosed conveyance systems which transport storm runoff to the major system (regulatory floodplain). Minor system facilities are those designed to accommodate runoff resulting from a storm with a given design frequency.
- 4. MANAGEMENT CONTROLS** Management controls are regulations applicable to the minor system under the provisions of this ordinance. Such controls shall limit any activity which will adversely affect hydraulic function of detention facilities, open channels, drainage swales, enclosed storm water conveyance systems and water quality best management practices within the minor system as previously defined.

Exceptions to the applicability of the use of management controls for new developments shall be granted in the following situations.

- a. Existing lots of record zoned single family.
- b. Additions to, improvements or repair of existing single family and duplex dwelling structures.
- c. Additions to, improvements or repair of existing commercial structures so long as there is no change in impervious surface area.
- d. On sites where storm water runoff discharges directly into a major stream or system component, as determined by the Director of Public Works, and such controls would serve no useful purpose.
- e. On land used for agricultural purposes where no change in grade over that which has existed historically will take place.

- f. Construction of any buildings or structures on a site which has been previously included with storm water management control facilities as part of a larger unit of development.

**5. DESIGN CRITERIA** Unless otherwise approved, the following rules shall govern the design of improvements with respect to managing storm water runoff:

In determining the amount of storm water runoff from a development it is important for the designer to relate the methodology to be used in his calculations to the proportionate size of the tributary watershed area. In developments of forty (40) acres or less, the rational method of calculating the quantity of runoff shall be used. Developments where the area developed is greater than forty (40) acres shall be designed using the kinematic wave model. Precipitation amounts for each methodology it is necessary to define the depth-duration-frequency relationships of rainfall. Precipitation data from the most current NOAA Atlas 14-point precipitation frequency estimates ([PF Map: Contiguous US \(noaa.gov\)](http://www.noaa.gov)) shall be used for all runoff computations. Use of methods other than those described shall be upon the approval of the Director of Public Works.

**A. Development Design:** Streets, blocks, depth of lots, parks, and other public grounds shall be located and laid out in such a manner as to minimize the velocity of overland flow and allow maximum opportunity for infiltration of storm water into the ground, and to preserve and utilize existing and planned streams, channels, and detention basins, and include, whenever possible, streams and floodplains within parks and other public grounds.

- i. **Enclosed Systems and Open Channels:** The Design Criteria for Storm Drainage Facilities, shall be per current APWA design standards or approved by the Director of Public Works.

**B. Methods of Controlling Downstream Flooding:** The Director of Public Works shall determine whether the proposed plan will cause or increase downstream local flooding conditions. This determination shall be made based on existing downstream development and drainage system capabilities and an analysis of storm water runoff prior to and after the proposed development. If the Director of Public Works determines that the proposed development will cause or increase downstream local flooding conditions during the design storm, provisions to minimize such flooding conditions shall be included in the design of storm drainage improvements and/or the temporary controlled detention of storm water runoff and its regulated discharge to the downstream storm drainage system.

- i. **Downstream Improvements:** Improvements to minimize downstream flooding conditions may include, but not be limited to, the construction of dams, dikes, levees, and floodwall; culvert enlargement; and channel clearance and modification projects.

**C. Detention Basins:** Detention of storm water runoff may be used in developments to minimize downstream flooding conditions. The design of detention facilities shall be in accordance with the following design criteria:

- i. **Storage Volume Requirements:** Sufficient storage volume shall be provided to prevent local flooding damage. Such volume shall be adequate to contain the differential volume of runoff which would result from the design storm occurring on a fully developed site minus the volume of runoff which would result from the design storm occurring over an undeveloped site. Inflow rates into the storage basin shall be determined utilizing either the rational method or the kinematic wave method dependent on the development size limitations and methodologies as previously described in this section. The minimum rainfall event to be utilized in determining the detention storage volume shall be based on the 25-year post developed rainfall event and a release rate of a 10-year pre-developed rainfall event.

In the event of special circumstances, the Director of Public Works may require the use of storms of greater magnitude. When utilizing the rational method for runoff computations, the rainfall intensity (I) and runoff coefficient (C) shall be based upon the area being fully developed in accordance with the planned land usage.

Associated with the analysis will be the routing of the storm hydrograph through the basin to determine the effect of the storage on the rate of inflow. As a result of the flood routing procedure, a determination of the required combination to temporary storage volume and outlet controls required to reduce post development peak outflows to no more than the rate may be made.

6. **DESIGN CRITERIA FOR BMPS** Unless otherwise approved, the following rules shall govern the design of improvements with respect to managing storm water runoff:

The City has adopted APWA/MARC's BMP Manual ([APWA BMP Manual](#)) and provided a Stormwater Pollution Prevention Plan (SWPPP) template ([Development and Construction | St. Joseph, MO](#)) to protect sensitive areas, minimize the creation of stormwater pollution, utilize BMPs that effectively remove stormwater pollution, and attempt to maintain predevelopment runoff conditions. Use of methods other than those described shall be upon the approval of the Director of Public Works.

The basic goal of stormwater management is to align water quantity and water quality management techniques in such a way as to prevent further deterioration of our watersheds. For this reason, water quality criteria have been developed to allow more stringent goals. The three basic techniques for addressing these goals include maintaining existing conditions, decreasing peak flows, and reducing pollutants. In addition, it is expected that special management goals may apply on a case-by-case basis.

- A. **Best Management Practice (BMP):** Stormwater management practice used to prevent or control the discharge of pollutants and minimize runoff to waters of the U.S. BMPs may include structural or non-structural solutions, a schedule of activities, prohibition of practices, maintenance procedures, or other management practices.
- B. **Level of Service (LS):** The level of water quality protection recommended for a development or provided by a post-development stormwater management system. The

LS requirement for the development is determined by the change in runoff from the predevelopment condition. The LS provided by the stormwater management system is determined by a combination of detention and water quality treatment.

**C. Value Rating (VR):** The assumed water quality improvement value of a cover type or BMP, based on its ability to improve water quality and mitigate runoff volume.