A motion was made by Commissioner Howell and seconded by Commissioner Woolley to: (1) approve the adoption of the Revised Johnson County Flood Damage Prevention Order of 2019; (2) to approve the adoption of the Digital Flood Insurance Rate Maps Revision Effective April 5, 2019 (FIRM) for Johnson County, Texas; and (3) to approve the adoption of the Fourth Revised Countywide Flood Insurance Study (FIS) for Johnson County, Texas and Incorporated Areas Effective April 5, 2019, Number 48251CV001B and 48251CV002B.

Said motion was approved by a vote of the Commissioners Court on the 27th day of March, 2019.

NOW THEREFORE BE IT RESOLVED AND ORDERED:

The Commissioners Court of Johnson County, Texas does hereby enter this order approving: (1) the adoption of the Revised Johnson County Flood Damage Prevention Order of 2019; (2) the adoption of the Digital Flood Insurance Rate Maps Revision Effective April 5, 2019 (FIRM) for Johnson County, Texas; and (3) the adoption of the Fourth Revised Countywide Flood Insurance Study (FIS) for Johnson County, Texas and Incorporated Areas Effective April 5, 2019, Number 48251CV001B and 48251CV002B

WITNESS OUR HAND THIS THE 27th DAY OF MARCH, 2019.

Roger Harmon, Johnson County Judge
Voted: ✓ yes, ___ no, ___ abstained

Rick Bailey, Comm. Pct. #1
Voted: ✓ yes, ___ no, ___ abstained

Kenny Howell, Comm. Pct. #2
Voted: ✓ yes, ___ no, ___ abstained

Jerry D. Stringer, Comm. Pct. #3
Voted: ✓ yes, ___ no, ___ abstained

Larry Woolley, Comm. Pct. #4
Voted: ✓ yes, ___ no, ___ abstained

ATTEST: Becky Ivey
Becky Ivey, County Clerk

COMMISSIONERS COURT ☆ JOHNSON COUNTY, TEXAS ☆

60.3(d)

REVISED JOHNSON COUNTY FLOOD DAMAGE PREVENTION ORDER OF 2019

ARTICLE I

STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND METHODS

SECTION A. STATUTORY AUTHORIZATION

The Legislature of the State of Texas has in the Flood Control Insurance Act, Texas Water Code, Section 16.315, delegated the responsibility of local governmental units to adopt regulations designed to minimize flood losses. Therefore, the Commissioners Court of Johnson County, Texas does ordain as follows:

SECTION B. FINDINGS OF FACT

(1) The flood hazard areas of Johnson County, Texas are subject to periodic inundation, which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services, and extraordinary public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.

(2) These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities, and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, floodproofed or otherwise protected from flood damage.

SECTION C. STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

(1) Protect human life and health;

(2) Minimize expenditure of public money for costly flood control projects;

(3) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

(4) Minimize prolonged business interruptions;

(5) Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains;

(6) Help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize future flood blight areas; and

(7) Insure that potential buyers are notified that property is in a flood area.

SECTION D. METHODS OF REDUCING FLOOD LOSSES

In order to accomplish its purposes, this ordinance uses the following methods:

(1) Restrict or prohibit uses that are dangerous to health, safety or property in times of flood, or cause excessive increases in flood heights or velocities;

(2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

(3) Control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;

(4) Control filling, grading, dredging and other development which may increase flood damage;

(5) Prevent or regulate the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards to other lands.

ARTICLE 2

DEFINITIONS

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted to give them the meaning they have in common usage and to give this order its most reasonable application.

ALLUVIAL FAN FLOODING - means flooding occurring on the surface of an alluvial fan or similar landform which originates at the apex and is characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and unpredictable flow paths.

APEX - means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

APPURTENANT STRUCTURE – means a structure which is on the same parcel of property as the principal structure to be insured and the use of which is incidental to the use of the principal structure.

AREA OF FUTURE CONDITIONS FLOOD HAZARD – means the land area that would be inundated by the 1-percent-annual chance (100 year) flood based on future conditions hydrology.

AREA OF SHALLOW FLOODING - means a designated AO, AH, AR/AO, AR/AH, or VO zone on a community's Flood Insurance Rate Map (FIRM) with a 1 percent or greater annual chance of flooding to an average depth of 1 to 3 feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

AREA OF SPECIAL FLOOD HAZARD - is the land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. The area may be designated as Zone A on the Flood Hazard Boundary Map (FHBM). After detailed rate making has been completed in preparation for publication of the FIRM, Zone A usually is refined into Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE or V.

BASE FLOOD - means the flood having a 1 percent chance of being equaled or exceeded in any given year.

BASE FLOOD ELEVATION (BFE) – The elevation shown on the Flood Insurance Rate Map (FIRM) and found in the accompanying Flood Insurance Study (FIS) for Zones A, AE, AH, A1-A30, AR, V1-V30, or VE that indicates the water surface elevation resulting from the flood that has a 1% chance of equaling or exceeding that level in any given year - also called the Base Flood.

BASEMENT - means any area of the building having its floor subgrade (below ground level) on all sides.

BREAKAWAY WALL – means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

CONDITIONAL LETTER OF MAP AMENDMENT (CLOMA) - means FEMA's comment or official letter on a proposed structure, group of structures, or parcel of land that upon construction would be located on existing natural ground above the base flood elevation on a portion of a legally defined parcel of land that is partially inundated by the base flood.

CONDITIONAL LETTER OF MAP REVISION (CLOMR) - means FEMA's comment or official letter on a proposed project that upon construction would affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing effective base flood elevations, the special flood hazard area, or the existing regulatory floodway.

CONDITIONAL LETTER OF MAP REVISION - FILL (CLOMR-F) - means FEMA's comment or official letter on a proposed structure, group of structures, or parcel of land that upon construction would result in a modification of the special flood hazard area through the placement of fill outside the existing regulatory floodway.

CRITICAL FACILITY - means those facilities essential to the preservation of life and property, including, but not limited to, schools, nursing homes, hospitals, police stations, fire and emergency response installations, facilities used for the storage of critical records, and commercial installations which produce, use or store hazardous materials, or hazardous waste.

CRITICAL FEATURE - means an integral and readily identifiable part of a flood protection system, without which the flood protection provided by the entire system would be compromised.

DEVELOPMENT - means any man-made change to improved and unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

ELEVATED BUILDING – means, for insurance purposes, a non-basement building, which has its lowest elevated floor, raised above ground level by foundation walls, shear walls, posts, piers, pilings, or columns.

ELEVATION CERTIFICATE - means a document certified by a licensed professional land surveyor used for the purpose of establishing the lowest floor (including basement) elevation of a building. All new construction or substantial improvements to existing buildings in flood hazard areas, or within 100 feet of a flood hazard area, shall obtain an Elevation Certificate and provide the necessary information in accordance with the FEMA's (FEMA) National Flood Insurance Program (NFIP) instructions.

EXISTING CONSTRUCTION - means for the purposes of determining rates, structures for which the "start of construction" commenced before the effective date of the FIRM or before January 1, 1975, for FIRMs effective before that date. "Existing construction" may also be referred to as "existing structures."

EXISTING MANUFACTURED HOME PARK OR SUBDIVISION - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

EXPANSION TO AN EXISTING MANUFACTURED HOME PARK OR SUBDIVISION - means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

EXPANSION OF A STRUCTURE – means an addition attached to, but outside of, either the vertical or horizontal confines of the existing structure or below the first floor of a building elevated on posts or piers, but which is not a – substantial improvement as defined by these Regulations.

FEMA – means Federal Emergency Management Agency.

FLOOD OR FLOODING - means a general and temporary condition of partial or complete inundation of normally dry land areas from:

(1) the overflow of inland or tidal waters.

(2) the unusual and rapid accumulation or runoff of surface waters any source.

FLOOD ELEVATION STUDY – means 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.

FLOOD INSURANCE RATE MAP (FIRM) - means an official map of a community, on which the Federal Emergency Management Agency has delineated both the special flood hazard areas and the risk premium zones applicable to the community.

FLOOD INSURANCE STUDY (FIS) – see *Flood Elevation Study*

FLOODPLAIN OR FLOOD-PRONE AREA - means any land area susceptible to being inundated by water from any source (see definition of flooding).

FLOODPLAIN ADMINISTRATOR – is an individual responsible for enforcing the floodplain management regulations in this chapter.

FLOODPLAIN MANAGEMENT - means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and floodplain management regulations.

FLOODPLAIN MANAGEMENT REGULATIONS - means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a floodplain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

FLOODPLAIN MITIGATION – means a hydraulically equivalent volume of floodplain storage sufficient to offset a reduction in floodplain storage or conveyance capacity.

FLOOD PROTECTION SYSTEM - means those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the area within a community subject to a "special flood hazard" and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

FLOOD PROOFING - means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

FLOODWAY – see *Regulatory Floodway*

FUNCTIONALLY DEPENDENT USE - means a use, which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

HIGHEST ADJACENT GRADE - means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

HISTORIC STRUCTURE - means any structure that is:

(1) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;

(2) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;

(3) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or

(4) Individually listed on a local inventory or historic places in communities with historic preservation programs that have been certified either:

(a) By an approved state program as determined by the Secretary of the Interior or;

(b) Directly by the Secretary of the Interior in states without approved programs.

LETTER OF MAP AMENDMENT (LOMA) – means FEMA's comment or official letter of an amendment to the currently effective FEMA Flood Insurance Rate Map (FIRM) which established that a structure, group of structures, or a parcel of land is not located in a Special Flood Hazard Area (SFHA) as shown on the FIRM. A LOMA is issued only by FEMA.

LETTER OF MAP REVISION (LOMAR) – means FEMA's modification to an effective FIRM or flood boundary and floodway map or both. LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective base flood elevations, or the SFHA. The LOMR officially revises the FIRM, and sometimes the flood insurance study report, and when appropriate, includes a description of the modifications. The LOMR is generally accompanied by an annotated copy of the affected portions of the FIRM, or the flood insurance study report. A LOMR is issued only by FEMA.

LETTER OF MAP REVISION – FILL (LOMAR-F) – means a letter from FEMA stating that an existing structure or panel of land that has been elevated by fill would not be inundated by the base flood. A LOMR-F is issued only be FEMA.

LEVEE - means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

LEVEE SYSTEM - means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

LOWEST FLOOR - means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely

for parking or vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirement of Section 60.3 of the National Flood Insurance Program regulations.

MANUFACTURED HOME - means a structure transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. The term "manufactured home" does not include a "recreational vehicle."

MANUFACTURED HOME PARK OR SUBDIVISION - means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

MEAN SEA LEVEL - means, for purposes of the National Flood Insurance Program, the North American Vertical Datum (NAVD) of 1988 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

NEW CONSTRUCTION - means, for the purpose of determining insurance rates, structures for which the "start of construction" commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, "new construction" means structures for which the "start of construction" commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

NEW MANUFACTURED HOME PARK OR SUBDIVISION - means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by a community.

RECREATIONAL VEHICLE - means a vehicle which is (i) built on a single chassis; (ii) 400 square feet or less when measured at the largest horizontal projections; (iii) designed to be self-propelled or permanently towable by a light duty truck; and (iv) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

REGULATORY FLOODWAY - means 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.

RIVERINE – means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

SPECIAL FLOOD HAZARD AREA – see *Area of Special Flood Hazard*

START OF CONSTRUCTION - (for other than new construction or substantial improvements under the Coastal Barrier Resources Act (Pub. L. 97-348)), includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for basement, footings, piers or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

STRUCTURE - means, for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home. The term includes a building which is in the course of construction, alteration or repair.

SUBSTANTIAL DAMAGE - means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

SUBSTANTIAL IMPROVEMENT - means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before "start of construction" of the improvement. This term includes structures which have

incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either: (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or (2) Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a "historic structure." For the purpose of determining the value of the structure before being repaired, reconstructed or improved, the Johnson County Central Appraisal District's assessed value for the structure will be used. If the applicant wishes to contest this value, an independent certified appraisal may be submitted by the applicant. Upon review and concurrence by the Johnson County Central Appraisal District, this appraised value for the structure will be used for determining if the improvement is substantial.

The Floodplain Administrator may require the submittal of an independent certified damage assessment in cases where the structure has suffered other than minor damage. In cases where the structure is covered by insurance and the insured losses for damage to the structure (excluding contents) amount to over 50% of the value of the structure, the structure shall be deemed substantially damaged regardless of any other data submitted.

UNINCORPORATED AREA – means the area on Johnson County, Texas, that is not within an incorporated city, town, village or other municipality defined by statute.

VARIANCE – means a grant of relief by a community from the terms of a floodplain management regulation. (For full requirements see Section 60.6 of the National Flood Insurance Program regulations.)

VIOLATION - means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Section 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

WATER SURFACE ELEVATION - means the height, in relation to the North American Vertical Datum (NAVD) of 1988 (or other datum, where specified), of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

Zones on the Flood Insurance Rate Map (FIRM) have the following meanings:

Zone A: Areas of the base (1% or 100-year) flood where base flood elevations have not been determined.

Zone AE: Areas of the base (1% or 100-year) flood where base flood elevations have been determined.

Zone AH: Areas of special flood hazards having shallow water depths and/or unpredictable flow paths between (1) and (3) feet, and with water surface elevations determined.

Zone AO: Areas of special flood hazards having shallow water depths and/or unpredictable flow paths between (1) and (3) feet.

Zone A99: Areas inundated by the (1% or 100-year flood to be protected by a Federal flood protection system under construction; no base flood elevations are determined.

Zone V: Areas of coastal flooding with velocity (wave action); base (1% or 100-year) flood elevations not determined.

Zone VE: Areas of coastal flooding with velocity (wave action); base (1% or 100-year) flood elevations determined.

Zone X: (Shaded): Areas of the 0.2% flood or 500-year flood, areas of the base (1% or 100-year) flood with average depths of less than 1.0 foot or with drainage areas less than one (1) square mile, and areas protected by levees from the 1% or 100-year flood.

Zone X: (Unshaded): Areas determined to be outside both the 1% (100-year) and 0.2% (500-year) floodplains.

For purposes of these Regulations, the term – Any V Zone includes Zone V and Zones VE and the term Any A Zone includes Zone A, AE, AH, AO and A99.

ARTICLE 3

GENERAL PROVISIONS

SECTION A. LANDS TO WHICH THIS ORDINANCE APPLIES

The order shall apply to all areas of special flood hazard within the jurisdiction of Johnson County, Texas.

SECTION B. BASIS FOR ESTABLISHING THE AREAS OF SPECIAL FLOOD HAZARD

The areas of special flood hazard identified by the Federal Emergency Management Agency in the current scientific and engineering report entitled, "The Flood Insurance Study (FIS) for Johnson County, Texas And Incorporated Areas," dated April 5, 2019, with accompanying Flood Insurance Rate Maps and/or Flood Boundary-Floodway Maps (FIRM and/or FBFM) dated April 5, 2019, and any revisions thereto are hereby adopted by reference and declared to be a part of this order.

SECTION C. ESTABLISHMENT OF DEVELOPMENT PERMIT

A Development Permit shall be required for all development both within and outside the Special Flood Hazard areas to ensure conformance with the provision of these Regulations.

SECTION D. COMPLIANCE

No structure or land shall hereafter be located, altered, or have its use changed without full compliance with the terms of this order and other applicable regulations or court orders.

SECTION E. ABROGATION AND GREATER RESTRICTIONS

This order is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this order and another order, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

SECTION F. INTERPRETATION

In the interpretation and application of this ordinance, all provisions shall be; (1) considered as minimum requirements; (2) liberally construed in favor of the governing body; and (3) deemed neither to limit nor repeal any other powers granted under State statutes.

SECTION G. WARNING AND DISCLAIMER OR LIABILITY

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. On rare occasions greater floods can and will occur and flood

heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of the community or any official or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

ARTICLE 4

ADMINISTRATION

SECTION A. DESIGNATION OF THE FLOODPLAIN ADMINISTRATOR

The Johnson County Public Works Director is hereby appointed the Floodplain Administrator to administer and implement the provisions of this ordinance and other appropriate sections of 44 CFR (Emergency Management and Assistance - National Flood Insurance Program Regulations) pertaining to floodplain management.

SECTION B. DUTIES & RESPONSIBILITIES OF THE FLOODPLAIN ADMINISTRATOR

Duties and responsibilities of the Floodplain Administrator shall include, but not be limited to, the following:

(1) Maintain and hold open for public inspection all records pertaining to the provisions of this ordinance.

(2) Review permit application to determine whether to ensure that the proposed building site project, including the placement of manufactured homes, will be reasonably safe from flooding.

(3) Review, approve or deny all applications for development permits required by adoption of this ordinance.

(4) Review permits for proposed development to assure that all necessary permits have been obtained from those Federal, State or local governmental agencies (including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334) from which prior approval is required.

(5) Where interpretation is needed as to the exact location of the boundaries of the areas of special flood hazards (for example, where there

appears to be a conflict between a mapped boundary and actual field conditions) the Floodplain Administrator shall make the necessary interpretation or require that a flood elevation study be submitted to the Director of Public Works in order to aid in making said interpretation. This determination may require the property owner to apply for a LOMR from FEMA.

(6) Notify, in riverine situations, adjacent communities and the State Coordinating Agency which is the Texas Water Development Board (TWDB) and also the Texas Commission on Environmental Quality (TCEQ), prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency.

(7) Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained.

(8) When base flood elevation data has not been provided in accordance with Article 3, Section B, the Floodplain Administrator shall obtain, review and reasonably utilize any base flood elevation data and floodway data available from a Federal, State or other source, in order to administer the provisions of these regulations.

(9) When a regulatory floodway has not been designated, the Floodplain Administrator must require that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community's FIRM, unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

(10) Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Program regulations, a community may approve certain development in Zones A1-30, AE, AH, on the community's FIRM which increases the water surface elevation of the base flood by more than 1 foot, provided that the community **first** applies for a conditional firm revision through FEMA and completes all of the provisions required by Section 65.12.

(11) The Floodplain Administrator shall appoint a qualified person to review all permit applications and approve any such permits in the absence of the administrator.

(12) Review subdivision proposals and other proposed new development, including manufactured home parks or subdivisions, to determine whether such proposals will be reasonably safe from flooding.

(13) Require within flood hazard areas that new and replacement water supply and sanitary sewerage systems be designed to minimize or eliminate infiltration of flood waters into the systems, and that discharges from the systems into flood waters and onsite waste disposal systems be located to avoid impairment to them or contamination from them during flooding.

(14) Require proposed development to obtain a LOMA when appropriate in accordance with Article 6.

(15) Require proposed development to obtain a conditional letter of map revision (CLOMR) when appropriate prior to any construction in accordance with Article 6. After such construction a formal LOMR shall be required in accordance with Article 6.

SECTION C. PERMIT PROCEDURES

(1) Application for a Floodplain Development Permit shall be presented to the Floodplain Administrator on forms furnished by him/her and may include, but not be limited to, plans in duplicate drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, including the placement of manufactured homes, and the location of the foregoing in relation to areas of special flood hazard.

(2) A Development Permit will be issued when the Director of Public Works or designee determines that the development will be made on land that is located entirely outside the mapped 1% floodplain or 100 year regulatory floodplain and that all other necessary reviews and approvals required by County regulations have been obtained.

(3) In a Shaded X Zone it must be determined that the ground level is above the base flood level before a Development Permit may be issued. The Director of Public Works may rely on data in his possession to make such a determination or require the submittal of topographical information by the applicant.

(4) Additionally, the following information is required for structures located in the Special Flood Hazard Areas or within 100 feet of a Special Flood Hazard Area for a Development Permit:

a) Detailed drawings for the proposed development. Drawings must clearly indicate that all provisions of these regulations will be met. On developments other than residential accessory buildings less than 150 square feet or other insignificant developments (carports, well houses, gazebos, etc.) drawings must be sealed by a licensed professional engineer or registered architect certifying that all provisions of these regulations will be met if the development is completed in accordance with the sealed drawings.

b) A detailed topographic survey of the property to be developed. This requirement may be waived for fences or other insignificant types of development.

c) In cases where a determination must be made as to whether the construction is substantial improvement, additional information may need to be submitted as outlined in these Regulations.

d) Elevation (in relation to mean sea level), of the lowest floor (including basement) of all new and substantially improved structures;

e) Elevation in relation to mean sea level to which any nonresidential structure shall be flood proofed;

f) A certificate from a licensed professional engineer or architect that the nonresidential flood proofed structure shall meet the flood proofing criteria of these Regulations;

g) Description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development

h) The top of the lowest floor must be elevated to three (3) feet or more above the base flood elevation.

i) A Form Board Survey with elevations correlated to the NAVD88 vertical datum signed by a Registered Professional Land Surveyor (R.P.L.S.) will be required before framing begins. Approval must be given by the County to begin framing if the survey meets all requirements.

j) A completed FEMA Elevation Certificate with the necessary base flood elevations, as-built lowest finished floor elevation, lowest adjacent grade, along with any hydrological and hydraulic data utilized to calculate the base flood elevations must be submitted when the structure is completed. All elevations shall be correlated to the NAVD88 vertical datum.

k) All structures will be constructed and anchored to prevent flotation, collapse or lateral movement of the structure resulting from the hydrodynamic and hydrostatic loads, including the effect of buoyancy.

l) Construction shall use methods that will minimize flood damage and construction materials and utility equipment that are resistant to flood damage. FEMA Technical Bulletins will serve as the guideline for this requirement.

m) Unless dry-proofed, enclosed areas below the base flood elevation must be equipped with flood openings or vents capable of equalizing water levels and hydrostatic loads. Covers for these openings must not interfere with the equalization of water levels in the event of a flood and should minimize potential blockage by debris. FEMA Technical Bulletin 1 or subsequent revisions shall serve as the guideline for this requirement. A licensed architect or licensed professional engineer shall certify the flood openings if there is any variance from the guidelines stated in Technical Bulletin 1.

n) Thermal insulation used below the base flood elevation shall be of a type that does not absorb water.

o) Water heaters, furnaces, air conditioning systems, electrical distribution panels and any other mechanical or electrical equipment must be elevated at least **three (3) feet** above the base flood elevation. Separate electrical circuits shall serve any level below the base flood elevation and shall be dropped from above.

p) All air ducts, loose pipes, propane tanks and storage tanks located at or below the base flood level shall be firmly anchored to prevent flotation. Tanks and ducts shall be vented to at least **three (3) feet** above the base flood elevation.

q) Levees may not be used to reclaim a property from any floodplain.

r) Construction of critical facilities shall be to the extent possible, located outside the limits of the 0.2% floodplain or 500-year floodplain (Shaded Zone X) and any —"A" Zone. Construction of new critical facilities shall be permissible within the base floodplain if no feasible alternative site is available.

i. Construction of critical facilities on land located below the base flood elevation in the 0.2% (500-year) floodplain or within the base floodplain shall have the lowest floor elevated to at least **three (3) feet** or more above the base flood elevation of the site.

ii. Flood proofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters. A licensed architect or licensed professional engineer shall certify all necessary flood proofing and sealing measures have been taken so that toxic substances will not be displaced by or released into floodwaters.

iii. Access routes elevated to or above the level of the base flood shall be provided to all critical facilities to the extent possible.

s) If the Floodplain Administrator determines that the development is within any —"X" Zone and all other necessary reviews and approvals have been issued, he may issue a Development Permit.

t) If a CLOMA or a CLOMR has been issued which will place the development in a —"X" Zone and all other necessary reviews and approvals have been issued, he may issue a Development Permit Elevation Certificates reflecting "as-built" conditions must be submitted to verify the development is above the required elevation.

u) Any reduction in floodplain storage or conveyance capacity must be offset with a hydraulically equivalent (one-to-one) volume of mitigation sufficient to offset the reduction. The reduction may result from development or the placement of fill within the floodplain. Such mitigation shall be within the same watershed and shall be provided on the same property or within the same hydrologic sub-watershed or at an alternate site meeting the approval of the Floodplain Administrator. A full hydrological and hydraulic analysis must be submitted to support a request for mitigation outside the boundaries of the property being developed.

v) The Floodplain Administrator shall review the proposed construction or development to assure that all reviews or approvals required by other County Regulations are obtained.

(5) The Floodplain Administrator shall maintain a record of all such information in accordance with these Regulations;

(6) Approval or denial of a Development Permit by the Floodplain Administrator shall be based on all of the provisions of this order and the following relevant factors:

a) The danger to life and property due to flooding or erosion damage;

b) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner,

c) The danger that materials may be swept onto other lands to the injury of others;

d) The compatibility of the proposed use with existing and anticipated development

e) The safety of access to the property in times of flood for ordinary and emergency vehicles;

f) The costs of providing governmental services during and after flood conditions including maintenance and repair of streets and bridges, and public utilities and facilities such as sewer, gas, electrical and water systems;

g) The expected heights, velocity, duration, rate of rise and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site;

h) The necessity to the facility of a waterfront location, where applicable;

i) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use;

j) The relationship of the proposed use to the current comprehensive plan for that area.

(7) The Floodplain Administrator may require the submission of additional information, drawings, specifications or documents if he is unable to determine whether a permit should be issued from the information submitted.

(8) Developments may require permits from other local, State and Federal agencies. The applicant is responsible for compliance with all applicable regulations and permit requirements.

(9) Where a conditional letter of map change has been obtained from the FEMA for property which has been elevated by the use of fill above the elevation of the base flood, inspections and Elevation Certificates will be required. Where engineered fill is utilized, a certificate shall be signed by the qualified design professional in responsible charge of designing the development shall be provided. The certificate form to be used is found in

Figure 1 of FEMA's Technical Bulletin 10-01. All supporting documents, tests and reports in which the design professional utilized in making the determination of the base flood elevation, and the determination that the development will be reasonably safe from flooding, must accompany said certificate.

SECTION D. VARIANCE PROCEDURES

(1) The Commissioners' Court shall hear and rule on requests for variances from the requirements of this order.

(2) The Commissioners' Court shall hear and rule on an appeal only when it is alleged in writing that there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the enforcement or administration of this order.

(3) Any person or persons aggrieved by the decision of the Commissioners' Court may appeal such decision in the courts of competent jurisdiction.

(4) The Floodplain Administrator shall maintain a record of all actions involving an appeal and shall report variances to the Federal Emergency Management Agency upon request.

(5) Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in the remainder of this order.

(6) Variances may be issued for new construction and substantial improvements to be erected on a lot of (1/2) acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing the relevant factors in Section C (2) of this Article have been fully considered. As the lot size increases beyond the 1/2 acre, the technical justification required for issuing the variance increases.

(7) Upon consideration of the factors noted above and the intent of this ordinance, the Commissioners' Court may attach such conditions to the granting of variances as it deems necessary to further the purpose and objectives of this order (Article 1, Section C).

(8) Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

(9) Variances may be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

(10) Prerequisites for granting variances:

(a) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

(b) Variances shall only be issued upon: (i) showing a good and sufficient cause; (ii) a determination that failure to grant the variance would result in exceptional hardship to the applicant, and (iii) a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.

(c) Any application to which a variance is granted shall be given written notice that the structure will be permitted to be built with the lowest floor elevation below the base flood elevation, and that the cost of flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

(11) Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that (i) the criteria outlined in Article 4, Section D (1)-(9) are met, and (ii) the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

SECTION E. NON-CONVERSION OF PERMITTED PROPERTY

(1) A structure that is designed to have a level below the base flood elevation that is not designed and permitted for living quarters shall not be converted to contain living quarters on such lower level unless a specific permit is obtained authorizing such conversion in accordance with this Flood Damage Prevention Order.

(2) As a prerequisite for a permit to be granted to construct a structure

that might have a level below the base flood elevation that is not for living quarters the property owner must execute an acknowledgement of the following conditions and must adhere to the following conditions:

(a) That the enclosed area below the base flood elevation shall be used solely for parking of vehicles, limited storage, or access to the building and will never be used for human habitation without first becoming fully compliant with the Flood damage prevention order in effect at the time of the beginning of the construction of the conversion.

(b) That all interior walls, ceilings, and floors below the Base Flood Elevation shall be unfinished or constructed of flood resistant materials.

(c) That mechanical, electrical, or plumbing devices shall not be installed below the Base Flood Elevation.

(d) The walls of the enclosed areas below the Base Flood Elevation shall be equipped with at least two vents which permit the automatic entry and exit of floodwater with total openings of at least one square inch for every square foot of enclosed area below flood level. The vents shall be on at least two different walls and the bottoms of the vents shall be no more than one foot above grade.

(e) That any variation in construction beyond what is permitted shall constitute a violation of this Flood Damage Prevention Order.

(f) That the Non-conversion Acknowledgement becomes part of the permit for construction on the described property described by the applicable permit.

(g) THAT THE ACKNOWLEDGEMENT IS A GOVERNMENT DOCUMENT AS DESCRIBED BY TEXAS PENAL CODE SECTION 37.10 AND IS MATERIAL TO THE GRANTING OF A PERMIT TO THE ABOVE NAMED PERSON FOR CONSTRUCTION OR DEVELOPMENT ON THE ABOVE IDENTIFIED PROPERTY.

(h) The acknowledgement shall be filed in the deed records of Johnson County, Texas in the form of an Affidavit to the Public.

JOHNSON COUNTY COMMISSIONERS COURT

COPY

THE STATE OF TEXAS §
§ **ORDER #2019-17**
COUNTY OF JOHNSON §

AN ORDER OF THE JOHNSON COUNTY COMMISSIONERS COURT: APPROVING AND ADOPTING THE REVISED JOHNSON COUNTY FLOOD DAMAGE PREVENTION ORDER OF 2019; THE DIGITAL FLOOD INSURANCE RATE MAPS REVISION EFFECTIVE APRIL 5, 2019 (FIRM); AND THE FOURTH REVISED COUNTY WIDE FLOOD INSURANCE STUDY (FIS) FOR JOHNSON COUNTY, TEXAS AND INCORPORATED AREAS EFFECTIVE APRIL 5, 2019, NUMBER 48251CV001B AND 48251CV002B

The Johnson County Commissioners Court met on March 27, 2019 in Special Session and held a public hearing to consider the adoption of the Revised Johnson County Flood Damage Prevention Order of 2019; adoption of Digital Flood Insurance Rate Maps Revision Effective April 5, 2019 (FIRM) for Johnson County, Texas; and adoption of the Fourth Revised Countywide Flood Insurance Study (FIS) for Johnson County, Texas and Incorporated Areas Effective April 5, 2019, Number 48251CV001B and 48251CV002B.

The Public Hearing was properly published in the Cleburne Times Review, on March 15, 2019, and on March 16, 2019 and placed on the County Web Page and on the bulletin board of the Johnson County Commissioners Court at the Johnson County Courthouse.

A copy of the Revised Johnson County Flood Damage Prevention Order of 2019, the Digital Flood Insurance Rate Maps Revision (FIRM) to be effective April 5, 2019 and the Flood Insurance Study (FIS) for Johnson County, Texas and Incorporated Areas Revision Effective April 5, 2019, Number 48251CV001B and 48251CV002B was posted via links on the Johnson County internet site at www.johnsoncountytx.org on March 18, 2019 and remained there until date of this order.

ARTICLE 5

PROVISIONS FOR FLOOD HAZARD REDUCTION

SECTION A. GENERAL STANDARDS

In all areas of special flood hazards the following provisions are required for all new construction and substantial improvements:

(1) All new construction or substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;

(2) All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage;

(3) All new construction or substantial improvements shall be constructed with materials resistant to flood damage;

(4) All new construction or substantial improvements shall be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;

(5) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;

(6) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the system and discharge from the systems into flood waters; and,

(7) On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

SECTION B. SPECIFIC STANDARDS

In all areas of special flood hazards where base flood elevation data has been provided as set forth in these regulations the following provisions are required:

(1) **Residential Construction** - new construction and substantial improvement of any residential structure shall have the lowest floor (including

basement), elevated to a minimum of **three (3) feet** above the base flood elevation. A registered professional engineer, architect, or land surveyor shall submit a certification to the Floodplain Administrator that the standard of these regulations are satisfied.

(2) **Nonresidential Construction** - new construction and substantial improvements of any commercial, industrial or other nonresidential structure shall either have the lowest floor (including basement) elevated to a minimum of **three (3) feet** above the base flood level or together with attendant utility and sanitary facilities, be designed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. A registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with accepted standards of practice as outlined in this subsection. A record of such certification which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained by the Floodplain Administrator.

(3) **Enclosures** - new construction and substantial improvements, with fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria:

(a) A minimum of two openings on separate walls having a total net area of not less than 1 square inch for every square foot of enclosed area subject to flooding shall be provided.

(b) The bottom of all openings shall be no higher than 1 foot above grade.

(c) Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

(4) **Manufactured Homes -**

(a) Require that all manufactured homes to be placed within Zone A on a community's FHBM or FIRM shall be installed using methods and practices which minimize flood damage. For the purposes of this requirement, manufactured homes must be elevated and anchored to resist flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable State and local anchoring requirements for resisting wind forces.

(b) Manufactured homes that are placed or substantially improved within Zones A1-30, AH, and AE on the community's FIRM on sites (i) outside of a manufactured home park or subdivision, (ii) in a new manufactured home park or subdivision, (iii) in an expansion to an existing manufactured home park or subdivision, or (iv) in an existing manufactured home park or subdivision on which a manufactured home has incurred "substantial damage" as a result of a flood, be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated to three (3) feet above the base flood elevation and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

(c) Manufactured homes be placed or substantially improved on sites in an existing manufactured home park or subdivision with Zones A1-30, AH and AE on the community's FIRM that are not subject to the provisions of paragraph (4) of this section be elevated so that either:

(i) the lowest floor of the manufactured home is at three (3) feet above the base flood elevation, or

(ii) the manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade and be securely anchored to an adequately anchored foundation system to resist flotation, collapse, and lateral movement.

(5) **Recreational Vehicles -** Require that recreational vehicles placed on sites within Zones A1-30, AH, and AE on the community's FIRM either (i) be on the site for fewer than 180 consecutive days, or (ii) be fully licensed and ready for highway use, or (iii) meet the permit requirements of Article 4, Section C (1), and the elevation and anchoring requirements for "manufactured homes" in paragraph (4) of this section. A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick

disconnect type utilities and security devices, and has no permanently attached additions.

SECTION C. STANDARDS FOR SUBDIVISION PROPOSALS

(1) All subdivision proposals including the placement of manufactured home parks and subdivisions shall be consistent with this order and shall comply with the current Johnson County Subdivision Rules & Regulations.

(2) All proposals for the development of subdivisions including the placement of manufactured home parks and subdivisions shall meet Development Permit requirements of this order and shall comply with the current Johnson County Subdivision Rules & Regulations.

(3) Base flood elevation data shall be generated for subdivision proposals and other proposed development including the placement of manufactured home parks and subdivisions which is greater than 50 lots or 5 acres, whichever is lesser, if not otherwise provided to these regulations.

(4) Base flood evaluation data, with the establishment of a floodway, shall be generated by a detailed engineering study for all Zone A areas within 100 feet of the contour lines of Zone A areas, and other streams not mapped by FEMA, as indicated on the community's FIRM.

(5) All subdivision proposals including the placement of manufactured home parks and subdivisions shall have adequate drainage provided to reduce exposure to flood hazards.

(6) All subdivision proposals including the placement of manufactured home parks and subdivisions hall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize or eliminate flood damage.

(7) The subdivision must be planned to provide adequate drainage, so as to reduce flood hazards.

(8) The following conditions must be met if the proposed development for which a Development Permit is sought is an expansion of a structure, as the term defined by these regulations, located in any – "A" Zone but not within a floodway.

(a) The expansion must be constructed of materials resistant to water damage below the base flood elevation and the expansion must be designed to

minimize flood damage in accordance with the FEMA approved flood-resistant materials list (Technical Bulletin 2-93).

(9) Notwithstanding any other provision of these Regulations, no permit will be issued if the Floodplain Administrator determines that the development will increase flood hazards.

(10) The following conditions must be met if the proposed development for which a Development Permit is sought includes a water or sanitary sewer system:

(a) The proposed system must be designed and constructed to minimize or eliminate infiltration of flood water into the system and to eliminate discharge of untreated waste from the system into the flood waters.

(b) All joints must be water tight.

(c) On-Site sewage disposal systems, if they meet Environmental Health Regulations, are allowed.

(d) Individual water wells or wastewater disposal systems must be located to avoid impairment to them or contamination from them during flooding.

SECTION D. STANDARDS FOR AREAS OF SHALLOW FLOODING (AO/AH ZONES)

Located within the areas of special flood hazard established in Article 3, Section B, are areas designated as shallow flooding. These areas have special flood hazards associated with flood depths of 1 to 3 feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow; therefore, the following provisions apply:

(1) All new construction and substantial improvements of **residential** structures have the lowest floor (including basement) elevated to a minimum of three (3) feet above the base flood elevation or the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least 2 feet if no depth number is specified).

(2) All new construction and substantial improvements of **non-residential** structures;

(a) have the lowest floor (including basement) elevated to a minimum of three (3) feet above the base flood elevation or the highest adjacent grade at least as high as the depth number specified in feet on the community's FIRM (at least 2 feet if no depth number is specified), or

(b) together with attendant utility and sanitary facilities be designed so that below the base specified flood depth in an AO Zone, or below the Base Flood Elevation in an AH Zone, level the structure is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads of effects of buoyancy.

(3) A registered professional engineer or architect shall submit a certification to the Floodplain Administrator that the standards of these regulations are satisfied.

(4) Within Zones AH or AO adequate drainage paths are required around structures on slopes, to guide flood waters around and away from proposed structures.

SECTION E. FLOODWAYS

Floodways - located within areas of special flood hazard established in Article 3, Section B, are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles and erosion potential, the following provisions shall apply:

(1) Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.

(2) If Article 5, Section E (1) above is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions of Article 5.

(3) Under the provisions of 44 CFR Chapter 1, Section 65.12, of the National Flood Insurance Program Regulations, a community may permit encroachments within the adopted regulatory floodway that would result in an increase in base flood elevations, provided that the community **first** completes all of the provisions required by Section 65.12.

SECTION F. SEVERABILITY

If any section, clause, sentence, or phrase of this order is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way affect the validity of the remaining portions of these regulations.

SECTION G. PENALTIES FOR NON COMPLIANCE

No structure or land shall hereafter be constructed, located, extended, converted, or altered without full compliance with the terms of this court order and other applicable regulations. Violation of the provisions of this court order by failure to comply with any of its requirements (including violations of conditions and safeguards established in connection with conditions) shall constitute the commission of a Class C misdemeanor as defined by the Texas Penal Code in effect at the date of the commission of the offense provided that the offense was committed after the date this Order was approved by the Commissioners' Court of Johnson County, Texas. Each day of violation occurs is a separate offense. Nothing in this Section shall prevent prosecution for an offense or application of a more severe penalty where such offense and penalty is specifically described by statute. Nothing herein contained shall prevent Johnson County from taking such other lawful action as is necessary to prevent or remedy any violation.

SECTION H. CERTIFICATION OF ADOPTION

APPROVED: _____
Roger Harmon, County Judge

PASSED: March 27, 2019
(adoption date)

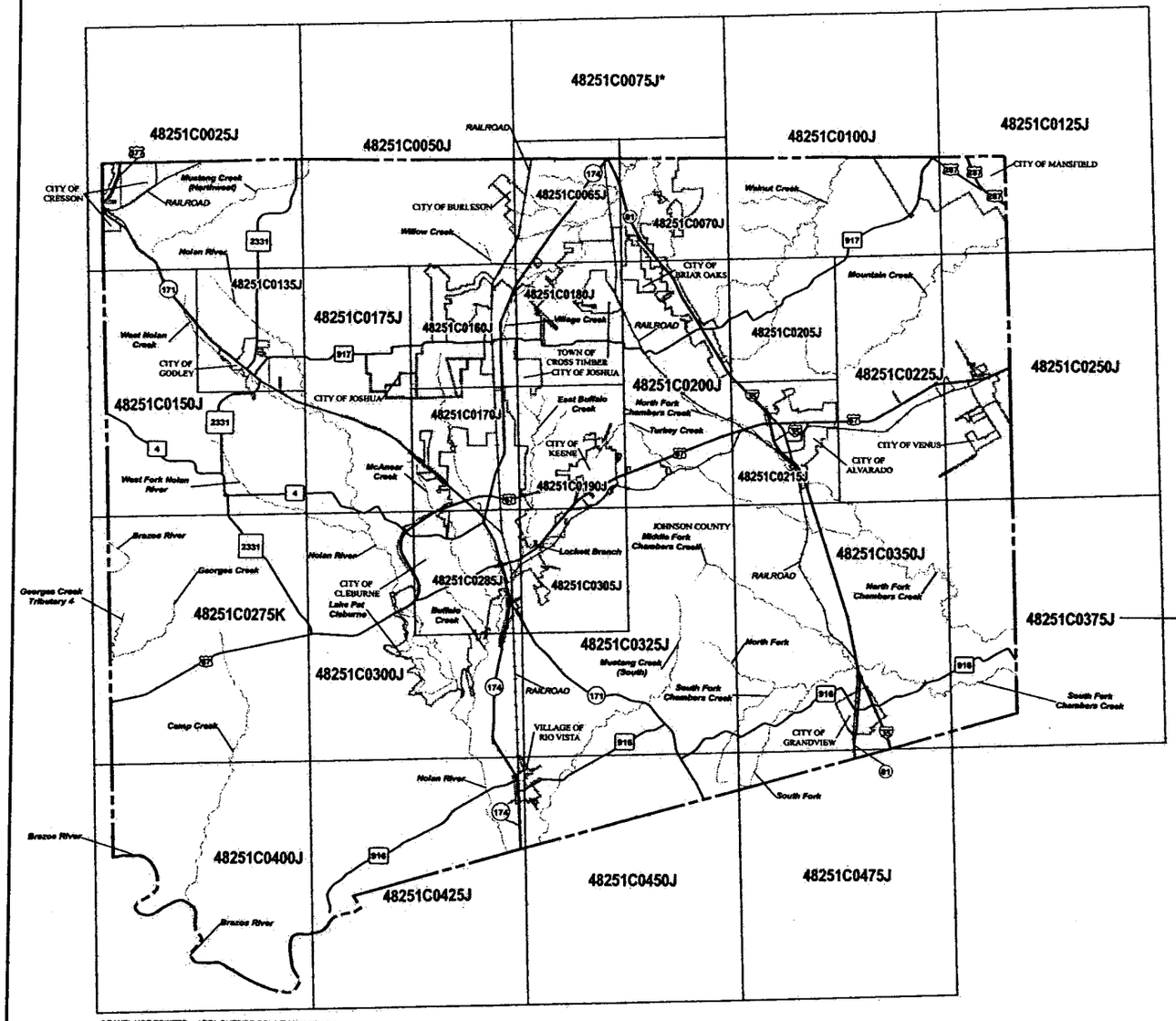
ORDINANCE BECOMES EFFECTIVE: March 27, 2019
(effective date)

I, the undersigned, Roger Harmon, County Judge, do hereby certify that the above is a true and correct copy of an order duly adopted by the Commissioners Court of Johnson County, Texas, at a regular meeting duly convened on March 27, 2019, 2019.

_____
Roger Harmon
County Judge

ATTEST: _____
Becky Ivey
County Clerk

COMMISSIONERS COURT ☆ JOHNSON COUNTY, TEXAS ☆



* PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY

BURLESON, CITY OF	485459	0050, 0065, 0070, 0100, 0120, 0200, 0205	November 2, 1973	November 2, 1973	November 3, 1983	December 4, 2012
CLEBURNE, CITY OF	480482	0170, 0175, 0190, 0285, 0300, 0305	June 23, 1972	July 13, 1972	July 13, 1972	December 4, 2012
*CRESSON, CITY OF	480177	0025	May 17, 1977	May 17, 1977	September 27, 1991	December 4, 2012
*CROSS TIMBER, TOWN OF	481605	0100, 0200	May 17, 1977	May 17, 1977	September 27, 1991	December 4, 2012
GODLEY, CITY OF	480650	0025, 0135, 0150, 0175	August 22, 1975	August 22, 1975	September 27, 1991	December 4, 2012
*GRANDVIEW, CITY OF	480891	0300	May 17, 1977	May 17, 1977	September 27, 1991	December 4, 2012
JOHNSON COUNTY (UNINCORPORATED AREAS)	480879	0025, 0050, 0065, 0070, 0100, 0125, 0135, 0150, 0160, 0170, 0175, 0180, 0190, 0200, 0205, 0215, 0225, 0250, 0275, 0285, 0300, 0305, 0325, 0350, 0375, 0400, 0425, 0450, 0475	May 17, 1977	May 17, 1977	September 27, 1991	April 5, 2019
JOSHUA, CITY OF	480662	0150, 0170, 0175, 0180, 0190	June 27, 1975	June 27, 1975	September 27, 1991	December 4, 2012
KEENE, CITY OF	481197	0150, 0200, 0205	June 4, 1976	June 4, 1976	September 27, 1991	December 4, 2012
MANSFIELD, CITY OF	480606	0100, 0125	February 22, 1974	February 22, 1974	December 15, 1983	December 4, 2012
*RIO VISTA, VILLA OF	481159	0300, 0400, 0450	May 17, 1977	May 17, 1977	September 27, 1991	December 4, 2012
VENUS, CITY OF	480883	0225, 0250	September 27, 1991	September 27, 1991	September 27, 1991	December 4, 2012

*This community did not have its own FIRM prior to the initial countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Johnson County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the Johnson County FIRM.

MAP REPOSITORIES

(Maps available for reference only, not for distribution.)

ALVARADO, CITY OF:
City Hall
104 West College Street
Alvarado, Texas 76009

BRIAR OAKS, CITY OF:
Johnson County Public Works Department, Johnson County Annex
2 North Main Street
Cleburne, Texas 76033

BURLESON, CITY OF:
City Hall
141 West Renfro Street
Burleson, Texas 76028

CLEBURNE, CITY OF:
City Hall
10 North Robinson Street
Cleburne, Texas 76033

CRESSON, CITY OF:
City Hall
8901 East U.S. Highway 377
Cresson, Texas 76035

CROSS TIMBER, TOWN OF:
Town Hall
141 West Renfro Street
Cross Timber, Texas 76206

GODLEY, CITY OF:
City Hall
104 South Main Street
Godley, Texas 76044

GRANDVIEW, CITY OF:
City Hall
304 East Criner Street
Grandview, Texas 76050

JOHNSON COUNTY (UNINCORPORATED AREAS):
Johnson County Public Works Department, Johnson County Annex
2 North Mill Street Suite 305
Cleburne, Texas 76033

JOSHUA, CITY OF:
City Hall
101 South Main Street
Joshua, Texas 76058

KEENE, CITY OF:
City Hall
100 North Mockingbird Lane
Keene, Texas 76059

MANSFIELD, CITY OF:
City Hall
1200 East Broad Street
Mansfield, Texas 76063

RIO VISTA, VILLAGE OF:
City Hall
201 South Highway 174
Rio Vista, Texas 76093

VENUS, CITY OF:
City Hall
105 East Highway 67
Venus, Texas 76084

MAP NUMBER

NOTE TO USER

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated April 5, 2019 or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" columns in the Listing of Communities table to determine the most recent FIRM Index date for each community.

MAP DATES

This FIRM index displays the map date for each FIRM panel at the time that this index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center (MSC) website at http://msc.fema.gov, or by calling the FEMA Map Information eXchange (FMIX) at 1-877-336-2627.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

FIRM Panel Dates For Printed Panels of Johnson County, TX and Incorporated Areas

PANEL	EFFECTIVE DATE	PANEL	EFFECTIVE DATE	PANEL	EFFECTIVE DATE
0025J	December 4, 2012	0175J	December 4, 2012	0300J	December 4, 2012
0050J	December 4, 2012	0180J	December 4, 2012	0305J	December 4, 2012
0065J	December 4, 2012	0190J	December 4, 2012	0325J	December 4, 2012
0075J	December 4, 2012	0200J	December 4, 2012	0350J	December 4, 2012
0100J	December 4, 2012	0205J	December 4, 2012	0375J	December 4, 2012
0125J	December 4, 2012	0215J	December 4, 2012	0400J	December 4, 2012
0135J	December 4, 2012	0225J	December 4, 2012	0425J	December 4, 2012
0150J	December 4, 2012	0250J	December 4, 2012	0450J	December 4, 2012
0160J	December 4, 2012	0275K	April 5, 2019	0475J	December 4, 2012
0170J	December 4, 2012	0285J	December 4, 2012		

NFIP

FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM

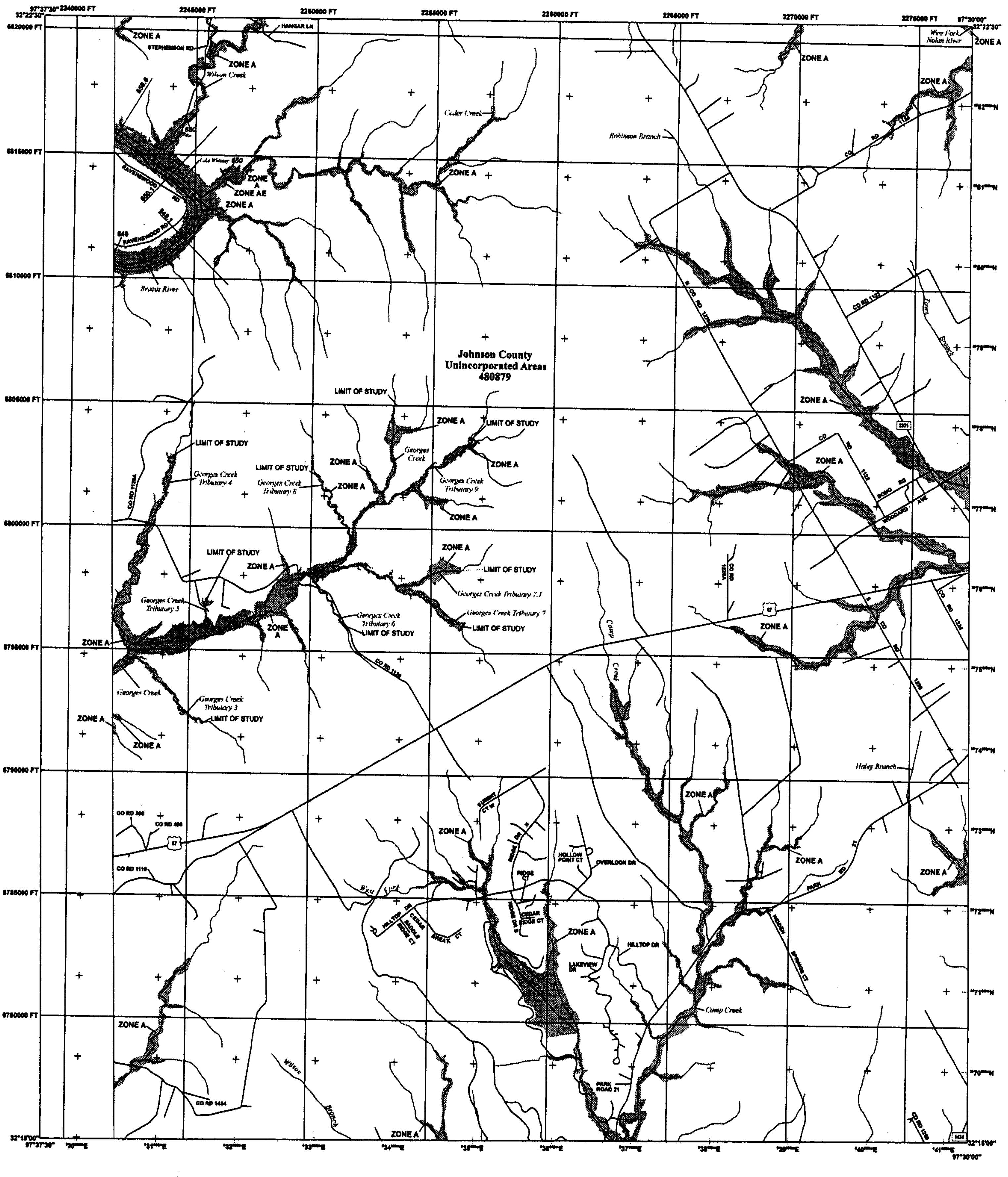
FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, TEXAS AND INCORPORATED AREAS

(SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

PANELS PRINTED: 25, 50, 65, 70, 100, 125, 135, 150, 160, 170, 175, 180, 190, 200, 205, 215, 225, 250, 275, 285, 300, 305, 325, 350, 375, 400, 425, 450, 475



) HAZARD INFORMATION

REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

NFORMATION DEPICTED ON THIS MAP AND SUPPORTING MENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

OOD REAS		Without Base Flood Elevation (BFE) *Zone A, V, A99* With BFE or Depth *Zone AE, AO, AH, VE, AR*
		Regulatory Floodway
S OF ARD		0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
		Future Conditions 1% Annual Chance Flood Hazard *Zone X*
		Area with Reduced Flood Risk due to Levee See Notes *Zone X*
THER REAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
		Area of Undetermined Flood Hazard *Zone D*
ERAL URES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
THER URES	(E) 18.2 / 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
	(8) - - - -	Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
	513	Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM including historic versions, the current map date for each FIRM panel, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided by the Texas Natural Resources Information System (TNRIS). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2004.

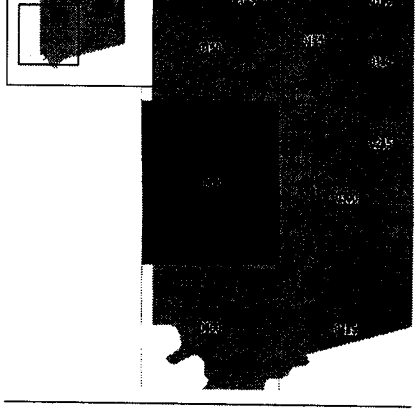
SCALE

Map Projection:
Texas State Plane North Central Zone (FIPS Zone 4202); North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

0 2,000 4,000 8,000 Feet

0 500 1,000 2,000 Meters

PANEL LOCATOR



FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE P
FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, TEXAS
And Incorporated Areas

PANEL 275 OF 475

Panel Contains:

COMMUNITY	NUMBER	PA
JOHNSON COUNTY	480879	027

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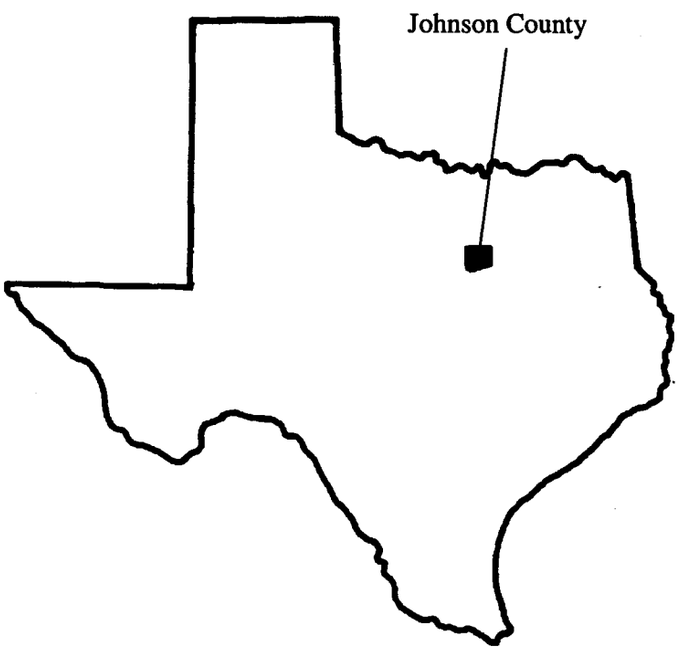
4825

APRI

FLOOD INSURANCE STUDY

JOHNSON COUNTY, TEXAS
AND INCORPORATED AREAS
VOLUME 1 OF 2

Community Name	Community Number
JOHNSON COUNTY UNINCORPORATED AREAS	480879
ALVARADO, CITY OF	480397
BRIAR OAKS, CITY OF	480398
BURLESON, CITY OF	485459
CLEBURNE, CITY OF	485462
CRESSON, CITY OF	480177
CROSS TIMBER, TOWN OF	481685
GODLEY, CITY OF	480880
GRANDVIEW, CITY OF	480881
JOSHUA, CITY OF	480882
KEENE, CITY OF	481107
MANSFIELD, CITY OF	480606
RIO VISTA, VILLAGE OF	481159
VENUS, CITY OF	480883



Revised: April 5, 2019

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
48251CV001B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

First Countywide FIS Effective Date: September 27, 1991
First Revised Countywide FIS Revision Date: January 6, 1993
Second Revised Countywide FIS Revision Date: January 6, 1999
Third Revised Countywide FIS Revision Date: December 4, 2012
Fourth Revised Countywide FIS Revision Date: April 5, 2019 - to add and change Special Flood Hazard Areas, and to reflect updated topographic information.

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April 5, 2019
VOLUME 1

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FLOOD INSURANCE STUDY
JOHNSON COUNTY, TEXAS AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Johnson County, including the Cities of Alvarado, Briar Oaks, Burleson, Cleburne, Cresson, Godley, Grandview, Joshua, Keene, Mansfield, and Venus; the Town of Cross Timber; the Village of Rio Vista, and the unincorporated areas of Johnson County (referred to collectively herein as Johnson County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that the City of Burleson is geographically located in Johnson and Tarrant counties; the City of Cresson is geographically located in Hood and Johnson counties; the City of Mansfield is geographically located in Ellis, Johnson and Tarrant counties; and the City of Venus is geographically located in Ellis and Johnson counties.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence, and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Johnson County

In the original countywide study effective September 27, 1991, the hydrologic and hydraulic analyses were performed by the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) (formerly known as Soil Conservation Service), for the Federal Emergency Management Agency (FEMA), for the portions of the following streams that lie within the unincorporated areas of the county: East Buffalo Creek, East Buffalo Creek Tributary A, East Buffalo Creek Tributary B, King Branch, Valley Branch, Valley Branch Tributary A, Walnut Creek, Walnut Creek Tributary A, and Walnut Creek Tributary B. This work was carried out under Interagency Agreement No. EMW-87-E-2511. That study was completed in October 1988 (Reference 1).

The original countywide study also included hydrologic and hydraulic analyses, performed during the preparation of the FIS for the City of Burleson, for the portions of the following streams that lie within the unincorporated areas of the county: Bypass

Creek, Quil Miller Creek, Shannon Creek, South Shannon Creek, Village Creek, and Willow Creek (Reference 1).

City of Burleson

The hydrologic and hydraulic analyses for the study effective June 24, 1977 were performed by the Fort Worth District of the U.S. Army Corps of Engineers (USACE), for FEMA, under Interagency Agreement No. IAA-H-16-75, Project Order No. 14 and Interagency Agreement No. IAA-H-7-76, Project Order No. 19. That study was completed in April 1976 (Reference 1).

The hydrologic and hydraulic analyses for the study effective December 3, 1987 were performed by the USACE, for FEMA, under Interagency Agreement No. EMW-E-1153, Project Order No. 1, Amendments No. 30 and No. 30a. That study was completed in September 1985 (Reference 2).

In the countywide study effective January 6, 1999, the hydrologic and hydraulic analyses for Hurst Creek, Little Booger Creek, and South Shannon Creek in the City of Burleson were performed by USDA-NRCS, for FEMA, under Interagency Agreement No. EMW-89-E-2995, Project Order No. 1. That study was completed in January 1992 (Reference 1).

City of Cleburne

The hydrologic and hydraulic analyses for the study effective September 30, 1980 were performed by Freese and Nichols, Inc./Randy and Associates, Inc., for FEMA, under Contract No. H-4570. That study was completed in April 1978 (Reference 1).

For the revision effective May 17, 1989, hydrologic and hydraulic analyses for West Buffalo Creek were performed by USDA-NRCS under agreement with FEMA. That study was completed in February 1987. The study also included a floodway analyses for West Buffalo Creek prepared by Dewberry & Davis and based on data developed by the USDA-NRCS as part of the existing hydraulic analysis. That study was completed in March 1988 (Reference 3).

In the countywide study effective January 6, 1993, hydrologic and hydraulic analyses for Unnamed Stream in the City of Cleburne were performed by USDA-NRCS, for FEMA, under Interagency Agreement No. EMW-89-2995, Project Order No. 1. That study was completed in April 1991 (Reference 1).

City of Mansfield

The hydrologic and hydraulic analyses for the study effective December 18, 1985, were performed by the USACE for FEMA, under Interagency Agreement No. EMW-E-0539, Project Order No. 6. That study was completed in January 1983. The hydraulic analyses for the revisions dated September 28, 1990, were performed by Carter & Burgess, Inc. FEMA reviewed and accepted those analyses for the purposes of that revision (Reference 1).

The Low Branch hydraulic study within the City of Mansfield was incorporated in this study as "Best Available" floodplain study data. Teague Nall & Perkins (TNP) prepared a

new detailed hydraulic model using the USACE Hydrologic Engineering Center (HEC) step-backwater computer program HEC-2 (Reference 4) as part of the City of Mansfield's Master Drainage Plan for Low Branch. Nave Engineering, Inc., in cooperation with Halff Associates, Inc., converted the TNP HEC-2 model to a HEC River Analysis System (HEC-RAS) model and updated the mapping, profiles, and floodway data information. The hydraulic analysis for this restudy was based on the prior effective FIS discharges.

This map revision was prepared for FEMA by Risk Assessment, Mapping, and Planning Partners (RAMPP), under FEMA Indefinite Delivery/ Indefinite Quantity (IDIQ) Contract Partners Contract No. HSHFEHQ-09-D-0369. This study revision was completed on April 29, 2016.

Base map information shown on the FIRM was provided by the Texas Natural Resources Information System (TNRIS). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2004.

This data is referenced to the State Plane Coordinate System, Texas State Plane North Central Zone (FIPS Zone 4202). Horizontal distances are measured in feet using the North American Datum 1983 (NAD83), GRS 1980 Spheroid. Differences in the datum and the spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

1.3 Coordination

The initial Consultation Coordination Officer (CCO) meeting was held on May 4, 2007 and attended by representatives of FEMA; the Cities of Alvarado, Briar Oaks, Burleson, Cleburne, Joshua, and Mansfield; Halff Associates, Inc.; Johnson County; Johnson County Appraisal District; Texas Department of Transportation (TxDOT); and the Village of Rio Vista.

The results of the study were reviewed at the final CCO meeting held on May 6, 2010 and attended by representatives of FEMA; Childress Engineers; the Cities of Alvarado, Burleson, Cleburne, Cresson, Godley, Grandview, Joshua, and Venus; Dumas Lano Surveying; Halff Associates, Inc.; Johnson County; Keene Fire Department; and the Texas Water Development Board. All concerns raised at that meeting have been addressed in this study.

The initial CCO meeting was held on June 28, 2012, attended by FEMA, RAMPP, Brazos River Authority (BRA), and a representative of Johnson County. The results for this revision were reviewed at the final CCO meeting held on March 29, 2017 and attended by FEMA and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Johnson County, Texas, including the incorporated communities listed in Section 1.1. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction through June 2009.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and community officials.

The flooding sources studied by detailed methods along with the limits of study are shown in Table 1, "Scope of Study."

Table 1 – Scope of Study
Stream Reaches Studied by Detailed Methods

Stream Name	Downstream Limit	Upstream Limit	Length (mi)
New Detailed Study Streams			
Low Branch	Tarrant County/ Johnson County	70 feet upstream of U.S. Business Highway 287	0.34
Redelineated Detailed Study Streams			
Brazos River	At the boundary of Erath/ Johnson Counties	At the Boundary of Erath/ Johnson Counties	1.90
Bypass Creek	Confluence with Quil Miller Creek	Interstate Highway 35W Southbound Frontage Road	1.43
East Buffalo Creek	Confluence of Unnamed Stream	1.02 miles upstream of County Road 704 / F.M. 3048	11.23
East Buffalo Creek Tributary A	Confluence with East Buffalo Creek	0.76 miles upstream of confluence with East Buffalo Creek	0.76
East Buffalo Creek Tributary B	Confluence with East Buffalo Creek	0.58 miles upstream of F.M. 3048	1.96
Hurst Creek	Confluence with Quil Miller Creek	135 feet upstream of Interstate Highway 35W Northbound Frontage Road	2.17
King Branch	Confluence with Walnut Creek	1.08 miles upstream of County Road 519	1.93
Little Booger Creek	Confluence with Village Creek	730 feet upstream of Marcia Lane	3.08
Lockett Branch	Confluence with East Buffalo Creek	0.84 miles upstream of Henderson Street	1.45
McAnear Creek	Confluence with East Buffalo Creek	County Road 1216	4.82

Table 1 – Scope of Study (Continued)
Stream Reaches Studied by Detailed Methods

Stream Name	Downstream Limit	Upstream Limit	Length (mi)
Redelineated Detailed Study Streams			
North Creek	Confluence with Village Creek	Johnson County/ Tarrant County	1.07
Quil Miller Creek	Confluence with Village Creek	65 feet upstream of Interstate Highway 35W Southbound Frontage Road	5.36
Shannon Creek	Confluence with Village Creek	0.55 miles upstream of Burlington Northern Santa Fe Railroad	3.65
South Shannon Creek	Confluence with Shannon Creek	90 feet upstream of Burlington Northern Santa Fe Railroad	2.80
Stream 3	Confluence with South Shannon Creek	County Road 714	0.27
Stream VC-8	Confluence with Village Creek	0.51 miles upstream of County Road 802	1.48
Stream VC-8A	Confluence with Stream VC-8	100 feet upstream of County Road 802	1.40
Unnamed Stream	800 feet upstream of confluence with East Buffalo Creek	1,300 feet upstream of Hyde Park Boulevard	2.28
Unnamed Tributary to Shannon Creek	Confluence with Shannon Creek	0.94 miles upstream of confluence with Shannon Creek	0.94
Valley Branch	Confluence with Walnut Creek	0.67 miles upstream of confluence of Valley Branch Tributary A	2.98
Valley Branch Tributary A	Confluence with Valley Branch	County Road 529	1.59
Village Creek	Tarrant County/ Johnson County	1,995 feet upstream of Lakeaire Drive and Dam	9.72
Walnut Creek	20 feet downstream of confluence of Valley Branch	1.08 miles upstream of confluence of Walnut Creek Tributary B	6.42

Table 1 – Scope of Study (Continued)
Stream Reaches Studied by Detailed Methods

Stream Name	Downstream Limit	Upstream Limit	Length (mi)
Redelineated Detailed Study Streams			
Walnut Creek Tributary A	Confluence with Walnut Creek	County Road 528	2.41
Walnut Creek Tributary B	Confluence with Walnut Creek	Interstate Highway 35W Northbound Frontage Road	4.15
West Buffalo Creek	Confluence with East Buffalo Creek	0.40 miles upstream of County Road 900	4.69
Willow Creek	Confluence with Village Creek	10 feet upstream of Burlington Northern Santa Fe Railroad	2.06

2.2 Community Description

Johnson County is located in the north-central part of Texas. It is bordered by Tarrant County to the north, Ellis County to the east, Hill County to the south, Bosque County to the southwest, Hood and Somervell counties to the west, and Parker County to the northwest (Reference 1).

The Caddo Indians lived in the county and surrounding areas. In 1839, the first settlers built homes along Chambers Creek. During the 1850's other pioneer families settled along the Brazos River. In 1854, Johnson County was created from parts of Ellis, Hill, and Navarro counties. The county was named after Colonel Middleton T. Johnson, a famous confederate soldier (Reference 5).

According to U.S. Census 2010 figures, the population of Johnson County was 159,990. This represents an increase in population of 6.9% since the 2000 census. The January 2006 estimate of Johnson County population was 146,162. There are 13 incorporated communities in the county; their population estimates are as follows: City of Alvarado (3,975), City of Briar Oaks (484), City of Burleson (42,228), City of Cleburne (30,741), City of Cresson (778), Town of Cross Timber (275), City of Godley (1,062), City of Grandview (1,605), City of Joshua (6,136), City of Keene (6,176), City of Mansfield (62,809), Village of Rio Vista (929), and City of Venus (3,282) (References 6 and 7).

Johnson County is the leading dairy producer in the state of Texas. Cattle, hay, horses, cotton, sorghum, wheat, oats, and hogs are among the main agribusiness present in the county. Railroad, shops, manufacturing, distribution, and lake activities drive the economy of the county. Burleson has experienced rapid industrial, business, and residential growth in the past few years, and it is anticipated that this will continue at its present rate or accelerate in the foreseeable future (Reference 7). Development within the unincorporated areas of the county is limited to homes with small acreages (Reference 1).

Johnson County is composed of several soil formations. The Bolar-Brackett-Aledo soil association is composed of very shallow to moderately deep, moderately alkaline loamy, stony and gravelly soils that are susceptible to water erosion. It can be found on strongly sloping to deep soils on uplands. The Minwells-Bastrop-Yahola soil association is composed of slightly acid to moderately alkaline loamy soils. It can be found on the Brazos River floodplains. The shrinking and swelling of the soil with changes in moisture and the slow permeability are the main limitations of the soil (Reference 5).

Johnson County lies in a region of temperate mean climatological conditions, experiencing occasional extremes of temperature, and rainfall of relatively short duration (Reference 1).

The average annual rainfall based on the City of Cleburne gage is 36.25 inches. The wettest month is May having an average of 5.11 inches. The driest month is January having an average of 1.90 inches (Reference 7).

The average annual temperature is 65.8 degrees Fahrenheit (°F). The hottest month of the year is July having an average daily high temperature of 97.0 °F. The coldest month of the year is January having an average daily low temperature of 34.0 °F. The recorded temperature extremes range from a maximum of 114 °F in 1939 to a minimum of -8 °F in 1899 (References 7 and 8).

2.3 Principal Flood Problems

Generally, major floods experienced in the area are produced by heavy rainfall from frontal storms that occur in the spring and the summer. Major floods, however, can also be caused by the intense rainfall usually associated with localized thunderstorms, which also occur mainly during the warm months (Reference 1).

Three major floods have occurred within the county in the past 30 years, in the spring of 1987; on May 3, 1979; and from May 6-7, 1989. The recurrence intervals of these floods were all estimated at the 4-percent-annual-chance flood (Reference 1).

Low-lying areas of the City of Burleson are subject to periodic flooding caused by overflow of Village Creek and its tributaries. There are no existing stream gaging stations in the Village Creek Watershed; however, there was a gage in the lower reaches of Village Creek during the period of June 1925 through March 1930 (Reference 9). The description for this gage indicates that the flood of April 1922 was the largest flood known at that time. Subsequent information obtained from residents and newspaper accounts indicates that the floods of May 1949 and April 1957 were approximately the same magnitude as the 1922 flood. Other floods of lesser magnitude occurred on Village Creek in 1916, 1962, 1964, 1965, 1968, 1969, 1970, 1976, 1977, 1979, and 1985 (Reference 1).

According to city officials, Little Booger Creek overflowed its banks on May 27, 1976, when 4 inches of rain fell in approximately two hours on the Little Booger Watershed. Also, 4 inches of rain fell on April 28 and 29, 1985, in the Shannon Creek Watershed. According to city officials, some structures were flooded (Reference 1).

The City of Cleburne has experienced several damaging floods in the past, most of them occurring along the streams studied by detailed methods. During May 1969, several days of flooding occurred. High-water marks have been established in the city by the USACE based upon the May 1969 flood. From measured discharges, this flood is estimated to

have a 2-percent probability of occurring in any one-year period (Reference 1).

On May 3, 1979, Cleburne experienced a 6-inch rain that caused both branches of Buffalo Creek to flood. The storm lasted approximately eight hours and caused a total of $1,473,162.00 in damages (Reference 1).

Within the City of Mansfield, historical flood information for Walnut Creek has been documented since the turn of the century. The highest flood stage of this period is thought to have occurred on May 25, 1922, although the elevation is unknown. Another large flood occurred on September 26-27, 1936, when 7.47 inches of rain fell in two days. The United States Geological Survey (USGS) established a water-stage recording gage on Walnut Creek at County Road 2016 in September 1960. Since the installation of the gage, the highest stage of 559.1 feet was recorded during the floods of May 6-7, 1969, and June 4, 1973 (Reference 1).

On April 4, 1997, numerous roads were reported flooded throughout the county. An underpass on Highway 171 south of the City of Cleburne was flooded and barricaded (Reference 10).

On September 5, 2007, forty to fifty high water rescues were required between the Cities of Keene and Venus. Portions of Highway 171 in the City of Cleburne and Highway 287 were flooded, and a total of 17 roads were closed. The worst flooding was reported between Highway 67 and F.M. 917 near the unincorporated community of Lillian (Reference 11).

2.4 Flood Protection Measures

Within the City of Burleson, nonstructural measures of flood protection in the form of land use regulations are being used to aid in the prevention of future flood damages (Reference 1).

Channelization is one structural measure being used to help rectify flood problems on Hurst Creek, Little Booger Creek, North Creek, Shannon Creek, South Shannon Creek, and Village Creek. In addition, there are four dams within the City of Burleson. Mountain Valley Estates Dam and Lakeaire Dam are both located along Village Creek. Also, Mountain Valley Estates Dams are located on Streams VC-8 and VC-8A. These dams do not provide any flood control protection (Reference 1).

The City of Cleburne also administers flood protection measures. Once a year, designated areas along the creeks are cleared of underbrush and collected debris. City ordinances control development of the 1-percent-annual-chance floodplain. Unnamed Stream is an unlined channel. Sections of the stream channel have been changed with channelization, concrete weirs, and culverts. Some of these improvements will affect the base flood. All existing structures and improvements were considered when the hydrologic and hydraulic analyses were made (Reference 1).

Within the City of Mansfield, Low Branch, near old State Route 287, has undergone channel improvements. Land use regulations are also used by the City of Mansfield to aid in the prevention of future flood damage (Reference 1).

There are no structural flood protection measures within the unincorporated areas of Johnson County (Reference 1).

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the county.

This Revision

For this revision, hydrologic analyses are carried out to establish peak discharge-frequency relationships for each of flooding source for all scoped streams in this approximate (Zone A) study within Johnson County, Texas and Incorporated Areas.

3.1.1 Redelineated Detailed Study Streams

The redelineated streams were initially studied by detailed methods. These flooding sources include all those listed in Table 1, "Scope of Study."

Information on the methods used to determine peak discharge-frequency relationships for the streams studied by detailed methods is shown below. The incorporated communities with detailed studies are listed in alphabetical order; methodologies are described for each community. For streams that flow through two or more communities, each methodology described applies only to that portion of the stream studied by detailed methods within that particular community.

The previously printed FIS for Hood County dated August 16, 2012 included a study of the Brazos River. The 10-, 2-, and 1-percent-annual-chance flood hydrographs for the Brazos River downstream of the DeCordova Bend Dam were developed from a volume-duration frequency analysis using the October 1981 flood at the Dennis gage as a pattern hydrograph and a period of record of stream flow from 1941 to 1983 for the USGS stream gaging stations on the Brazos River near Dennis and Glen Rose (References 23 and 24). Discharges were taken from the Hood County FIS dated August 16, 2012 for the Brazos River.

The previously printed FIS for the City of Burleson considered the following streams: Bypass Creek, Hurst Creek, Little Booger Creek, North Creek, Quil Miller Creek, Shannon Creek, South Shannon Creek, Stream 3, Stream VC-8, Stream VC-8A, Village Creek, and Willow Creek (Reference 2). During the preparation of that study, detailed hydrologic analyses were carried out for portions of Bypass Creek, Quil Miller Creek,

Shannon Creek, South Shannon Creek, Village Creek, and Willow Creek that are located in the unincorporated areas of the county (Reference 1).

In that study, the computer program NUDALLAS was used to develop the hydrology (Reference 12). The watersheds were divided into sub-basins, and synthetic unit and flood hydrographs were developed at selected locations. U.S. Weather Bureau Technical Paper No. 40 and National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum National Weather Service (NWS) Hydro-35 was used in developing the 10-, 2-, and 1-percent-annual-chance storms (References 14 and 15). Discharges for the 0.2-percent-annual-chance flood were determined by straight-line extrapolation of the logarithmic probability graphs of flood discharges computed for frequencies up to the 1-percent-annual-chance. Peak discharge-frequency values were computed for selected locations. Routing of the flood hydrographs through each sub-basin reach on the detailed study streams was accomplished using a modified PULS reservoir routing. The HEC-2 step-backwater model provided the elevation-discharge-storage relationships for each reach on all streams (Reference 4). There are no stream gages to calibrate the hydrology on any of the streams studied (Reference 1).

The previously printed FIS for the City of Cleburne considered the following streams: East Buffalo Creek, Lockett Branch, McAnear Creek, Unnamed Stream, and West Buffalo Creek (Reference 3). In that study, discharges for East Buffalo Creek, Lockett Branch, McAnear Creek, and West Buffalo Creek, were determined by the USACE using unit hydrograph coefficients based on the May 1969 flood and on data developed in studies on adjacent streams. These coefficients, together with rainfall data published by the National Weather Service, were used to compute runoff hydrographs for the community. For the portions of West Buffalo Creek revised in the study effective May 17, 1989, the USDA-NRCS Technical Release No. 20 (TR-20) model was used to determine discharges for the selected recurrence intervals (References 1 and 16).

In the original countywide study, hydrologic analyses were carried out for the following streams, within the unincorporated areas of Johnson County: East Buffalo Creek, East Buffalo Creek Tributary A, East Buffalo Creek Tributary B, King Branch, Valley Branch, Valley Branch Tributary A, Walnut Creek, Walnut Creek Tributary A, and Walnut Creek Tributary B. The hydrologic evaluations were based on synthetic frequency methods. Rainfall frequency data were obtained from Technical Paper No. 40 (Reference 14). Values greater than the 1-percent-annual-chance frequency were determined by extrapolating data on standard log-log paper. For all streams within the county, peak discharge values for various frequencies were determined using the USDA-NRCS TR-20 computer program (Reference 16). In some cases, downstream discharges decrease because of overbank storage effects (Reference 1).

Also, in the January 6, 1999 countywide study, hydrology for Low Branch within the City of Mansfield was developed using the computer program NUDALLAS (Reference 12). The watershed being studied was divided into sub-basins, and synthetic unit and flood hydrographs were developed at selected locations. Technical Paper No. 40 was used in developing the 10-, 2-, and 1-percent-annual-chance storms (Reference 14). The 0.2- percent-annual-chance flood was based on extrapolated data. Routing of the flood hydrographs through each sub-basin was accomplished using a modified PULS reservoir routing method. The USACE HEC-2 step-backwater model provided the elevation- discharge-storage relationships (References 1 and 4).

In the original countywide study, the USDA-NRCS provided data on the George Marti Dam on West Buffalo Creek within the City of Cleburne. This data supported a 1-

percent-annual-chance water surface elevation of 834.8 feet North American Vertical Datum of 1988 (NAVD) for the lake formed by the dam (Reference 1).

For the hydrologic analyses for Unnamed Stream in the January 6, 1993, countywide revision, the rainfall frequency data were obtained from the U.S. Weather Bureau Technical Paper No. 40 (Reference 14). The peak discharges were determined by routing various storm frequencies with a 24-hour rainfall duration using USDA-NRCS TR-20 (References 1 and 16).

In the previous countywide revision, the rainfall frequency data were obtained for Hurst Creek, Little Booger Creek, and South Fork Shannon Creek, from the U.S. Weather Bureau Technical Paper No. 40 (Reference 14). The peak discharges were determined by routing various storm frequencies with a 24-hour rainfall duration using the USDA-NRCS TR-20 (References 1 and 16).

Peak discharge-drainage area relationships for streams studied by detailed methods are shown in Table 2, "Summary of Discharges."

Table 2 – Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mile)	PEAK DISCHARGES (cfs) 10% Annual Chance	2 % Annual Chance	1% Annual Chance	0.2% Annual Chance
BYPASS CREEK					
At confluence with Quil Miller Creek	3.72	3,600	4,950	5,500	6,750
EAST BUFFALO CREEK					
Approximately 550 feet downstream of confluence of West Buffalo Creek	48.10	13,700	24,000	30,700	55,800
Approximately 20 feet downstream of Watters Street	31.50	9,600	16,800	20,900	38,100
Approximately 1,400 feet upstream of confluence of Lockett Branch	25.30	8,100[1]	14,000	17,700	31,100
Approximately 5.7 miles upstream of confluence of Unnamed Stream	22.69	8,232[1]	13,351	16,193	30,520
Approximately 6.4 miles upstream of confluence of Unnamed Stream	21.63	8,243[1]	13,343	16,171	30,427
At County Road 700	21.08	8,257	13,335	16,146	30,320
At County Road 701	17.74	7,771	12,188	14,646	26,764
At County Road 801	5.57	2,305	3,594	4,315	8,108
At County Road 705	2.69	1,720	2,647	3,142	5,562
EAST BUFFALO CREEK TRIBUTARY A					
Approximately 0.47 miles upstream of confluence with East Buffalo Creek	1.40	1,047	1,606	1,907	3,384
Approximately 0.76 miles upstream of confluence with East Buffalo Creek	1.16	924	1,416	1,679	2,965

Table 2 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mile)	PEAK DISCHARGES (cfs) 10% Annual Chance	2 % Annual Chance	1% Annual Chance	0.2% Annual Chance
EAST BUFFALO CREEK TRIBUTARY B					
Approximately 1,150 feet upstream of confluence with East Buffalo Creek	3.28	2,330	3,551	4,218	7,321
At F.M. 3048	1.67	1,232	1,884	2,236	3,919
Approximately 1.96 miles upstream of confluence with East Buffalo Creek	0.94	716	1,098	1,303	2,302
HURST CREEK					
At confluence with Quil Miller Creek	1.19	1,650	2,250	2,550	3,100
At confluence of unnamed tributary, approximately 0.57 miles upstream of County Road 532	0.87	1,300	1,750	1,950	2,400
Approximately 430 feet downstream of County Road 601	0.50	562	1,152	1,387	1,937
At County Road 601	0.34	659	1,032	1,197	1,585
Approximately 825 feet below Interstate Highway 35W Northbound Frontage Road	0.10	230	337	388	509
Below Interstate Highway 35W Northbound Frontage Road	0.07	161	237	273	359
KING BRANCH					
Approximately 2,150 feet upstream of confluence with Walnut Creek	3.31	2,022[1]	2,932[1]	3,399[1]	6,150[1]
At County Road 519	3.19	2,029[1]	2,960[1]	3,440[1]	6,208[1]
At pipeline approximately 1.9 miles upstream of confluence with Walnut Creek	2.37	2,086	3,198	3,794	6,697
LITTLE BOOGER CREEK					
At confluence with Village Creek	2.26	2,700[1]	3,350[1]	3,650[1]	4,450[1]
At State Highway 174	1.77	2,900	3,600	3,950	4,950
Approximately 1,000 feet upstream of Southwest Thomas Road	0.97	1,650	2,150	2,400	2,950
Downstream side of Southwest Alsbury Boulevard	0.61	1,088	1,571	1,799	2,347
Approximately 1,500 feet upstream of Southwest Alsbury Boulevard	0.34	665	907	1,013	1,128
Approximately 3,150 feet upstream of Southwest Alsbury Boulevard	0.17	*	*	432	*
LOCKETT BRANCH					
Approximately 955 feet upstream of confluence with East Buffalo Creek	6.20	3,200	5,300	6,400	10,000

Table 2 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mile)	PEAK DISCHARGES (cfs) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
LOW BRANCH					
At State Highway 496	0.70	1,700	2,200	2,400	3,050
MCANEAR CREEK					
Approximately 740 feet upstream of confluence with East Buffalo Creek	6.60	3,600	6,000	7,100	11,100
At upstream side of U.S. Business Highway 67	5.40	3,300	5,200	6,400	9,200
At upstream side of Kilpatrick Avenue	2.80	2,700	4,200	4,800	6,200
NORTH CREEK					
At confluence with Village Creek	2.98	2,850	4,150	4,850	6,150
At confluence of unnamed tributary, approximately 0.85 miles downstream of Interstate Route 35W	2.05	1,750[1]	2,800[1]	3,200[1]	4,050[1]
At Interstate Route 35W	1.76	2,200	3,150	3,950	4,350
At Missouri-Kansas-Texas Railroad	1.27	1,650	2,100	2,350	2,800
At Northeast Alsbury Boulevard	0.73	1,350	1,850	2,050	2,550
Approximately 600 feet downstream of McAlister Road	0.47	1,100	1,450	1,600	2,050
QUIL MILLER CREEK					
At confluence with Village Creek	24.13	9,700[1]	15,350	18,300	24,200
Downstream of confluence of Hurst Creek	22.46	9,550[1]	14,950	17,700	23,050
Upstream of confluence of Hurst Creek	21.27	9,400[1]	14,600[1]	17,100[1]	22,150[1]
At confluence of unnamed tributary approximately 0.64 miles upstream of Old Alvarado Highway	20.89	9,850	14,850	17,350	22,250
Downstream of confluence of Bypass Creek	16.86	8,250	12,250	14,100	17,900
Upstream of confluence of Bypass Creek	13.14	6,450[1]	9,500[1]	11,000[1]	13,950[1]
Upstream of Interstate Highway 35W	11.65	6,750	9,700	11,100	14,000
SHANNON CREEK					
Immediately downstream of confluence of South Shannon Creek	8.33	6,750	9,550	11,000	13,950
Immediately upstream of confluence of South Shannon Creek	6.32	4,900	7,000	8,050	10,250
Downstream of confluence of unnamed tributary approximately 0.76 miles upstream of State Highway 174	5.13	4,400	6,200	7,050	8,850

Table 2 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mile)	PEAK DISCHARGES (cfs) 10% Annual Chance	2 % Annual Chance	1% Annual Chance	0.2% Annual Chance
SHANNON CREEK (CONTINUED)					
Upstream of confluence of unnamed Tributary, approximately 0.76 miles Upstream of State Highway 174	3.76	3,450	4,850	5,550	6,900
SOUTH SHANNON CREEK					
At confluence with Shannon Creek	1.33	1,450	2,090	2,380	2,940
At headwaters of South Shannon Creek	0.86	1,150	1,560	1,750	2,120
Approximately 1,800 feet downstream of Burlington Northern Santa Fe Railroad	0.47	867	1,323	1,544	2,071
Downstream side of Burlington Northern Santa Fe Railroad	0.08	102	187	231	340
STREAM 3					
At confluence with South Shannon Creek	1.95	2,350	3,250	3,650	4,600
STREAM VC-8					
At confluence with Village Creek	3.62	3,550[1]	5,250[1]	6,100	7,650
Downstream of confluence of Stream VC-8A	3.35	3,600	5,250	5,950	7,350
At confluence of Stream VC-8A	1.69	2,150	2,950	3,300	4,000
Approximately 1,700 feet upstream of County Road 802	1.49	2,150	2,900	3,200	3,900
STREAM VC-8A					
At confluence with Stream VC-8	1.66	1,550	2,400	2,750	3,450
At Mountain Valley Estates Dam	1.46	1,350	2,050	2,400	2,950
At the first crossing of County Road 802	1.09	1,450	1,950	2,200	2,650
UNNAMED STREAM					
At Sewage Disposal	1.51	1,719	2,634	3,067	4,020
At Country Club Road	1.31	1,955	2,836	3,248	4,141
At Westhill Drive	0.69	993	1,445	1,660	2,128
Below U.S. Business Highway 67	0.40	567	828	954	1,229

Table 2 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mile)	PEAK DISCHARGES (cfs) 10% Annual Chance	2 % Annual Chance	1% Annual Chance	0.2% Annual Chance
UNNAMED TRIBUTARY TO SHANNON CREEK					
At confluence with Shannon Creek	1.23	1,640	2,400	2,690	3,490
Approximately 2,000 feet upstream of confluence with Shannon Creek	0.89	1,190	1,770	1,990	2,600
VALLEY BRANCH					
Approximately 1,580 feet upstream of confluence with Walnut Creek	6.26	3,130[1]	5,189[1]	6,092[1]	12,130[1]
At F.M. 2738	6.13	3,178[1]	5,236[1]	6,169[1]	12,175[1]
At County Road 528	5.28	3,417	5,460	6,522	12,282
At County Road 529	2.47	2,789	4,268	5,058	8,906
VALLEY BRANCH TRIBUTARY A					
At County Road 608	1.84	1,386	2,154	2,577	4,707
Approximately 0.57 miles upstream of County Road 529	0.88	1,093	1,669	1,977	3,474
VILLAGE CREEK					
At confluence of Quil Miller Creek	31.65	12,600[1]	18,750[1]	22,100[1]	30,600[1]
At confluence of Sewage Disposal Tributary	27.72	12,050[1]	18,250[1]	21,750[1]	29,900[1]
Downstream of confluence of Little Booger Creek	26.90	12,200[1]	18,650[1]	22,150[1]	30,150[1]
At confluence of Little Booger Creek	24.64	11,950[1]	18,050[1]	21,250[1]	28,600[1]
Downstream of confluence of Shannon Creek	22.49	13,000	20,750	24,400	30,850
At confluence of Shannon Creek	14.16	9,450	14,750	17,050	21,750
At F.M. 731	11.87	8,550	13,150	15,100	18,850
Downstream of confluence of Stream VC-8	10.66	8,250	12,050	13,900	17,500
At confluence of Stream VC-8	7.04	5,200[1]	7,500[1]	8,650[1]	10,900[1]
Downstream of confluence of Willow Creek	6.68	5,350	7,600	8,700	10,900
Upstream of confluence of Willow Creek	2.11	2,350	3,250	3,600	4,400
WALNUT CREEK					
At the confluence of Valley Branch	29.33	10,180	15,771	20,141	41,272
At F.M. 2738	20.98	7,720	11,728	14,652	29,412
Approximately 0.64 miles upstream of confluence of Walnut Creek Tributary A	17.04	6,501	9,758	12,025	23,834
At County Road 608	13.53	6,117	9,338	11,314	21,399
At County Road 519	5.43	4,364	6,693	7,940	14,029

Table 2 – Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mile)	PEAK DISCHARGES (cfs) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
WALNUT CREEK TRIBUTARY A					
Approximately 1,575 feet upstream of confluence with Walnut Creek	2.83	2,341[1]	3,685[1]	4,487[1]	8,491
At County Road 608	2.53	2,458	3,816	4,587	8,397
At County Road 528	0.84	1,176	1,799	2,132	3,754
WALNUT CREEK TRIBUTARY B					
At County Road 604	4.76	2,767	4,313	5,160	10,269
At County Highway 600	3.02	2,137	3,215	3,821	7,136
At Forgotten Lane	1.15	1,376	2,145	2,542	4,478
At Interstate Highway 35W	0.43	790	1,196	1,412	2,458
WEST BUFFALO CREEK					
Approximately 75 feet downstream of Country Club Road	11.88	*	*	6,007	9,118
Approximately 62 feet downstream of Westhill Drive	11.73	*	*	5,852	8,882
Approximately 78 feet downstream of Wilson Street	11.05	*	*	5,123	7,771
Approximately 63 feet downstream of Kilpatrick Street	9.78	*	*	3,631	5,499
Approximately 82 feet upstream of State Highway 171	8.46	*	*	2,048	3,089
WILLOW CREEK					
At confluence with Village Creek	4.57	3,550	5,050	5,800	7,300
Upstream of confluence of unnamed tributary located just downstream of Burlington Northern Santa Fe Railroad	2.92	2,950	4,050	4,600	5,650
At Burlington Northern Santa Fe Railroad	2.05	2,000	2,800	3,150	3,850

[1]Decreased because of storage routing effects

*Data not computed

3.2 Hydraulic Analyses

The analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the FIRM.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

This Revision

For this revision, water surface elevations for the 1-percent-annual-chance floods were computed using HEC-RAS Version 4.1.0 (Reference 16).

3.2.1 New Detailed Study Streams

The Low Branch hydraulic study within the City of Mansfield was incorporated as "Best Available" floodplain study data. Water surface elevations were initially determined using the USACE HEC-2 step-backwater computer program (Reference 4). The HEC-2 model was converted to HEC-RAS for the FEMA Map Modernization Project. Cross sections were located at close intervals upstream and/or downstream of bridges and culverts in order to compute the significant backwater effects of those structures. The City of Mansfield master drainage study HEC-2 model was used to provide the channel geometry. The primary source of terrain data used for the overbank geometry was developed from the 2001 North Central Texas Council of Governments (NCTCOG) LiDAR data. Field survey data and "As-Built" plans were used to convert hydraulic structures from the HEC-2 model to the HEC-RAS model. Starting water surface elevations for Low Branch were taken from the FIS for the incorporated and unincorporated areas of Tarrant County, Texas (Reference 17).

3.2.2 Redelineated Detailed Study Streams

The analyses for the redelineated study stream were taken from the prior Flood Insurance Studies for Johnson County. The Base (1-percent-annual-chance) Flood Elevations (BFEs) from the profiles were plotted on the best available topographic data to better define the special flood hazard areas. The redelineated streams are identified in Section 2.1.

Information on the methods used to determine water surface elevations for the streams studied by detailed methods is shown below. The incorporated communities with detailed studies are listed in alphabetical order; methodologies used to develop cross sections and starting water surface elevations are described for each community. For streams that flow through two or more communities, each methodology described applies only to that

portion of the stream studied by detailed methods within that particular community.

The previously printed FIS for Hood County dated August 16, 2012 included a study of the Brazos River. For the Brazos River downstream of the DeCordova Bend Dam, cross sections were developed from 2-foot contour interval map obtained from SEMCO, Inc., Surveying-Mapping-Planning-Consultants, of Fort Worth, Texas; obtained from the BRA of Waco, Texas; obtained from field surveys done by the USGS; developed from USGS 10-foot contour maps; and synthesized where terrain similarities existed. The tailwater elevation for the 1-percent-annual-chance flood discharge at DeCordova Bend Dam was obtained from the Brazos River Authority's Lake Granbury Probable Maximum Flood Analysis (Reference 26). Cross sections that were developed from 2-foot contour interval map extended into Johnson County for the approximate 1 mile that is the source of this redelineation. Water surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (Reference 25). The starting water surface elevations for Brazos River downstream of the DeCordova Bend Dam (at the southern county boundary), were determined by the slope-area method (Reference 24). For the Brazos River downstream of the DeCordova Bend Dam, vertical roughness factors were used for cross section 974+20 and were assigned based on elevations as follows: 0.080 below 641.14 feet NAVD and 0.055 between 641.14 and 672.24 feet NAVD (Reference 24). Roughness coefficients were obtained from the FIS for Hood County dated August 16, 2012 for the Brazos River.

The previously printed December 3, 1987 FIS for the City of Burleson considered the following streams: Bypass Creek, Hurst Creek, Little Booger Creek, North Creek, Quil Miller Creek, Shannon Creek, South Shannon Creek, Stream 3, Stream VC-8, Stream VC-8A, Village Creek, and Willow Creek (Reference 2). During the preparation of that study, detailed hydraulic analyses were carried out for portions of Bypass Creek, Quil Miller Creek, Shannon Creek, South Shannon Creek, Village Creek, and Willow Creek that are located in the unincorporated areas of the county; the original countywide study reflects those analyses (Reference 1).

In that study, cross sections for the streams studied by detailed methods were field surveyed and located at close intervals upstream and/or downstream of bridges and culverts in order to compute the significant backwater effects of those structures. Bridge data were obtained by field measurements and by bridge plans from TxDOT and from the City of Burleson. Water surface elevations were determined using the USACE HEC-2 step-backwater computer program (Reference 4). Starting water surface elevations for all streams studied by detailed methods except Village Creek were based on slope/area computations. Starting elevations for Village Creek were taken from the FIS for the incorporated and unincorporated areas of Tarrant County, Texas (Reference 17).

The previously printed May 17, 1989 FIS for the City of Cleburne considered the following streams: East Buffalo Creek, Lockett Branch, McAnear Creek, Unnamed Stream, and West Buffalo Creek (Reference 3). In that study, cross sections were field surveyed and located at close intervals above or below bridges and culverts in order to compute their significant backwater effects. Water surface elevations were computed using the USACE HEC-2 step-backwater computer program (Reference 4). Starting water surface elevations were determined using the slope/area method.

In the original countywide study, hydraulic analyses were carried out for the following streams, within the unincorporated areas of the county: East Buffalo Creek, East Buffalo Creek Tributary A, East Buffalo Creek Tributary B, King Branch, Valley Branch, Valley

Branch Tributary A, Walnut Creek, Walnut Creek Tributary A, and Walnut Creek Tributaries B. Cross sections were obtained from field surveys. All bridges, dams, and culverts were field checked to obtain elevation data and structural geometry. Water surface elevations were computed using the USDA-NRCS WSP-2 step-backwater computer program (Reference 18). Starting water surface elevations for all streams studied, except East Buffalo Creek, were calculated using normal depth or critical depth, as appropriate. Starting elevations for East Buffalo Creek were taken from the previously printed FIS for the City of Cleburne (Reference 3).

In the January 6, 1993 revisions to the countywide FIS, cross sections for Unnamed Stream were obtained from field surveys. Water surface elevations of floods of the selected recurrence intervals were computed using the USDA-NRCS WSP-2 computer program (Reference 18). Starting water surface elevations were computed using the slope/area method.

In the countywide study effective January 6, 1999, cross sections for the revised streams within the City of Burleson were field surveyed at selected locations. Water surface elevations of floods of the selected recurrence intervals were computed using the USDA-NRCS WSP-2 computer program (Reference 18). Starting water surface elevations were obtained from the previously printed FIS for the City of Burleson (Reference 2).

Channel roughness coefficient (Manning's "n") used in the hydraulic computations were selected by engineering judgment and based on field observations of the streams and floodplain areas. Channel and overbank "n" values for the streams studied by detailed methods are shown in Table 3, "Summary of Roughness Coefficients."

Table 3 – Summary of Roughness Coefficients
Stream Reaches Studied by Detailed Methods

Stream Name	Channel "n" Value	Overbank "n" Value
Bypass Creek	0.050 - 0.055	0.075 - 0.085
East Buffalo Creek	0.040 - 0.060	0.070 - 0.095
East Buffalo Creek Tributary A	0.050	0.075
East Buffalo Creek Tributary B	0.013 - 0.070	0.075
Hurst Creek	0.013 - 0.070	0.050 - 0.100
King Branch	0.050	0.085
Little Booger Creek	0.015 - 0.060	0.020 - 0.085
Lockett Branch	0.040 - 0.050	0.070 - 0.095
Low Branch	0.045	0.060
McAnear Creek	0.040 - 0.050	0.070 - 0.095
North Creek	0.025 - 0.080	0.025 - 0.080
Quil Miller Creek	0.050 - 0.080	0.045 - 0.070
Shannon Creek	0.065 - 0.080	0.050 - 0.060
South Shannon Creek	0.050 - 0.065	0.060 - 0.080
Stream 3	0.065 - 0.075	0.050
Stream VC-8	0.035 - 0.075	0.060 - 0.095

Table 3 – Summary of Roughness Coefficients
Stream Reaches Studied by Detailed Methods (Continued)

Stream Name	Channel "n" Value	Overbank "n" Value
Stream VC-8A	0.015 - 0.080	0.050 - 0.095
Unnamed Stream	0.040 - 0.060	0.080 - 0.090
Valley Branch	0.050- 0.065	0.075 - 0.085
Valley Branch Tributary A	0.045 - 0.060	0.075 - 0.085
Village Creek	0.055 - 0.085	0.050 - 0.100
Walnut Creek	0.055 - 0.060	0.075 - 0.085
Walnut Creek Tributary A	0.050 - 0.060	0.075 - 0.090
Walnut Creek Tributary B	0.050 - 0.060	0.075 - 0.085
West Buffalo Creek	0.040 - 0.050	0.070 - 0.095
Willow Creek	0.010 - 0.065	0.045 - 0.080

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the completion of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Some of the data used in this revision were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD. The datum conversion factor from NGVD to NAVD in Johnson County is +0.09 feet.

For information regarding conversion between the NGVD and NAVD, visit the National Geodetic Survey (NGS) website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services, NOAA
N/NGS12, National Geodetic Survey
SSMC3, #9340
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the NGS at

(301) 713-3242, or visit their website at www.ngs.noaa.gov.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent- annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps with a contour interval of 2 feet for the Cities of Burleson and Cleburne and the northern quarter of the county. Brazos River was redelineated using LiDAR topographic data obtained for this study (Reference 27). For the remainder of the county, the boundaries between cross sections were interpolated using topographic maps at a scale of 1:24,000, with a contour interval of 10 feet (References 19, 20, 21, and 22).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 0.2-percent-annual- chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations, but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM. Streams that are newly studied by approximate methods utilized LiDAR topographic data obtained for this study (Reference 27).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the

channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (see Table 4, "Floodway Data"). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water surface elevation (WSEL) of the base flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Bypass Creek								
A	1,380	450	1,493	3.7	704.5	704.5	705.5	1.0
B	3,500	350	1,924	2.9	709.6	709.6	710.6	1.0
C	4,375	350	2,223	2.5	711.2	711.2	712.2	1.0
D	5,550	299	1,219	4.5	715.4	715.4	716.1	0.7
E	7,550	450	2,837	1.9	724.8	724.9	725.8	0.9

[1]Stream distance in feet above confluence with Quil Miller Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

BYPASS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
East Buffalo Creek								
A	7,200	973	4,489	7.7	729.1	729.1	729.8	0.7
B	8,380	1,016	8,637	3.6	732.2	732.2	733.2	1.0
C	10,560	1,047	6,643	4.6	737.6	737.6	738.6	1.0
D	12,250	1,343	9,757	2.3	740.6	740.6	740.7	0.1
E	13,530	1,100	7,374	3.1	745.0	745.0	745.4	0.4
F	16,430	639	5,878	3.9	749.1	749.1	750.1	1.0
G	18,500	547	4,084	5.1	755.6	755.6	756.3	0.7
H	19,970	1,081	7,692	2.7	759.1	759.1	759.7	0.6
I	21,500	1,264	8,203	2.5	760.8	760.8	761.4	0.6
J	23,030	1,322	7,765	2.3	762.1	762.1	762.8	0.7
K	25,850	920	4,966	3.6	766.1	766.1	767.1	1.0
L	28,310	655	4,087	4.3	772.1	772.1	773.1	1.0
M	30,650	726	5,894	2.7	776.7	776.7	777.7	1.0
N	33,730	760	5,917	2.7	780.9	780.9	781.9	1.0
O	35,810	907	5,393	3.0	784.1	784.1	785.1	1.0
P	35,910	867	4,734	3.4	784.6	784.6	785.6	1.0
Q	41,500	528	3,914	3.7	795.1	795.1	796.1	1.0
R	47,650	470	326	13.2	805.6	805.6	806.6	1.0
S	47,750	255	1,409	3.1	806.5	806.5	807.4	0.9
T	53,900	247	1,118	3.9	821.0	821.0	822.0	1.0
U	54,000	347	1,836	2.4	822.1	822.1	823.1	1.0
V	59,300	234	979	3.2	837.1	837.1	838.1	1.0

[1]Stream distance in feet above confluence of Unnamed Stream

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

EAST BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
East Buffalo Tributary A								
A	2,250	111	471	4.0	833.0	833.0	834.0	1.0
B	4,000	182	493	3.4	842.8	842.8	843.8	1.0

[1]Stream distance in feet above confluence with East Buffalo Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

EAST BUFFALO CREEK TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
East Buffalo Tributary B								
A	1,150	304	1,150	3.7	807.2	807.2	808.2	1.0
B	2,490	171	854	4.8	813.5	813.5	814.5	1.0
C	2,590	222	1,258	3.3	815.4	815.4	816.4	1.0
D	7,250	76	418	5.3	831.2	831.2	832.2	1.0
E	7,350	109	543	4.1	832.6	832.6	833.6	1.0
F	10,350	196	513	2.5	844.2	844.2	845.2	1.0

[1]Stream distance in feet above confluence with East Buffalo Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

EAST BUFFALO CREEK TRIBUTARY B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Hurst Creek								
A	1,830	118	385	6.6	679.1	679.1	679.3	0.2
B	2,360	71	369	6.9	682.0	682.0	682.0	0.0
C	3,950	50	352	7.2	692.3	692.3	692.8	0.5
D	5,513	95	394	4.9	704.6	704.6	705.4	0.8
E	7,023	250	583	2.2	711.2	711.2	711.5	0.3
F	8,352	141	369	3.8	724.6	724.6	725.2	0.6
G	8,672	151	476	2.5	727.0	727.0	727.5	0.5
H	8,796	253	429	2.8	728.3	728.3	728.5	0.2
I	9,596	168	457	2.5	732.6	732.6	733.2	0.6
J	10,546	62	109	3.6	739.6	739.6	740.1	0.5
K	11,326	60	69	4.0	750.3	750.3	751.0	0.7
L	11,453	45	102	2.7	751.2	751.2	752.1	0.9

[1]Stream distance in feet above confluence with Quil Miller Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

HURST CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
King Branch								
A	2,150	91	510	6.7	648.0	648.0	649.0	1.0
B	4,452	91	600	5.7	658.0	658.0	659.0	1.0
C	4,524	96	714	4.8	660.1	660.1	661.1	1.0
D	7,300	103	591	6.1	674.2	674.2	675.2	1.0
E	10,200	242	1,013	3.7	686.7	686.7	687.7	1.0

[1]Stream distance in feet above confluence with Walnut Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

KING BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Little Booger Creek								
A	1,350	130	550	6.6	691.7	691.7	692.1	0.4
B	2,900	180	1,248	2.9	702.2	702.2	703.2	1.0
C	3,500	90	490	7.4	702.8	702.8	703.6	0.8
D	4,600	128	740	4.9	708.7	708.7	709.4	0.7
E	6,950	100	690	5.7	723.9	723.9	724.7	0.8
F	8,825	123	353	6.8	730.6	730.6	730.7	0.1
G	10,805	101	479	3.5	738.6	738.6	738.6	0.0
H	11,905	89	343	5.4	743.5	743.5	743.5	0.0
I	13,110	34	199	9.0	752.2	752.2	752.2	0.0
J	14,202	83	300	3.8	760.0	760.0	760.0	0.0
K	16,247	42	111	3.9	768.8	768.8	768.8	0.0

[1]Stream distance in feet above confluence with Village Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE BOOGER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Lockett Branch								
A	955	800	2,235	2.9	760.9	760.7[2]	760.8	0.1
B	3,140	698	3,135	2.0	766.6	766.6	766.8	0.2
C	5,585	400	1,585	4.0	775.8	775.8	776.4	0.6
D	7,650	468	1,371	4.7	781.6	781.6	781.9	0.3

[1]Stream distance in feet above confluence with East Buffalo Creek
[2]Elevation computed without consideration of backwater effects from East Buffalo Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

LOCKETT BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Low Branch A	40,113	291	1,080	2.2	622.4	622.4	622.6	0.2

[1]Stream distance in feet above confluence with Lake Joe Pool

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

LOW BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
McAnear Creek								
A	740	470	4,332	1.6	731.4	731.4	731.9	0.5
B	3,600	236	2,036	3.5	746.2	746.2	747.2	1.0
C	5,570	150	860	8.3	750.4	750.4	750.5	0.1
D	6,700	200	1,048	6.8	758.1	758.1	758.1	0.0
E	8,110	406	1,686	4.2	761.7	761.7	762.0	0.3
F	9,740	246	1,201	5.3	767.6	767.6	768.5	0.9
G	11,420	148	873	7.3	776.2	776.2	776.8	0.6
H	12,760	102	603	10.6	784.8	784.8	785.8	1.0
I	16,200	343	2,018	3.2	796.9	796.9	797.9	1.0
J	20,125	207	1,393	3.4	810.9	810.9	811.8	0.9

[1]Stream distance in feet above confluence with East Buffalo Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

MCANEAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
North Creek A	5,320	230	940	3.4	682.8	682.8	683.7	0.9

[1]Stream distance in feet above confluence with Village Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

NORTH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Quil Miller Creek								
A	4,025	860	4,460	4.0	666.9	666.9	667.2	0.3
B	7,200	601	2,989	5.7	676.8	676.8	677.6	0.8
C	9,940	708	4,335	4.0	682.0	682.0	682.9	0.9
D	13,050	658	4,467	3.9	689.8	689.8	690.7	0.9
E	13,850	666	4,505	3.9	691.6	691.6	692.5	0.9
F	15,310	598	4,091	4.2	695.4	695.4	696.1	0.7
G	16,340	627	4,297	3.3	697.6	697.6	698.5	0.9
H	19,535	800	5,626	2.0	704.8	704.8	705.8	1.0
I	20,535	630	3,530	3.1	705.7	705.7	706.6	0.9
J	27,385	260	2,156	5.1	721.4	721.4	722.1	0.7
K	28,285	270	4,135	2.7	725.1	725.1	725.9	0.8

[1]Stream distance in feet above confluence with Village Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

QUIL MILLER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Shannon Creek								
A	5,140	410	1,692	4.8	729.3	729.3	730.2	0.9
B	7,250	163	1,198	6.9	738.0	738.0	738.7	0.7
C	8,500	198	1,280	5.4	741.8	741.8	742.3	0.5
D	10,300	550	1,842	3.8	748.8	748.8	749.3	0.5

[1]Stream distance in feet above confluence with Village Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

SHANNON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
South Shannon Creek								
A	2,700	140	400	6.0	737.9	737.9	738.5	0.6
B	3,325	215	709	3.4	741.5	741.5	742.3	0.8
C	4,450	109	365	6.5	750.0	750.0	750.4	0.4
D	6,740	130	542	4.4	762.5	762.5	763.3	0.8
E	10,025	140	379	4.6	771.1	771.1	771.8	0.7
F	11,950	136	496	4.0	784.6	784.6	784.6	0.0
G	12,850	109	414	4.0	788.7	788.7	789.6	0.9
H	14,620	35	63	3.7	803.4	803.4	803.5	0.1
I	14,794	47	162	1.4	810.1	810.1	810.1	0.0

[1]Stream distance in feet above confluence with Shannon Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH SHANNON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Stream 3								
A	0.06	110	345	5.9	728.7	728.7	729.7	1.0
B	0.23	81	368	6.0	734.7	734.7	735.5	0.8

[1]Stream distance in miles above confluence with South Shannon Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

STREAM 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Stream VC-8								
A	815	160	889	6.9	761.1	761.1	762.1	1.0
B	1,410	350	2,192	2.8	764.2	764.2	765.2	1.0
C	3,370	300	2,920	2.0	775.4	775.4	776.4	1.0
D	4,005	150	718	4.6	778.0	778.0	779.0	1.0
E	5,020	171	898	3.7	782.7	782.7	783.6	0.9
F	5,280	170	959	3.4	784.4	784.4	785.4	1.0
G	5,690	141	711	4.6	786.3	786.3	786.9	0.6
H	6,190	130	651	5.1	789.0	789.0	789.9	0.9
I	6,500	110	529	6.1	791.1	791.1	792.0	0.9
J	7,185	160	768	4.2	795.3	795.3	796.3	1.0
K	7,815	80	449	7.1	800.0	800.0	800.8	0.8

[1]Stream distance in feet above confluence with Village Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

STREAM VC-8

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Unnamed Stream								
A	800	228	1,138	2.9	718.4	718.4	719.4	1.0
B	3,200	130	560	6.6	738.9	738.9	739.9	1.0
C	5,100	66	403	8.8	754.1	754.1	755.1	1.0
D	5,174	78	556	6.9	758.0	758.0	758.0	0.0
E	6,400	60	388	7.7	764.6	764.6	765.5	0.9
F	7,000	59	322	8.3	769.1	769.1	769.3	0.2
G	7,110	54	326	8.2	770.9	770.9	770.9	0.0
H	7,560	45	219	12.1	773.9	773.9	774.0	0.1
I	7,890	238	716	4.5	777.3	777.3	778.3	1.0
J	7,980	299	880	3.5	777.7	777.7	778.7	1.0
K	8,920	276	661	4.4	783.1	783.1	784.1	1.0
L	9,800	45	234	7.1	791.6	791.6	791.9	0.3
M	9,917	69	279	6.0	794.6	794.6	794.8	0.2
N	10,020	45	152	11.1	795.8	795.8	796.8	1.0
O	10,930	27	183	7.6	798.2	798.2	798.5	0.3
P	11,012	26	119	11.8	799.9	799.9	800.2	0.3
Q	11,480	109	331	4.8	803.9	803.9	804.9	1.0
R	11,565	90	294	5.3	804.2	804.2	805.2	1.0
S	12,440	62	220	4.7	810.3	810.3	810.6	0.3
T	12,820	60	180	5.3	813.0	813.0	813.8	0.8

[1]Stream distance in feet above confluence with East Buffalo Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

UNNAMED STREAM

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Valley Branch								
A	1,580	704	2,233	2.7	626.9	626.9	627.9	1.0
B	4,330	195	1,225	5.0	638.9	638.9	639.9	1.0
C	4,458	327	2,206	2.8	641.3	641.3	642.3	1.0
D	7,280	310	1,886	3.4	649.0	649.0	650.0	1.0
E	10,318	1,041	2,566	2.5	656.6	656.6	657.6	1.0
F	10,407	1,156	5,820	1.1	661.1	661.1	662.1	1.0
G	12,150	300	1,700	3.9	666.9	666.9	667.9	1.0
H	15,750	440	1,453	3.5	682.7	682.7	683.7	1.0

[1]Stream distance in feet above confluence with Walnut Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

VALLEY BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Valley Branch Tributary A								
A	767	121	613	4.2	669.4	669.4	670.4	1.0
B	859	181	933	2.8	671.7	671.7	672.7	1.0
C	3,780	100	517	4.6	684.4	684.4	685.4	1.0
D	8,400	170	547	3.6	708.4	708.4	709.4	1.0

[1]Stream distance in feet above confluence with Valley Branch

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

VALLEY BRANCH TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Village Creek								
A	128,130	1,351	5,885	3.7	671.8	671.8	672.1	0.3
B	130,610	1,350	7,082	3.1	676.7	676.7	677.3	0.6
C	132,240	750	5,260	5.2	679.9	679.9	680.7	0.8
D	134,500	1,500	7,584	2.9	689.1	689.1	689.3	0.2
E	135,890	1,500	6,877	3.1	692.5	692.5	692.9	0.4
F	138,640	1,012	6,493	3.3	703.9	703.9	704.3	0.4
G	139,360	945	6,187	3.4	704.8	704.8	705.4	0.6
H	141,305	735	2,786	7.6	710.4	710.4	711.0	0.6
I	143,150	795	6,578	3.7	716.4	716.4	716.8	0.4
J	148,870	700	4,218	4.0	730.1	730.1	730.9	0.8
K	149,670	700	3,390	5.0	732.5	732.5	733.3	0.8
L	156,240	651	4,233	3.6	749.2	749.2	750.0	0.8
M	160,085	700	4,124	3.7	755.7	755.7	756.7	1.0
N	162,065	400	1,432	6.0	759.5	759.5	760.5	1.0
O	163,250	670	3,533	2.4	764.8	764.8	765.8	1.0
P	167,020	810	2,738	3.2	772.8	772.8	773.8	1.0
Q	168,520	134	517	7.0	785.5	785.5	785.6	0.1
R	168,860	190	835	4.3	788.2	788.2	788.7	0.5
S	170,685	450	3,908	0.9	805.3	805.3	806.3	1.0
T	170,860	425	3,829	0.9	806.5	806.5	807.1	0.6
U	171,680	350	2,020	1.8	806.6	806.6	807.2	0.6
V	172,300	112	503	7.2	812.4	812.4	813.1	0.7
W	172,835	112	552	6.5	817.2	817.2	818.2	1.0

[1]Stream distance in feet above confluence with West Fork Trinity River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

VILLAGE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Walnut Creek								
A	11,780	1,154	6,244	3.2	626.8	626.8	627.8	1.0
B	15,950	741	3,783	3.9	635.9	635.9	636.9	1.0
C	16,276	890	5,370	2.7	638.0	638.0	639.0	1.0
D	16,320	149	1,178	12.4	638.1	638.1	639.1	1.0
E	16,500	764	6,233	2.3	640.4	640.4	641.4	1.0
F	21,550	765	3,874	3.1	647.8	647.8	648.8	1.0
G	26,450	445	3,232	3.7	658.8	658.8	659.8	1.0
H	28,700	266	2,254	5.0	664.8	664.8	665.8	1.0
I	28,862	238	1,931	5.9	665.7	665.7	666.7	1.0
J	31,300	317	2,792	4.0	670.3	670.3	671.3	1.0
K	39,950	411	2,958	4.0	691.3	691.3	692.3	1.0
L	45,700	193	1,458	5.4	709.8	709.8	710.8	1.0

[1]Stream distance in feet above Tarrant County/Johnson County boundary

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

WALNUT CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Walnut Creek Tributary A								
A	1,580	193	964	4.6	661.6	661.6	662.6	1.0
B	3,415	219	1,044	4.4	669.7	669.7	670.7	1.0
C	3,515	157	800	5.7	670.3	670.3	671.3	1.0
D	6,850	92	733	6.5	688.8	688.8	689.8	1.0
E	12,700	133	495	4.3	718.8	718.8	719.8	1.0

[1]Stream distance in feet above confluence with Walnut Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

WALNUT CREEK TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Walnut Creek Tributary B								
A	1,772	338	1,191	4.3	693.3	693.3	694.3	1.0
B	1,844	103	443	11.6	693.4	693.4	694.4	1.0
C	5,050	206	1,059	4.4	706.5	706.5	707.5	1.0
D	8,820	221	915	4.2	719.2	719.2	720.2	1.0
E	8,900	315	1,607	2.4	721.3	721.3	722.3	1.0
F	12,900	108	725	4.9	735.8	735.8	736.8	1.0
G	17,420	31	200	12.7	768.9	768.9	769.9	1.0
H	17,500	230	1,155	2.2	772.3	772.3	773.3	1.0
I	21,900	153	392	3.6	811.4	811.4	812.4	1.0

[1]Stream distance in feet above confluence with Walnut Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOODWAY DATA

WALNUT CREEK TRIBUTARY B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
West Buffalo Creek								
A	950	650	9,000	2.7	739.6	739.6	740.6	1.0
B	3,150	118	1,055	5.6	744.6	744.6	745.1	0.5
C	5,020	123	1,039	5.4	752.5	752.5	753.0	0.5
D	7,220	152	1,249	4.2	759.8	759.8	760.3	0.5
E	10,030	120	1,171	4.2	769.0	769.0	769.5	0.5
F	11,790	145	983	4.7	773.5	773.5	774.0	0.5
G	12,510	115	858	5.2	776.2	776.2	776.7	0.5
H	13,610	118	787	5.0	780.1	780.1	780.6	0.5
I	15,160	92	831	4.4	786.0	786.0	787.0	1.0
J	16,150	136	672	3.1	786.9	786.9	787.4	0.5
K	18,080	80	397	4.4	793.0	793.0	793.5	0.5
L	20,680	90	319	3.8	800.8	800.8	801.3	0.5

[1]Stream distance in feet above confluence with East Buffalo Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

WEST BUFFALO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
Willow Creek								
A	3,000	240	1,016	5.7	779.3	779.3	780.1	0.8
B	4,160	429	1,331	4.4	780.0	780.0	780.7	0.7
C	5,279	89	1,029	5.6	790.8	790.8	791.3	0.5
D	7,045	457	2,804	2.1	795.0	795.0	795.7	0.7
E	8,540	677	2,450	2.4	801.4	801.4	802.0	0.6
F	9,300	660	817	7.1	802.5	802.5	802.7	0.2
G	10,380	195	767	6.0	812.9	812.9	813.3	0.4

[1]Stream distance in feet above confluence with Village Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSON COUNTY, TX

AND INCORPORATED AREAS

FLOODWAY DATA

WILLOW CREEK

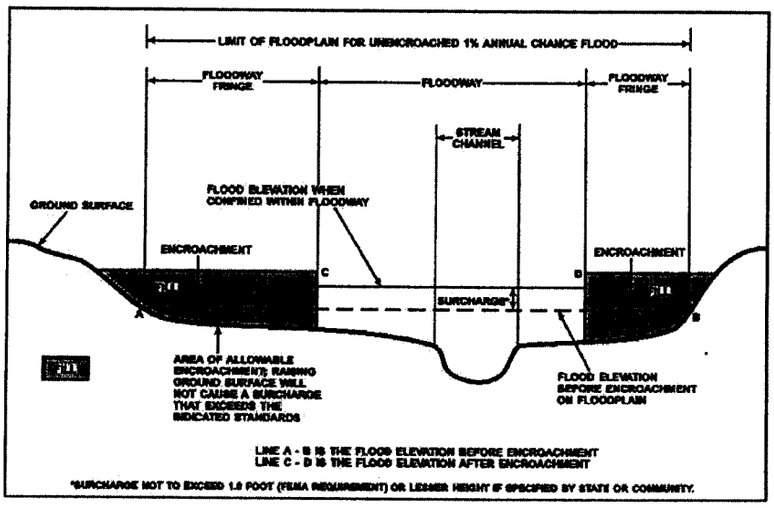


Figure 1: Floodway Schematic

No floodways were computed for Stream VC-8A and Unnamed Tributary to Shannon Creek.

In the case of redelineation, effort was made to maintain the prior effective regulatory floodway width and shape. However, due to updated topographic data, some modifications were made to contain the floodway within the limits of the 1-percent- annual-chance floodplain. Most modifications to the prior effective regulatory floodway boundaries are due to topographic changes that have occurred along the streams.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 4 for certain downstream cross sections of Lockett Branch are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile (sq. mi.), and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Johnson County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the county identified as flood-prone. This countywide FIRM also includes flood hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 5, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISIONS DATE
Alvarado, City of	August 9, 1974	January 23, 1976	May 4, 1982	None
Briar Oaks, City of	March 29, 1974	June 18, 1976	September 27, 1991	None
Burleson, City of	November 2, 1973	None	November 2, 1973	July 1, 1974 July 25, 1975 April 16, 1976 June 24, 1977 December 3, 1987
Cleburne, City of	June 23, 1972	None	July 13, 1972	July 1, 1974 September 12, 1975 September 30, 1980 May 17, 1989
Cresson, City of*	May 17, 1977	None	September 27, 1991	None

*This community did not have its own FIRM prior to the first countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Johnson County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the Johnson County FIRM.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FLOOD INSURANCE RATE MAP EFFECTIVE DATE	FLOOD INSURANCE RATE MAP REVISIONS DATE
Cross Timber, Town of*	May 17, 1977	None	September 27, 1991	None
Godley, City of	August 22, 1975	None	September 27, 1991	None
Grandview, City of*	May 17, 1977	None	September 27, 1991	None
Johnson County, Unincorporated Areas	May 17, 1977	None	September 27, 1991	None
Joshua, City of	June 27, 1975	None	September 27, 1991	None
Keene, City of	June 4, 1976	None	September 27, 1991	None
Mansfield, City of	February 22, 1974	May 10, 1977	December 18, 1985	September 28, 1990
Rio Vista, Village of*	May 17, 1977	None	September 27, 1991	None
Venus, City of	July 11, 1975	None	September 27, 1991	None

*This community did not have its own FIRM prior to the first countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Johnson County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the Johnson County FIRM.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

The preparation of updated Flood Insurance Studies is on-going for the Incorporated and Unincorporated Areas of Bosque, Ellis, Hill, and Hood counties, Texas. An updated FIS has been prepared for the Incorporated and Unincorporated Areas of Parker and Tarrant counties. The Johnson County Study is in agreement with these studies. This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting FEMA Region VI, Federal Insurance and Mitigation Division, 800 North Loop 288, Denton, Texas 76209.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Flood Insurance Study Johnson County, Texas Incorporated and Unincorporated Areas. Federal Emergency Management Agency, Washington, D.C., January 6, 1999.

2. Flood Insurance Study City of Burleson, Johnson County. Federal Emergency Management Agency, Washington, D.C., December 3, 1987.

3. Flood Insurance Study City of Cleburne, Johnson County. Federal Emergency Management Agency, Washington, D.C., May 17, 1989.

4. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, CA, April 1984.

5. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Johnson County, TX, October 1985.

6. US. Census Bureau; Census 2010, Summary File 1(SF 1); using American Factfinder; http://facfinder.census.gov/; 1 April, 2010.

7. Texas A&M University Press Consortium, Texas Almanac 2008-2009. 112. Dallas: The Dallas Morning News, 2008.

8. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Monthly and Annual Climatological Data for Texas, Asheville, North Carolina, National Climatic Center, Published Annually.

9. U.S. Department of the Interior, Geological Survey, Stream Gaging Records. Washington, D.C.

10. National Oceanic and Atmospheric Administration's Storm Data and Unusual Weather Phenomena – April 1997, <http://www.srh.noaa.gov/images/fwd/pdf/sd0497.pdf, December 2, 2009.

11. National Oceanic and Atmospheric Administration's Storm Data and Unusual Weather Phenomena –September 2007, http://www.srh.noaa.gov/images/fwd/ pdf/sd0907.pdf, December 2, 2009.

12. U.S. Army Corps of Engineers, Fort Worth Disctrict, Computer Program NUDALLAS, Fort Worth, TX, revised September 1982.

13. U.S. Department of Commerce, Weather Bureau, Technical Paper No.40, Rainfall Frequency Atlanta of the United States, Washington, D.C., 1961, Revised 1963.

14. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Technical Memorandum NWS Hydro-35, Five to 60 Minute Precipitation Frequency for the Eastern and Central United States, Asheville, NC, National Climatic Center, June 1977.

15. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 20, Computer Program, Project Formulation, Hydrology, Washington, D.C., 1965.

16. U.S. Army Corps of Engineers, HEC-RAS, Hydrologic Engineering Center, River Analysis System, Version 4.1.0 Davis, CA, March 2008.

17. Flood Insurance Study Tarrant County, Texas Incorporated and Unincorporated Areas. Federal Emergency Management Agency, Washington, D.C., September 25, 2009.

18. U.S. Department of Agriculture, Soil Conservation Service, Technical Release No. 61, WSP-2 Computer Program, Washington, D.C., May 1976.

19. City of Burleson, Topographic Map, Contour Interval 2 feet, 1999/2000.

20. City of Cleburne, Topographic Map, Contour Interval 2 feet, 2005.

21. North Central Texas Council of Government (NCTCOG), Topographic Maps Compiled from LiDAR, Contour Interval 2 feet, January 2001.

22. United States Geological Survey (USGS) Hypsography, Alvarado, Blum, Bono, Brazos Point, Britton, Burleson, Cleburne East, Cleburne West, Covington, Cresson, Files Valley, Godley, Grandview, Itasca, Joshua, Keen, Mansfield, Maypearl, Promrose, Venus Quadrangles, Texas; 7.5-Minute Series Topographic Map. Scale of 1:24,000. For 2007 Restudy, data (tagged vector lines\Digital Line Graph) downloaded from Texas National Resources Information Systems (TNRIS) website.

23. Flood Insurance Study Hood County, Texas Unincorporated Areas. Federal Emergency Management Agency, October 18, 1988.

24. Flood Insurance Study City of Granbury, Texas Hood County. Federal Emergency Management Agency, May 16. 1994.

25. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, January 1981 and September 1982, with updates.

26. Brazos River Authority, Lake Granbury Probable Maximum Flood Analysis by Freese and Nichols, Inc., Consulting Engineers, 1985.

27. TNRIS, Independent Quality Control Report--High Resolution Elevation Data and QA/QC for Small Project Locations in Texas, Austin, TX, August 31, 2012.

Appendix A

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was 4202. The horizontal datum was NAD 83 GRS 1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov.

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was derived from the Texas Natural Resources Information System (TNRIS). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2004.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Johnson County Texas, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to the Johnson County, Texas and Incorporated Areas FIRM Index to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Johnson County Texas, effective April 5, 2019.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Johnson County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)

Zone A — The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.

Zone AE — The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.

Zone AH — The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.

Zone AO — The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.

Zone AR — The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

Zone A99 — The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.

Zone V — The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.

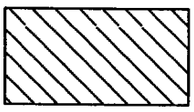
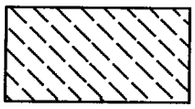
Zone VE — Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.

Regulatory Floodway determined in Zone AE.

OTHER AREAS OF FLOOD HAZARD

Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.

	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. **See Notes to Users for important information.**
	Area with Flood Risk due to Levee: Areas where a non-accredited levee, dike, or other flood control structure is shown as providing protection to less than the 1% annual chance flood.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
NO	Unshaded Zone X: Areas of minimal flood hazard.
FLOOD HAZARD AND OTHER BOUNDARY LINES	
(ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike, or Floodwall
Bridge	Bridge
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.*	

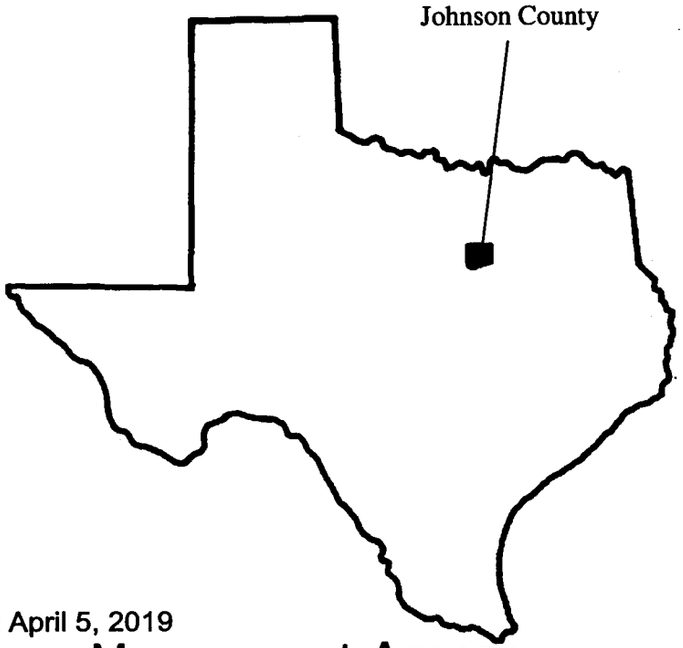
 CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
 OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
22.0 ●	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8 - - - - - - -	Coastal Transect
——-———	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
——--———	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
~~ 513 ~~~~	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity
BASE MAP FEATURES	
——— *Missouri Creek*	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway

(234)	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
———	Horizontal Reference Grid Line
—	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}E$	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16' 52.5"	Corner Coordinates (Latitude, Longitude)

FLOOD INSURANCE STUDY

JOHNSON COUNTY, TEXAS
AND INCORPORATED AREAS
VOLUME 2 OF 2

Community Name	Community Number
JOHNSON COUNTY UNINCORPORATED AREAS	480879
ALVARADO, CITY OF	480397
BRIAR OAKS, CITY OF	480398
BURLESON, CITY OF	485459
CLEBURNE, CITY OF	485462
CRESSON, CITY OF	480177
CROSS TIMBER, TOWN OF	481685
GODLEY, CITY OF	480880
GRANDVIEW, CITY OF	480881
JOSHUA, CITY OF	480882
KEENE, CITY OF	481107
MANSFIELD, CITY OF	480606
RIO VISTA, VILLAGE OF	481159
VENUS, CITY OF	480883



Revised: April 5, 2019

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
48251CV002B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components.

First Countywide FIS Effective Date: September 27, 1991
First Revised Countywide FIS Revision Date: January 6, 1993
Second Revised Countywide FIS Revision Date: January 6, 1999
Third Revised Countywide FIS Revision Date: December 4, 2012
Fourth Revised Countywide FIS Revision Date: April 5, 2019 - To add and change Special Flood Hazard Areas, and to reflect updated topographic information.

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JOHNSON COUNTY, TX

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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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NORTHBOUND
INTERSTATE HIGHWAY 35W
SOUTHBOUND
INTERSTATE HIGHWAY 35W
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2% ANNUAL CHANCE FLOOD
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730
725
720
715
710
705
700
695
690
0
5
10
15
20
25
30
35
40
45
50
55
60

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2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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D8P

LEGEND
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
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790
785
780
775
770
765
760
755
750
265
270
275
280
285
290
295
300
305
310
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION

FEDERAL EMERGENCY MANAGEMENT AGENCY
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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JOHNSON COUNTY, TX
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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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HURST CREEK
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0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
COUNTY ROAD 601
HIDDEN COURT
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FLOOD PROFILES

KING BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
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KING BRANCH
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0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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10% ANNUAL CHANCE FLOOD
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FEDERAL EMERGENCY MANAGEMENT AGENCY
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LITTLE BOOGER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
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2% ANNUAL CHANCE FLOOD
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LOCKETT BRANCH

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2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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MCANEAR CREEK

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FLOOD PROFILES

MCANEAR CREEK

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1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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2% ANNUAL CHANCE FLOOD
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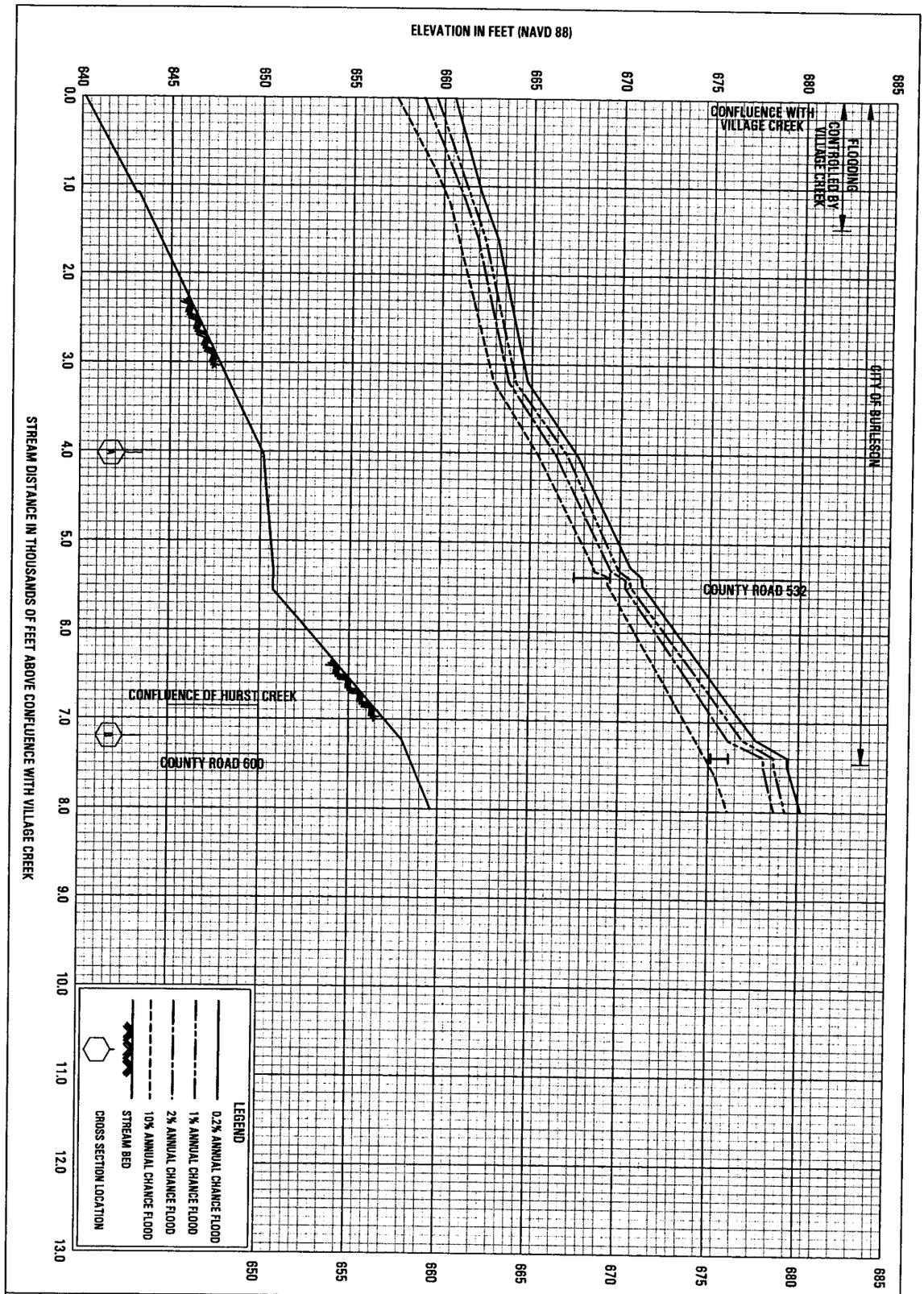

32P	FEDERAL EMERGENCY MANAGEMENT AGENCY JOHNSON COUNTY, TX AND INCORPORATED AREAS	FLOOD PROFILES QUIL MILLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
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2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
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CONFLUENCE OF
UNNAMED TRIBUTARY
TO QUIL MILLER CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH VILLAGE CREEK

FLOOD PROFILES

QUIL MILLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
35P
FLOOD PROFILES
SHANNON CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
STATE HIGHWAY 174
CITY OF BURLESON
BACKWATER EFFECTS FROM VILLAGE CREEK
FLOODING CONTROLLED BY VILLAGE CREEK
CONFLUENCE OF SOUTH SHANNON CREEK
CONFLUENCE WITH VILLAGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

SHANNON CREEK

FLOOD PROFILES

SHANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
38P
FLOOD PROFILES
SOUTH SHANNON CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
CITY OF BURLESON
STATE HIGHWAY 174
F.M. 731
CONFLUENCE OF STREAM 3
CONFLUENCE WITH SHANNON CREEK
BACKWATER EFFECTS FROM SHANNON CREEK
FLOODING CONTROLLED BY SHANNON CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SHANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
39P
FLOOD PROFILES
SOUTH SHANNON CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
COUNTY ROAD 920
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SHANNON CREEK

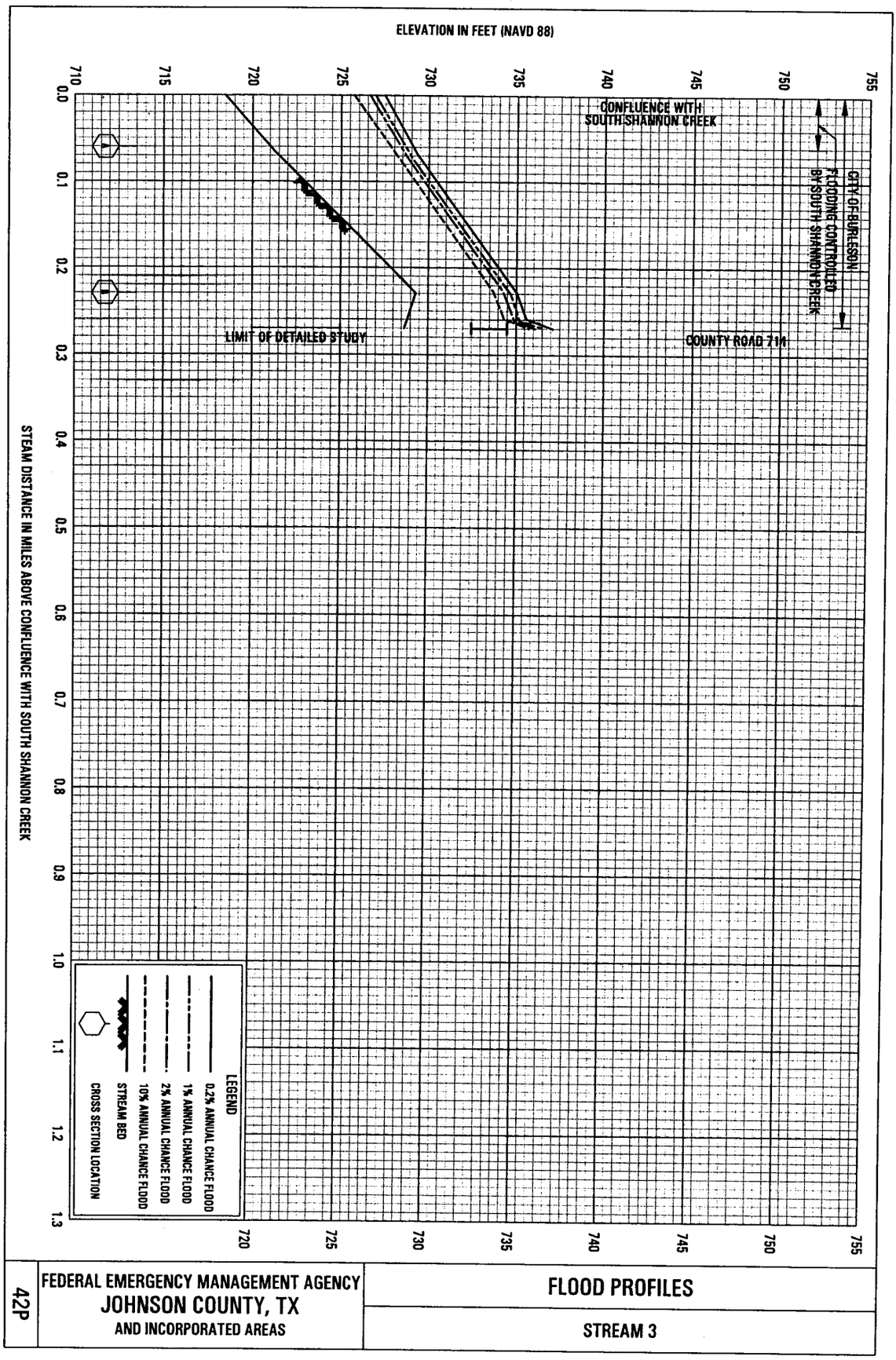
FLOOD PROFILES

SOUTH SHANNON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

SOUTH SHANNON CREEK



42P	FEDERAL EMERGENCY MANAGEMENT AGENCY JOHNSON COUNTY, TX AND INCORPORATED AREAS	FLOOD PROFILES STREAM 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

STREAM VC-8

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

STREAM VC-8

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
45P
FLOOD PROFILES
STREAM VC-8A
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH STREAM VC-8
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
CONFLUENCE WITH STREAM VC-8

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

STREAM VC-8A

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
47P
FLOOD PROFILES
UNNAMED STREAM
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF CLEBURNE
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD 88)
STEAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
48P
FLOOD PROFILES
UNNAMED STREAM
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF CLEBURNE
COUNTRY CLUB ROAD
FM 1718

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
49P
FLOOD PROFILES
UNNAMED STREAM
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF CLEBURNE
JANEHAVEN STREET
SURRY PLACE DRIVE
795
790
785
780
775
770
765
760
755
750
58
60
62
64
66
68
70
72
74
76
78
80
82
84
E
F
G
H
I

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
50P
FLOOD PROFILES
UNNAMED STREAM
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
STONELAKE DRIVE
WESTHILL DRIVE
CITY OF CLEBURNE
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
51P
FLOOD PROFILES
UNNAMED STREAM
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
LIMIT OF DETAILED STUDY
SERVICE ROAD
CITY OF CLEBURNE
HYDE PARK BOULEVARD
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
52P
FLOOD PROFILES
UNNAMED TRIBUTARY TO SHANNON CREEK
ELEVATION IN FEET (NAVD 88)
STEAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH SHANNON CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
FLOODING CONTROLLED BY
SHANNON CREEK
CONFLUENCE WITH SHANNON CREEK
LIMIT OF DETAILED STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

VALLEY BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
54P
FLOOD PROFILES
VALLEY BRANCH
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
COUNTY ROAD 528
CONFLUENCE OF VALLEY BRANCH TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
55P
FLOOD PROFILES
VALLEY BRANCH
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WALNUT CREEK
700
695
690
685
680
675
670
665
660
655
13000
13500
14000
14500
15000
15500
16000
16500
17000
17500
18000
18500
19000
19500

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
56P
FLOOD PROFILES
VALLEY BRANCH TRIBUTARY A
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
BACKWATER FROM VALLEY BRANCH
CONFLUENCE WITH VALLEY BRANCH
COUNTY ROAD 608
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH VALLEY BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
57P
FLOOD PROFILES
VALLEY BRANCH TRIBUTARY A
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH VALLEY BRANCH
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
COUNTY ROAD 529
LIMIT OF DETAILED STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

VILLAGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
59P
FLOOD PROFILES
VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
INTERSTATE HIGHWAY 35W SOUTH BOUND
INTERSTATE HIGHWAY 35W NORTHBOUND FRONTAGE ROAD
INTERSTATE HIGHWAY 35W NORTH BOUND
RENFRO STREET COUNTY ROAD 600
CONFLUENCE OF NORTH CREEK
CITY OF BURLESON
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
60P
FLOOD PROFILES
VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
HIDDEN CREEK PARKWAY
COUNTY ROUTE 714
COUNTY ROUTE 803
UNION PACIFIC RAILROAD
TOP OF ROAD
ELVATION 717.5
LOW STEEL
ELVATION 712.5
CITY OF BURLESON
CONFLUENCE OF
LITTLE BOOGER CREEK
INTERSTATE HIGHWAY 35W
SOUTHBOUND FRONTAGE ROAD
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
61P
FLOOD PROFILES
VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
CONFLUENCE OF SHANNON CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
62P
FLOOD PROFILES
VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CITY OF BURLESON
COUNTY ROAD 714
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
63P
FLOOD PROFILES
VILLAGE CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
F.M. 731

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
64P
FLOOD PROFILES
VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

65P
FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
FLOOD PROFILES
VILLAGE CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CONFLUENCE OF WILLOW CREEK
CITY OF BURLESON
CONFLUENCE OF STREAM VC-8
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
LIMIT OF DETAILED STUDY
CITY OF JOSHUA
CITY OF JOSHUA
CITY OF BURLESON
LAKEAIRE DRIVE AND DAM
MOUNTAIN VALLEY ESTATES DAM
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
67P
FLOOD PROFILES
WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
OLD RAILROAD GRADE
F.M. 2738
LIMIT OF DETAILED STUDY
CONFLUENCE OF VALLEY BRANCH
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE TARRANT COUNTY/JOHNSON COUNTY BOUNDARY

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
FLOOD PROFILES
WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CONFLUENCE OF KING BRANCH
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE TARRANT COUNTY/JOHNSON COUNTY BOUNDARY
18000
18500
19000
19500
20000
20500
21000
21500
22000
22500
23000
23500
24000
24500
625
630
635
640
645
650
655
660
665
670

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
69P
FLOOD PROFILES
WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
COUNTY ROAD 608
CONFLUENCE OF WALNUT CREEK TRIBUTARY A
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE TARRANT COUNTY/JOHNSON COUNTY BOUNDARY

70P
FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
FLOOD PROFILES
WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
COUNTY ROAD 519
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE TARRANT COUNTY/JOHNSON COUNTY BOUNDARY

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
71P
FLOOD PROFILES
WALNUT CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE TARRANT COUNTY/JOHNSON COUNTY BOUNDARY
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
CONFLUENCE OF WALNUT CREEK TRIBUTARY B
710
705
700
695
690
685
680
675
670
665
37500
38000
38500
39000
39500
40000
40500
41000
41500
42000
42500
43000
43500
44000

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
72P
FLOOD PROFILES
WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE TARRANT COUNTY/JOHNSON COUNTY BOUNDARY

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WALNUT CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
74P
FLOOD PROFILES
WALNUT CREEK TRIBUTARY A
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WALNUT CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
A
715
710
705
700
695
690
685
680
675
670
5500
6000
6500
7000
7500
8000
8500
9000
9500
10000
10500
11000
11500
12000

75P
FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
FLOOD PROFILES
WALNUT CREEK TRIBUTARY A
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
COUNTY ROAD 528
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
76P
FLOOD PROFILES
WALNUT CREEK TRIBUTARY B
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
COUNTY ROAD 604
CONFLUENCE WITH WALNUT CREEK
BACKWATER EFFECTS FROM WALNUT CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WALNUT CREEK
720
715
710
705
700
695
690
685
680
675
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WALNUT CREEK TRIBUTARY B

78P
FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
FLOOD PROFILES
WALNUT CREEK TRIBUTARY B
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WALNUT CREEK TRIBUTARY B

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
80P
FLOOD PROFILES
WEST BUFFALO CREEK
ELEVATION IN FEET (NAVD 88)
765
760
755
750
745
740
735
730
725
720
0
5
10
15
20
25
30
35
40
45
50
55
60
65
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD*
10% ANNUAL CHANCE FLOOD*
STREAM BED
CROSS SECTION LOCATION
*DATA NOT AVAILABLE
CONFLUENCE WITH EAST BUFFALO CREEK
BACKWATER EFFECTS FROM EAST BUFFALO CREEK
COUNTRY CLUB ROAD
F.M. 1178
CITY PARK CHANNEL DAM
WESTHILL DRIVE
SMITH STREET
CITY OF CLEBURNE
HARRELL STREET
CHAMBERS STREET
U.S. BUSINESS HIGHWAY 67
HENDERSON STREET

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WEST BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WEST BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS
83P
FLOOD PROFILES
WEST BUFFALO CREEK
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH EAST BUFFALO CREEK
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD*
10% ANNUAL CHANCE FLOOD*
STREAM BED
CROSS SECTION LOCATION
*DATA NOT AVAILABLE
LIMIT OF DETAILED STUDY
COUNTY ROAD 900
CITY OF CLEBURNE

FLOOD PROFILES

WILLOW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
JOHNSON COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WILLOW CREEK