

# ELLIS COUNTY QUALITY GROWTH INITIATIVES



## VOLUME II DRAINAGE DESIGN MANUAL

## **SECTION I. GENERAL INFORMATION AND ADMINISTRATION**

### **A. OFFICIAL NAME**

The official name of these regulations shall be the "Ellis County Drainage Design Manual."

### **B. AUTHORITY**

These regulations are adopted under the authority of the Constitution and Laws of the State of Texas, including but not limited to, the Texas Local Government Code, as amended, Texas Revised Civil Statutes Annotated (Vernon), as amended, and any other applicable laws, regulations, and approved orders.

### **C. APPLICATION & PURPOSE**

- (1) All development in Ellis County shall provide drainage facilities and improvements in accordance with the following requirements and design standards.
- (2) The purpose of these standards is to provide for the health, safety, and general well-being of the public by assuring that adequate drainage facilities and structures are provided in all subdivisions, and to provide infrastructure which can be maintained without imposing a burden to taxpayers.

### **D. CONSISTENCY WITH OTHER REGULATIONS**

- (1) These regulations shall be consistent with the adopted Ellis County Subdivision and Development Standards, and the Standard Construction Details and any other supplemental land use and community development policies that may be adopted by the Commissioners' Court.
- (2) Should a conflict arise with other applicable orders, the strictest shall apply, until an updated order is approved by the County Commissioners' Court.

### **E. AMENDMENTS**

- (1) As needed, County Engineer may only amend the illustrations within these regulations without the consent of Commissioners' Court to better assist in graphically depicting portions of these regulations.
- (2) As needed, the Commissioners' Court may amend these regulations to reflect desired changes and updates in policy. Public hearings on all proposed written amendments shall be held by the Commissioners' Court in open session after publication in a newspaper of general circulation for at least fifteen (15) days before the public hearing date.

### **F. INTERPRETATIONS**

- (1) As needed, the County Engineer shall provide interpretations of these regulations.
- (2) Rulings made by the County Engineer are issued on a case-by-case basis and shall not set a precedent for other similar situations.
- (3) Should an applicant disagree with the interpretation provided, that decision may be appealed to the Commissioners' Court at the next available meeting, as listed in the latest submittal calendar and pay any associated costs.

**G. FINES & PENALTIES**

- (1) Any person, firm or corporation who violates any of the provisions of these regulations or who fails to comply with any provision hereof within the Ellis County shall be subject to civil penalties including a fine of \$1,000 for each day that such violation continues shall constitute a separate offense and shall be punishable accordingly, pursuant to Section 232.035 of the Texas Local Government Code.
  - (i) The primary objective of the department is not to impose fines but to have everyone comply with these regulations.
  - (ii) The Department of Development shall have the right to institute an action in the court to enjoin the violation or threatened a violation of any provision in the County.

**H. SEVERABILITY CLAUSE**

If any section, article, paragraph, sentence, clause, phrase or word of these regulations, or application, thereto any person or circumstances is held invalid or unconstitutional by a Court of competent jurisdiction, such holding shall not affect the validity of the remaining portions of these regulations; and the Commissioners' Court hereby declares it would have passed such remaining portions of these regulations despite such invalidity, which remaining portions shall remain in full force and effect.

## **SECTION II. GENERAL DRAINAGE REQUIREMENTS**

### **A. PRELIMINARY DRAINAGE PLAN**

- (1) A preliminary drainage plan shall be submitted with the preliminary plat so that the Engineering Department and the Department of Development may review the design with regard to potential drainage problems.
- (2) The preliminary drainage plan shall include an existing drainage map and a proposed drainage map.
- (3) Approval of the preliminary plat may be contingent on the preliminary drainage plan documenting that the drainage for the proposed development can be adequately controlled without causing any adverse impact.
- (4) The entire contributing drainage area for the proposed subdivision shall be shown at an appropriate scale for review. This map may also serve as the location (vicinity) map for the project. Drainage areas within the proposed subdivision shall be shown on a map prepared from field or aerial survey.
- (5) Areas that are off-site and contribute to the storm water discharge passing through the subdivision shall be clearly identified.
- (6) Direction of flow within streets, alleys, natural and improved channels and at system intersections shall be clearly shown on the drainage area maps. This includes sags, crests and corners.
- (7) Existing and proposed drainage channels shall be clearly shown and differentiated on the drainage area maps.
- (8) The preliminary drainage plan shall be prepared by a licensed professional engineer.

### **B. FINAL DRAINAGE PLAN**

- (1) A final drainage plan also shall be submitted with the final plat.
- (2) In addition to the requirements for the preliminary drainage plans, the final drainage plan shall show drainage areas contributing to each storm drain inlet or point of collection, volume of storm water being collected, size of storm drainage structure (including driveway culverts), drainage easements, finished floor elevations (if appropriate) and any other information which will clarify the proposed design.
- (3) The final drainage plan shall be prepared by a licensed professional engineer.

### **C. DRAINAGE IMPROVEMENT REQUIRED**

- (1) Drainage improvements including but not limited to detention ponds, channel improvements, grading, culverts and existing facility improvements shall be provided in accordance with these design standards.

- (i) To provide for the conveyance of all storm water from the development, when fully developed, to an adequate discharge point.
- (ii) To fulfill any purpose for which these requirements are imposed.
- (iii) To adequately protect the development from flooding, including the effects of the 100-year design storm.
- (iv) To properly control any drainage resulting from the development so as to not increase the upstream or downstream water surface elevation, post-development storm water runoff shall not exceed pre-developed storm water runoff.
- (v) Upstream or downstream storm drainage improvements and/or easements beyond the limits of the development may be necessary to meet this requirement.
- (vi) To provide for the conveyance of existing storm drainage flowing through the development.

**D. OFF-SITE DRAINAGE**

- (1) Off-site drainage facilities and improvements shall be provided by the development whenever additional storm water runoff from the development would adversely affect any off-site property or would overload an existing drainage facility, whether natural or man-made.
- (2) Where storm water runoff has been collected or concentrated to one point, it shall not be discharged onto adjacent properties, except into existing creeks, channels, or storm drains, unless drainage or flowage easements are obtained for those properties.

**E. DETENTION FACILITIES**

- (1) Detention may be used to reduce peak discharge where conditions prevent conveying storm water to an adequate discharge point, or studies show that off-site structural facilities will not mitigate hydraulic effects more efficiently.
- (2) Detention facilities may be constructed only in areas to be dedicated to the public.

**F. FEMA FLOODPLAIN**

- (1) Any proposed development within the FEMA floodplain must comply with the current Ellis County Flood Damage Prevention Order.
- (2) Open space is encouraged within the FEMA floodplain boundaries.

**G. CHANNEL REQUIREMENTS**

- (1) Channel regulations and improvement requirements shall be based on the amount and concentration of the storm water runoff produced from the proposed development and any additional upstream contributing drainage areas.

- (2) All developments shall provide for the permanent improvement and modification of existing drainage channels as necessary to serve the development, subject to and in accordance with the following.
- (3) Channels which serve drainage basins larger than one square mile shall be maintained in a natural state.
- (4) Channels of local drainage systems serving areas less than one (1) square mile may be lined with concrete or an improved grass-lined channel.

#### **H. CHANNEL ACCESS ROADS AND RAMPS**

Any development which makes use of any channel within or on the perimeter of the development to provide for storm water runoff may be required to provide adequate access roads and ramps for channel maintenance purposes as directed by the Engineering Department or Department of Development.

#### **I. LOT DRAINAGE**

- (1) Each lot shall be designed or graded with positive drainage to direct storm water into an abutting street, alley, channel, or inlet.
- (2) If drainage is provided in the rear of any lot by an alley or closed storm drainage system consisting of inlets and pipes, the alley or drainage system shall be designed for the 50-year storm event.
- (3) Where it is not practical to provide abutting drainage facilities for each lot, drainage facilities shall generally be required wherever the storm water runoff from no more than two lots is directed across a third residential lot, or whenever the facilities are necessary to avoid an adverse effect on any other lot.
- (4) Lots that are lower than the road or roads on which they abut shall have a finished floor elevation of no less than one (1) foot above the finished grade of the uphill side of the proposed structure to prevent damage from storm water runoff. This can be accomplished via the addition of fill and/or a swale.
- (5) Lots located in depressions shall have a minimum finished floor elevation shown on the final plat. This elevation shall not be less than one (1) foot above the 100-year water surface elevation.
- (6) The developer is responsible to notify a prospective buyer of the above requirements. Ellis County will not be responsible for any flooding or flood conditions that occur in these areas.

#### **J. STANDARD DETAILS**

Standard details adopted by the Texas Department of Transportation Hydraulic Design Manual as Revised in July 2016, as amended, shall be used for applicable drainage facility improvements. The Commissioners Court hereby adopts this Manual as its applicable standards for Hydraulic facilities including open channels, bridges, culverts, storm drains, pump stations, and storm-water quantity and quality control systems. Should conflicts arise between the Ellis County Drainage Design Manual and the Texas Department of Transportation Hydraulic Design Manual, the Ellis County Drainage Design Manual shall control.

### SECTION III. STORM DRAINAGE DESIGN CRITERIA

#### A. APPLICATION

- (1) Storm Water Runoff: All storm water drainage improvements shall be designed based upon the entire contributing drainage area being fully developed.
- (2) A downstream assessment may be required at the direction of the Ellis County Engineering Department. Depending upon project and site specific conditions, as well as downstream facilities, the developer may be required to provide a narrative and detailed calculations demonstrating the degree of downstream impacts.
- (3) The intent of the downstream assessment is to analyze the pre-project and post-project hydrologic and hydraulic conditions to ensure that post-developed runoff is conveyed downstream in an acceptable manner.

#### B. GENERAL

- (1) The design of storm drainage improvements in Ellis County shall be based on flood discharges determined by using an appropriate method.
  - (i) The Rational Method may be used to estimate peak flow for basin areas of 200 acres or less.
  - (ii) The SCS Unit Hydrograph Method may be used for basin areas of any size and all design applications.
  - (iii) The Texas Department of Transportation (TxDOT) Regression Equations may be used for basin areas from 10 to 100 square miles for rural design applications (see current TxDOT Hydraulic Manual – Regression Equations Section).
- (2) The Rational Method is based on the direct relationship between rainfall and runoff, and the method is expressed by the following equation:

$$Q=CIA,$$

where,

**Q** = the maximum rate of discharge (cfs).

**C** = a coefficient of runoff

**I** = intensity of rainfall (in/hr)

**A** = the drainage area (acres)

Values for the runoff coefficient are given in Table 1.

**TABLE 1. RUNOFF COEFFICIENTS FOR TYPES OF LAND USE**

<b>TYPE OF AREA OR LAND USE</b>	<b>ADOPTED RUNOFF COEFFICIENT "C"</b>
<b>Parks or Open Areas</b>	0.30
<b>Residential Areas ( Lots of 1 acre or more)</b>	0.45
<b>Residential Areas (Lots of less than 1 acre)</b>	0.65
<b>Commercial / Industrial Areas</b>	0.75
<b>Agricultural Areas</b>	0.30
<b>Business Areas</b>	0.95
<b>Apartment Areas</b>	0.80
<b>Streets (Asphalt and Concrete)</b>	0.95
<b>Drives, Walks, and Roofs</b>	0.95

(3) Rainfall Intensity is the average rainfall rate in in/hr for a duration equal to the time of concentration for a selected return period. Once a particular return period has been selected for design and a time of concentration calculated for the drainage area, the rainfall intensity can be determined from Rainfall-Intensity-Duration data given in the ISWM Technical Manual in the Ellis County Rainfall Data section or other methods accepted as standard engineering practice.

(i) Rainfall intensity can be determined from the formula:

$$i = \frac{b}{(t + d)^e}$$

where,

**i** = rainfall intensity (in/hr)

**t** = rainfall duration (min) (equal to the time of concentration)

**b,d,** and **e** = parameters found in the ISWM Technical Manual

(ii) The time of concentration (tc) is the time in minutes required for overland flow from the most hydraulically remote point in the watershed to a point where the runoff is concentrated plus the time of flow in a closed conduit or open channel to the design point.

(iii) The time of concentration may be determined by using methods accepted as standard engineering practice. The minimum inlet time of concentration for various types of areas to be used for design purposes can be seen in Table 2.

**TABLE 2. INLET TIME OF CONCENTRATION**

<b>Type of Area</b>	<b>Minimum Time</b>	<b>Maximum Time</b>
<b>Parks or Open Areas</b>	20 Minutes	30 minutes
<b>Single Family Residential</b>	15 Minutes	20 Minutes
<b>Industrial</b>	10 Minutes	20 Minutes
<b>Business</b>	10 Minutes	20 Minutes

(4) Storm Water Design Frequencies:

(i) Recommended design storm frequencies for the storm drainage improvements in Ellis County are listed in Table 3.



**TABLE 3. DESIGN STORM FREQUENCIES**

<b>Drainage Facility</b>	<b>Minimum Design Storm</b>
<b>Roadway Ditches &amp; Driveway Culverts</b>	5-year
<b>Enclosed Storm Drainage</b>	25-year
<b>Roadway Culverts and All Bridges</b>	100-year plus one-foot of freeboard above the 100-year water surface elevation
<b>Earthen &amp; Concrete Lined Channels (channel solely for conveying storm water runoff)</b>	100-year plus one-foot of freeboard above the 100-year water surface elevation

\*The discharge for 100-year return frequency storm and the resulting possible damages there from shall be evaluated to determine if said damages are sufficient to warrant enlargement of the planned facility.

- (5) Street Drainage Requirements:
  - (i) The permissible water spreads for streets are based on the 5-year design storm.
  - (ii) All streets shall be capable of conveying a 100-year design storm without water exceeding the right-of-way limits and/or drainage easement on adjacent lots.
  - (iii) The spread limits listed in Table 4 shall apply to the following streets and facilities:

**TABLE 4. PERMISSIBLE WATER SPREAD (5-YEAR DESIGN STORM)**

<b>Type of Road</b>	<b>Design</b>
<b>Regional Arterial</b>	One lane open in each direction
<b>Minor Arterial</b>	One lane open
<b>Collector</b>	Top of curb

Note: Inverted crown sections are permitted only in alleys.

**C. CULVERTS:**

- (1) All culvert designs including safety end treatments, headwall, and wingwall designs, must be signed and sealed by a licensed professional engineer in the State of Texas.
- (2) The developer shall install all drainage culverts as designated by the Engineer who designed the drainage system and with approval of the Engineering Department and the Department of Development.
- (3) The plat shall notify lot owners that the size of required drainage culverts for driveways is designated in the drainage study on file in the Department of Development.
- (4) Design of culverts shall include the determination of upstream backwater conditions as well as downstream velocities and flooding conditions. The maximum discharge velocity from the culvert shall not exceed the permitted velocity of the receiving channel or conduit at the outfall to prevent erosive conditions.

**D. ROADWAY CULVERTS:**

- (1) Culverts shall be constructed of reinforced concrete pipe (RCP) and designed to the 100-year frequency with one-foot of freeboard.
- (2) Safety End Treatments (SETs) or headwalls must be designed for all roadway culverts. The slope for the SET shall not exceed 4:1.
- (3) Roadway Culverts shall be designed in accordance with the adopted TxDOT Hydraulic Manual.

**E. DRIVEWAY CULVERTS:**

- (1) Culverts shall be constructed of reinforced concrete pipe (RCP) or corrugated metal pipe (CMP) and designed to the 5-year design storm at minimum, any culverts designed less than the 5-year design storm must obtain written approval of the Ellis County Engineering Department before installation.
- (2) The use of multi-barrel CMP shall be limited and reviewed on a case-by-case basis by the Engineering Department and the Department of Development.

**F. PIPE SYSTEM REQUIREMENTS:**

- (1) Storm drain systems capable of conveying the 25-year design storm are required when water spread limits are exceeded. Storm drain conduit shall be sized to full flow using Manning's Equation.

$$Q = \frac{1.486AR^{\frac{2}{3}}S^{\frac{1}{2}}}{n}$$

where;

**Q** = is the discharge (cubic feet per second)

**A** = the cross-sectional area of flow (square feet)

**R** = the hydraulic radius (feet)

**S** = the slope of the hydraulic (ft/ft)

**n** = the coefficient of roughness

- (i) The minimum velocity with the pipe flowing full shall be three (3) feet per second.
  - (ii) The minimum storm drainpipe diameter shall be eighteen (18) inches.
  - (iii) Pipe soffits at changes in pipe sizes shall be set the same elevation.
  - (iv) Vertical curves in the conduit will not be permitted and horizontal curves will be permitted only with the approval of the Engineering Department and the Department of Development.
- (2) Manholes shall be placed at the connection of two (2) or more laterals, at pipe junctions having pipe sizes greater than twenty-four (24") inches, at alignment changes, and at the beginning of the storm drain system.
    - (i) Maximum manhole size and specification shall be in accordance to Table 5:

**TABLE 5. MANHOLE SIZE AND MAXIMUM SPACING**

Pipe Size (Inches)	Maximum Spacing (feet)
18-36	600
42-60	1000
>60	No Limit

**G. CHANNELS:**

The calculations for capacity of channels shall consider the effects of backwater from downstream conditions.

**H. NATURAL CHANNELS:**

- (1) Channels may be left in a natural state if both of the following conditions are met and certified by a licensed engineer in the State of Texas:
  - (i) Channel velocities are less than eight (8) feet per second based on the 100-year design storm.
  - (ii) The flow from the 100-year design storm is contained within the natural channel while allowing one-foot of freeboard.

**I. IMPROVED CHANNELS:**

- (1) If a natural channel is to be replaced by an improved channel, the flow from the 100-year design storm must be contained in the improved channel while allowing for one-foot of freeboard.
- (2) Improved channels shall contain a lined section if the design velocity is greater than six (6) feet per second.
- (3) Lined sections shall be designed in accordance with the adopted TxDOT Hydraulic Manual.
- (4) Lining types such as concrete, rock walls and gabions, may be used upon approval of the Engineering Department.
  - (i) For lined channels, all of the channel bottom and at least the first three (3) feet (vertical height) of the side slopes up from the channel bottom shall be lined, unless otherwise approved by the Engineering Department.
  - (ii) Earthen sides above the lined section (or totally earthen channels) shall be on at least three (3) horizontal to one (1) vertical slope and shall have approved ground cover to prevent erosion.
- (5) Unless shown to be feasible in a soils report sealed by a registered professional engineer in the State of Texas, and approved by the Engineering Department, improved channels shall have minimum side slopes of:
  - (i) Three (3) feet horizontal to one (1) foot vertical for earthen, grass-lined side slopes (3:1)
  - (ii) Two (2) feet horizontal to one (1) foot vertical for concrete-lined side slopes (2:1)
- (6) Channels discharging into watercourses shall have the same invert level as the watercourse.

**J. DETENTION PONDS**

- (1) The following requirements and design standards shall apply to detention ponds to the extent they do not conflict with any applicable Federal or State laws or regulations, as amended:
  - (i) The 100-year design storm shall be used to determine the volume of storage required.
  - (ii) Detention facilities shall be designed so that any additional runoff generated by the proposed development will not increase the amount of original discharge for storm frequencies from the 5-year to the 100-year design storm.
- (2) The Unit Hydrograph Method is recommended to determine the volume of runoff storage for drainage areas of any size. For drainage areas less than 200 acres, other methods accepted as standard engineering practice are allowable.
- (3) Any outflow structure which conveys water through the embankment in a conduit shall be designed with reinforced concrete.
- (4) The conduit shall withstand the internal hydraulic pressure without leakage under full external load or settlement and must convey water at the design velocity without damage to the interior surface of the conduit.
- (5) The outflow structure of a detention basin discharging water into any natural stream or unlined channel shall discharge at a non-erosive rate, unless approved erosion protection is provided.
- (6) Detention basins resulting from excavation shall provide positive drainage with a minimum bottom slope of one (1) percent.
- (7) The side grade for any excavated detention basin, which is not a rock, shall not exceed 3:1. Side slopes and bottom shall be protected from erosion with grass or other approved materials.
- (8) Earthen embankments used for water impoundments must be constructed with suitable fill material and be designed based upon geotechnical investigations of the site. Embankments shall be protected from erosion with grass or other approved materials.

## SECTION IV. EASEMENTS

### A. APPLICATION

The following requirements for public drainage improvements, channels, and facilities required for any development shall apply

- (1) All public drainage systems and facilities which are not to be included within an existing or proposed public street right-of-way shall be located within easements to be dedicated to the County with adequate access to a public street.
- (2) Prior to acceptance of any public drainage facilities, all easements within which the facilities are located shall be cleared of all buildings, structures, fences, trees, or other obstacles that would interfere with drainage flow and access to the easement.
- (3) The developer shall be responsible for maintenance of drainage easements until the land is sold.
- (4) The landowners shall be responsible for maintenance of drainage easements after the purchase of the property.
- (5) Floodways or floodplains which are necessary to provide for the drainage needs of the development shall be dedicated to the public as a drainage easement to the limits defining the floodway or floodplain.
- (6) Easements for closed drainage systems shall be in accordance with the following minimum standards, unless special circumstances warrant additional or reduced, as determined by Ellis County Engineering.

<u>Pipe Size</u>	<u>Minimum Easement Width</u>
<b>36" and under</b>	15 feet
<b>42" through 54"</b>	20 feet
<b>60" through 66"</b>	25 feet
<b>72" and above</b>	30 feet

- (7) Easements for improved channels shall be provided with sufficient width for maintenance access.
  - (i) Channels having a top width greater than 30-feet and a side slope steeper than 4:1 shall have access roads of 15-feet in width along both sides of the channel unless otherwise approved by Ellis County Engineering.
- (8) Utilities shall not be located within any existing drainage easement, unless it is also designated for utility use.
  - (i) No utilities shall be located in any lined channel in such a way as to interfere with maintenance of or access to the channel.
- (9) A drainage easement shall be provided for a required outfall channel or ditch to the point where the flowline matches natural grade.

- (10) To provide for maintenance, a drainage easement shall be provided at least twenty-five (25') feet beyond any outfall headwall.

**B. ELLIS-PRAIRIE SOIL AND WATER CONSERVATION DISTRICT (EPSWCD) AND DALWORTH SOIL AND WATER CONSERVATION DISTRICT (DSWCD)**

The following requirements for any development shall apply when located in close proximity to a Natural Resource Conservation Service (NRCS) Floodwater Retarding Structure in Ellis County.

- (1) If a proposed development is within close proximity, as determined by the Ellis County Engineering Department, to a NRCS floodwater retarding structure, the Department of Development and Engineering Department will defer to the EPSWCD or DSWCD for an impact analysis and letter of approval before issuing a development permit.
- (2) For structures where a potential dam breach inundation area has been established, construction is not recommended.

**EPSWCD Policy on Activities Adjacent to the Floodwater Retarding Structures**

**Purpose**

This policy is for the purpose of addressing requests to modify the size of easement areas adjacent to floodwater retarding structures; and to provide guidance on the handling and consideration of requests for development activities within the easement area, and deviations from District policy.

**Background**

There are 84 floodwater retarding structures in the Ellis-Prairie Soil and Water Conservation District (the "District"). See attached map.

Funding for these structures was authorized by the National Flood Control Act of 1944 (Public Law 534) for the purpose of watershed protection and flood prevention. The U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, oversaw the design and construction.

These structures or "soil conservation lakes" were constructed on private lands through easements obtained by the District. The easements were filed with the Ellis County Clerk's office. These lakes are not federal property and therefore not open to the general public.

As easement holder, the District is responsible for the operation, maintenance and inspection of these floodwater retarding structures. Under an agreement with Ellis County Commissioners Court, the County provides financial support in performing maintenance activities.

As Ellis County continues to grow, the land adjacent to floodwater retarding structures becomes a primary target for residential development, ranchettes, and other special uses that pose a potential hazard to life and property, and may adversely affect the operation of the structure. Developers and potential developers are requesting the District to modify, restrict and reduce easements to the minimum amount feasible while preserving the structure and its function.

Therefore, to protect public safety, ensure the proper function of the structure, maintain the integrity of the easements and to accommodate requests by current and future developers, the District is adopting the following policy relating to all activities within such easements.

## General Policy

- (1) Easement Area – The easement includes the dam, emergency spillway (to the outlet channel), pipe outlet works, sediment pool, flood detention pool (flood easement elevation), ingress/egress and any adjoining land deemed necessary for carrying out operation and maintenance responsibilities. The flood easement elevation is the contour line determined by the emergency spillway crest elevation plus two (2) feet. (Note: This is not the 100-Year floodplain, which is determined by the Federal Emergency Management Agency (FEMA)).
- (2) Ingress/Egress – As specified in the easement, the District is provided and will reserve access for the purpose of inspecting, operating, repairing and maintaining the structure. The minimum width of the access road will be thirty (30) feet. The District will install locks on access gates as needed to protect the landowner’s privacy.
- (3) Floodwater Retarding Structure – The dam, emergency spillway, primary spillway/pipe outlet and related appurtenances shall not be modified in any form for any reason without prior written approval of the District and concurrence from the NRCS.
- (4) Fencing – The fence and gates around the dam and emergency spillway are the property of the District. These fences were constructed for grazing management. Any changes or modifications to the existing fences require prior written approval of the District. Property line fences located within the easement are not the responsibility of the District. (Note: The fenced-in area around the dam and emergency spillway is not an indicator of the “easement area”.)
- (5) Grazing – Controlled grazing on the dam and emergency spillway is permitted under the following conditions:
  - (a) Grazing is regulated so as to maintain a 4-inch stubble height on Bermuda grass, and a 6-inch stubble height on other grasses.
  - (b) Livestock are removed when the soil is extremely wet or dry.
  - (c) Livestock will not be confined and/or fed on dam or emergency spillway.
  - (d) Corrals or pens will not be constructed on the dam or emergency spillway.
- (6) Other Agricultural Uses - Where practical, the dam and emergency spillway may be hayed. Cutting heights will be the same as grazing heights. Haying will be completed by October 1 to allow time for adequate regrowth before the winter. Plowing and planting annual crops such as small grains on the dam and spillway area is prohibited. Over seeding using a no-till drill or similar equipment is permitted.
- (7) Trafficking – Vehicular travel across the top of dam and spillway areas will be limited to prevent rutting and damage to vegetation. All vehicles, including ATV’s, are prohibited on the slopes of the dam and in the emergency spillway area.
- (8) Water Level – The water level in the structure is controlled by the District. Landowner(s) within the sediment pool (permanent water) wishing to lower the water level must have prior written

approval of the District. Other landowners within the sediment pool must be in agreement and submit written concurrence showing unanimous agreement before the District will consider the request.

- (9) Water Use – All surface water in Texas is owned by the State. The landowner(s) involved in the floodwater retarding structure have the right to use water in the sediment pool for domestic or livestock use. The use of water for commercial agricultural production and other commercial uses is regulated by the Texas Commission on Environmental Quality (TCEQ). Before applying for a state permit, the landowner must first receive written approval from the District to ensure that such activities will have no adverse effect on the structure. Secondly, the landowner(s) having sediment pool must be in unanimous agreement and submit written concurrence to the District.
- (10) Development – Development is defined as any manmade change to improved or unimproved real estate, including but not limited to, adding buildings or other structures, dredging, filling, grading, paving, excavation, or drilling operations.

The following activities relating to development are prohibited within the easement area:

- (a) Residential construction, and other structures (garages, barns, utility buildings, etc)
- (b) Placement of fill for any reason;
- (c) Installation of dikes, levees or other structures which may reduce the storage capacity of the flood detention pool, decrease the capacity of the flood channel, deflect the flow from the channel or divert natural runoff;
- (d) Construction of buried or above ground utilities on dam or emergency spillway;
- (e) Temporary or permanent placement of objects in the emergency spillway that will reduce or disturb flow (i.e., fences, hay bales, equipment storage, etc.).

In developing watersheds, the District recommends that the minimum finished floor elevation for proposed development areas be one (1) foot above top of dam elevation. All development will comply with the National Flood Insurance Program and be approved by the governmental authority having jurisdiction. To provide a technical basis for development, future development that impacts on, or is impacted by the structure and/or the easement, shall require a detailed engineering study and a final copy provided to the District at the sole expense of the developer. The engineering firm completing the study shall be approved by the District and concurred by the NRCS. All plans for developing land within the easement area must be approved in writing by the District. Refer to the sections “Upstream Development” and “Identification of Easement Area” for guidance on submission and approval of plans.

- (11) Request involving deviations from District Policy – Deviations from District policy will not be permitted unless the following criteria are met:
  - (a) It can clearly be shown by approved procedures that the deviation will not adversely affect conditions either upstream or downstream from the point of deviation; and
  - (b) All owners directly affected by the deviation are in agreement; and



- (c) The deviation is not in conflict with any other plan or ordinance adopted by any local governing authority having jurisdiction.

Request for deviation must be submitted, in written form, at least twenty-one (21) days prior to the date of the District meeting at which consideration is requested.

### **Upstream Development**

When residential or commercial development is contemplated on land on which the District holds an easement, the owner shall contact the District to review the plans and the impact on the District's easement. This review should take place as soon as reasonably possible and prior to the tender of any

plats, preliminary or otherwise, to any governmental authority, and prior to the sale of any land or an interest in any land. See "General Policy-Development". If development is feasible, as evidenced by written approval of the District, then the following information will be required and provided at the owner's expense for District approval.

- (a) A survey of the easement area by metes and bounds. See "Identification of Easement Area for guidance of amending easement.
- (b) Two (2) prints of a preliminary plat of the proposed development which must be provided at least twenty-one (21) days prior to the date of the District meeting at which approval of the preliminary plat is requested. The preliminary plat shall include the following information, as applicable:
  - (i) Depiction of the recorded easement showing boundary lines of the easement, and location of the dam, emergency spillway and flood detention pool;
  - (ii) Flood easement elevation contour with flood detention pool shown by shading;
  - (iii) Sediment pool elevation contour (permanent water level);
  - (iv) The 100-year floodplain boundaries and source of information;
  - (v) Top of dam elevation contour (in developing watershed);
  - (vi) Location of utilities, easements and right-of-ways (existing and planned);
  - (vii) Layout of subdivision including streets and lots and any other features relating to the proposed subdivision.

Approval of the preliminary plat does not constitute acceptance of the development, but merely an authorization to proceed with preparation of the final plat. When development activities require County and/or city approval, District approval in writing, shall be obtained prior to submission to the appropriate governing authority. All development will comply with the National Flood Insurance Program.

- (c) The owner will submit two (2) prints of the final plat of the proposed development at least twenty-one (21) days prior to the date of the District meeting at which approval of the final plat is requested.

The final plat shall have all the information required for the preliminary plat plus the following additional information shall be provided:

- (i) A written list of all changes made in the final plat that are different from the preliminary plat;
- (ii) Subdivision restriction, including those imposed by the developer.

**District review and written approval of the final plat must be obtained prior to submission to the County or City.**

**After approval, the final plat will be filed with the Ellis County Clerk's Office, and two (2) certified copies of the final plat and accompanying restrictions along with recording information furnished to the District at the owner's expense.**

#### Identification of Easement Area

When land on which the District holds an easement is to be developed (residential subdivision, commercial development, etc.), the original easement shall be amended to identify the easement by a metes and bounds description. All expenses incurred will be the sole responsibility of the owner.

The owner shall provide to the District a certificate of title from a title company showing that the title to said property is vested in the owner and a listing of any and all lien holders(s).

A registered public surveyor shall conduct the survey. The District will provide details and limits, specific to the easement to be redefines. The area retained and therein describer will, as a minimum, include the dam, emergency spillway, pipe outlet, sediment pool, flood detention pool (flood easement elevation), ingress/egress and any adjoining lands deemed necessary for carrying out District responsibilities.

Survey field notes and plat will be submitted to the District for examination. The plat will, as a minimum, contain the following information:

- (1) Boundaries of the easement area including call notes (lines, bearings and distances); and the area clearly identified by shading;
- (2) Show location of the dam, emergency spillway, flood easement elevation, as applicable;
- (3) A seal, signature and certification by a surveyor to the effect that the plat correctly represents a survey made by him.

Following written approval of the survey by the District, the owner will have his attorney prepare, for the consideration and possible execution by the District, a partial release that modifies the original easement and that includes:

- (1) The title history of the subject property form the inception of ownership by the Grantor in the original easement;
- (2) A detailed explanation of the changes that not only show the portion of the easement released by also defines and clarifies, by metes and bounds, that portion of the easement to be retained;

- (3) The following statement: "Except as above amended, all other provisions of the original easement shall remain in full force and effect."; and
- (4) A plat of the subject property as outlined above, and identified as "Exhibit A".

**Note:** A copy of all deeds and/or easements referenced in the conveying document shall accompany said document.

The owner will then submit two (2) original copies of this amendment to the District for final review and approval at least twenty-one days (21) prior to the date of the District meeting at which approval of the amendment is requested.

Following District approval, the District will, at the owner's expense, file the amended easement with the Ellis County Clerk's office. In addition, the owner shall pay the cost of providing the District with a certified copy of said document with recording information.

**SECTION V - IXX**  
**RESERVED**

**SECTION XX.**  
**DEFINITIONS**

**A. APPLICATION**

- (1) For these regulations, the following terms, phrases, words and their derivations shall have the meaning ascribed to them in this section.
  
- (2) If the terms, phrases, words and their derivations are not located within these set of regulations, it may be located in the County's other associated development regulations.
  - (i) Definitions not expressly prescribed herein are to be construed in one of the following methods as determined by the Department of Development Director to apply a definition that closely applies:
    - (a) In accordance with customary usage in subdivision, planning and engineering practices;  
or,
    - (b) The most recent edition of Black's Law Dictionary.
  
  - (ii) Any interpretation shall be addressed by the County Engineer as outlined in Section I (F).

**B. DEFINITIONS**

**Access Ramp**

A route used to provide entry for vehicles and machinery into a channel.

**Access Road**

A route parallel to and at the top of the bank of a channel used for maintenance of channels.

**Base Flood**

The flood having a one percent chance of being equaled or exceeded in any given year.

**Channel**

Any open or closed device for conveying flowing water.

**Drainage Area or Basin**

The land area or catchment area, upon which rainfall contributes runoff to a specific location.

**Drainage Facilities or System**

One or more conduits, channels, ditches, swales, pipes, detention devices, or any other device, work, or improvement, natural or manmade, which is used, designed, or intended to be used to carry, direct, detain, or otherwise control storm water.

**Detention**

The storage of storm water runoff for a controlled release during or immediately following the design storm.

**Flood Hazard Boundary Map (FHBM)**

An official map issued by the Federal Emergency Management Agency (FEMA), where the areas of special flood hazards have been designated.

**Flood Insurance Rate Map (FIRM)**

An official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the special flood hazard areas and the risk premium zones applicable to the community.

**Flood Insurance Study**

An examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

**Floodplain**

For purposes of these rules, the floodplain is the area designated as subject to flooding from the base flood (100-year flood) on the Flood Insurance Rate Map. The floodplain includes the floodway when established.

**Floodway**

The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

**Floodway Fringe**

The area located within the floodplain and outside the floodway.

**Freeboard**

The vertical distance between the design water surface level and the top of an open conduit left to allow for wave action, flotation debris, or any other condition or emergency without over topping the structure.

**Hydrograph**

A graph showing stage, flow, velocity or other properties of water versus time at a given point in a stream or conduit.

**Inlet**

An opening into a storm drain system for the entrance of surface water runoff.

**Inverted Crown Section**

A street cross-section usually reserved for alleys, in which the center of the street is lower than the edges so that drainage is carried down the center of the street.

**Local Drainage System**

Any drainage facility or system which serves an area having a contributory drainage basin of less than a one (1) square mile area.

**Off-Site**

Located outside the boundary of a development.

**On-Site**

Located within the boundary of a development.

**Pipe**

A closed conduit through which water flows.

**Positive Drainage**

The practice or system of proper grading to direct runoff away from structures and to prevent ponding.

**Positive Overflow**

Refers to when inlets do not function properly or the design capacity of a conduit is exceeded, the excess flow can be conveyed overland along a road, alley, or special drainage easement.

**Soffit**

Inside top of a pipe.

**Time of Concentration**

The estimated time, in minutes, required for storm water runoff to flow from the most hydraulically remote section of the drainage area to a specific design point.