1.0 DRAINAGE POLICY

1.1 GENERAL

This Manual represents the application of accepted principles of stormwater drainage engineering and is a working supplement to basic information obtainable from standard drainage handbooks and other publications on drainage design. The policy statements of this Chapter provide the underlying principles by which all drainage facilities shall be designed. The application of the policy is facilitated by the technical criteria contained in the remainder of the Manual.

1.2 CITY OF KILLEEN DRAINAGE POLICY

1.2.1 Application

The City of Killeen's (City) drainage policy shall govern the planning and design of drainage infrastructure within the corporate limits of the City and within all areas subject to its extra territorial jurisdiction, as required. Definitions, formulae, criteria, procedures and data in this manual have been developed to support this policy. Methods not discussed in this manual may be used if they are acceptable industry standard methods. If any condition requiring some additional measure of protection is identified during design or construction, the design engineer shall make provisions within the design. All plans must be signed and sealed by a Professional Engineer licensed in the State of Texas. Any deviations from this manual due to special circumstances are acceptable if they meet the same levels of safety identified in this manual and are approved by the Director of Public Works or his/her designee.

1.2.2 General

A. Stormwater runoff peak flow rates for the 25- and 100-year frequency storms shall not cause increased adverse inundation of any building or roadway surface.

B. Street curbs, gutters, inlets, and storm sewers shall be designed to intercept, contain, and transport all runoff from the 25-year frequency storm, with a maximum overtopping the curb of ~~zero~~ four (~~0~~4) inches and total depth of flow does not exceed ~~6~~ 10 inches anywhere between the curb faces during this same frequency storm. In addition, any runoff above the top of curb shall not exceed a velocity of 7 feet per second.

C. In addition to B above, the public drainage system shall be designed to convey those flows from greater than the 25-year frequency storm up to and including the 100-year frequency storm within defined public rights-of-way less 4 feet on each side or drainage easements.

D. When stormwater detention is provided, stormwater runoff peak flow rates shall not be increased at any point of discharge for the 25-year storm frequency event. The 100-year storm event shall be passed from the detention facility through an emergency spillway such that the flow from that event shall not overtop the facility or cause damage to the downstream facilities.

1.2.3 Drainage Flow in Streets

No concentrated point discharges directly into streets will be allowed unless approved by the Public Works Director or his/her designee.

Streets shall have a minimum cross slope of 2% to properly remove water from the pavement surface. Lowering the height of the street crown may be allowed for the purposes of obtaining additional hydraulic capacity. In this case, the crown elevation shall be no lower than 2 inches below the top of curb.

1.2.4 Street Cross Flow

Whenever storm runoff, other than limited sheet flow, moves across a traffic lane, a serious and dangerous impediment to traffic flow occurs. When street cross flow occurs from one curb line to the opposing curb line, the depth of flow shall not exceed 6 inches of depth at any point within the street. This policy requires the use of concrete valley gutters to convey runoff across the street. At points of concentration other than intersections, cross-flows shall be contained within underground storm conduit.

In the event that underground storm drainage is not practical, cross flow is allowed. The crown shall be removed and a concrete valley shall be required to convey the runoff across the street. Cross flow shall not exceed 6 inches of depth within the concrete valley or between curb faces.

1.2.5 Allowable Flow of Water through Intersections

As the stormwater flow approaches a residential or marginal access street intersection, inlets shall be required if the depth of flow exceeds 6 inches at any portion of the street intersection. For this section an intersection shall be defined as the area between and including the curb returns. Concrete valley gutters shall be used to convey stormwater flow through intersections. In the case of tee intersections designed in sump conditions, the Engineer shall demonstrate that the depth of stormwater will not exceed 6 inches at any point within the intersection measured from the flowline of the valley gutter. Inlets in such cases shall not be installed within the curb radius of the intersection.

the design engineer shall use a concrete valley gutter to convey the runoff across the street. Cross flow from the higher elevation to the lower elevation gutter should be eliminated.

3.1.4 Allowable Flow of Water Through Intersections

As the stormwater flow approaches an arterial or collector, an inlet is required if more than 5 cfs for the 25-year storm enters the intersection. As stormwater flow approaches a residential or marginal access intersection, an inlet is required if the maximum depth of water exceed 6 inches measured from the flowline of the valley gutter. In either situation, the inlet shall not be placed inside a curb return. For this section an intersection shall be defined as the area between and including the curb returns.

3.1.5 Valley Gutter

Concrete valley gutters are essential in diminishing the deterioration of pavements and shall be required at all local street intersections with cross flow regardless of slope. At the intersection of two arterial streets, a valley gutter cannot be used. At the intersection of two collector streets or local streets, a valley gutter shall be installed when cross flow slope occurs across the intersection.

3.2 PERMISSIBLE SPREAD OF WATER

The flow of water in gutters of various streets of different categories shall be limited by the values found on Table 3-1. These clear widths at the crown of the roadway or at the high point on a divided roadway are necessary to provide access for vehicles in the event of an emergency. Equation 3-1 may be used to determine the spread of gutter flow for a specific street width and flow depth.

$$\text{Spread} = W/2\ [(W^2/4)\ 30y_oW^2/(30 + W)]^{1/2} \qquad \text{(Equation 3-1)}$$

where:

W = Street width, feet

y_o = Water depth in the gutter, feet