

Best Practice Strategies for Flood Prevention in Development Codes: DFW Examples

Built Environment				
Category	Type	Sample Code	Description	Key Provisions
Stormwater Management / LID	Stormwater Management and Green Infrastructure Standards	Cedar Hill, TX: Stormwater Management Ordinance	Defines private storm drainage systems to include natural and built features.	Applies to all projects that affect stormwater runoff and require city review. Defines private storm drainage systems more broadly and recognizes natural systems.
		Frisco, TX: Multifamily Development Regulations	Prohibits above-ground stormwater detention within required open spaces.	Applies to multifamily developments and pushes for more effective flood management with on-site infiltration, instead of ponding runoff.
	Parking Lot Bioretention, Green Infrastructure, Native Landscaping, Streetscape GI, and Rainwater Harvesting	Richardson, TX: Rain Harvesting Regulation	Standards for rainwater harvesting systems to ensure safety, proper design, and aesthetic.	Small tanks are exempt from permits but must be registered; larger systems require permits and inspections. Establishes requirements for tank construction, screening, and location.
		Texas Trees Foundation: Southwestern Medical District Streetscape Plan	Highlights context- sensitive street design to manage stormwater.	Standards for landscaping in an urban corridor redesign with emphasis on LID strategies to manage stormwaters.
Impervious Cover	Reduced Parking Requirement	Lewisville, TX: Flexible Parking Requirements	Allows flexibility in parking requirements.	For non-residential projects, more parking is allowable if spaces use permeable pavement or include landscaping. Parking minimums can be met through joint-use agreements.
	Parking and Impervious Cover Reductions; Permeable Alleys and Low-Traffic Accessways	Farmers Branch, TX: Sustainable Parking Lot Design	Parking lot design uses innovative stormwater management.	Flexible parking regulations for applying two or more sustainable standards. Each option includes specific requirements for design, materials, and installation to offset parking lot impervious surface coverage.

	<i>Right-of-Way and Parking Reform</i>	Southlake, TX: Permeable Pavement to Offset Impervious Coverage	Incentivizes developers to implement permeable pavement	Developers may receive 50% credit on stormwater utility fees based on dimensions of off-street parking areas using permeable pavement that meets requirements.
Conservation Development	<i>Conservation Zone</i>	Flower Mound, TX: SMART Growth Conservation Zone Standards	Guides growth to protect natural landscapes, resources, and infiltration.	Criteria and technical methodologies establishing requirements to ensure development is sustainable and doesn't exceed available infrastructure capabilities.
		Southlake, TX: Rural Conservation Subdivision Zoning	Preserves natural areas by condensing residential lot and home size.	Requires a minimum of 20 contiguous acres, limits net density to 1.4 dwelling units per acre, and encourages clustering to reduce infrastructure and land disturbance.
	<i>Yield Plan Options, Density Flexibility and Cluster Subdivision Design</i>	Denton, TX: Cluster Subdivision Yield Plan Options	Regulates land-disturbing activities in environmentally sensitive areas.	Protect sensitive lands in residential districts by clustering development and reserving a minimum of 30% as open space. Cluster subdivisions require planned development zoning, and deed restrictions, conservation easement, or dedicating land to the city.
		Flower Mound, TX: Cluster Subdivision and Open Space Planning Standards	Strategies to preserve natural resources through voluntary conservation.	Prioritize preservation through voluntary measures and sustainable development practices. It promotes conservation easements, purchase of development rights and conservation-oriented subdivision design to maintain open space.

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Open Space and Environmentally Sensitive Areas				
Category	Type	Sample Codes	Description	Key Provisions
Open Space/ Growth Management	<i>Landscape Standards for Stormwater and Heat Mitigation</i>	Cedar Hill, TX: Landscape Standards	The use of landscaping to provide environmental benefits.	Requirements for the preservation and mitigation of trees and other natural features to provide protection from stormwater runoff, heat island effect, lighting glare, and noise.
	<i>Green Space and Open Space Requirements</i>	Fort Worth, TX: Green Space Requirements	Establishes open space requirements for Urban Residential (UR) and Mixed Use (MU-1 and MU-2) zoning districts.	Enhances environmental performance and livability of development through required open space standards. Requires pocket parks and open space to include a minimum of 20% developed area. Integrates vegetated areas that provide shade, infiltration, and aesthetic value.
	<i>Preservation of Natural Features</i>	Fort Worth, TX: Grading Permit	Restricts development from causing any loss of floodwater storage.	Developments that disturb an acre or more must provide compensatory storage to preserve valley storage. Expanding the regulations citywide to all FEMA floodplains.
		Ponder, TX: Preservation of Natural Features	Development must preserve natural features to greatest extent feasible.	Requires preservation of natural landscape by limiting site clearing only to areas needed for development, leaving native vegetation undisturbed, and provide space for buffers and trees of a certain size.
		Flower Mound, TX: Conservation Development Standards	Conservation developments that cluster homes and preserve open-space areas.	Developers can minimize disturbance and protect existing natural features while incorporating buffers and green corridors. Developments preserving at least 50% of the site as open space earn incentives to promote sustainable growth and protecting habitat and water quality.

	<i>Open Space Protection, Incentives, and Funding Mechanisms</i>	Frisco, TX: Voluntary Buffer Area Zoning Provision	Developments are encouraged to use open space to protect flood-prone areas.	Establish buffers along waterways to reduce stormwater runoff damage, increase open space, and protect property and safety. Developers who accept buffers can earn density bonuses but must meet additional conditions such as tree-lined streets.
Sensitive Resource Protection	<i>Critical Area Overlay</i>	Dallas, TX: Neighborhood Forest Overlay	Requires replacement of trees that are removed or seriously injured during development.	Enables neighborhoods to request an overlay district that protects native trees by enforcing urban forest conservation regulations.
	<i>Conservation Buffers, Riparian Setbacks and Sensitive Area Protection</i>	Denton, TX: Environmentally Sensitive Areas Development Standards	Protects sensitive areas when new development is planned.	Protects environmentally sensitive areas by setting standards for management of habitats, floodplains, and other natural resources during development. Developments involving ESAs must follow the city's ESA Criteria Manual and undergo a review.
		Garland, TX: Existing Drainageways	Preserves natural creeks by requiring developments to maintain natural drainage.	Recognizes the ability of natural waterways to convey water and requires developments to minimize disruption to waterway by preserving drainage buffer easements to convey a 100-year flood.
	<i>Subdivision Natural Features</i>	Ponder, TX: Preservation of Natural Features	Development must preserve natural features to greatest extent feasible.	Requires preservation of natural landscape. Limits site clearing, minimizing native vegetation disturbance, and providing space for buffers and trees of a certain size.

Best Practice Strategies for Flood Prevention in Development Codes: State Examples

Built Environment				
Category	Type	Sample Codes	Description	Key Provisions
Stormwater Management/ Low Impact Development	Low Impact Development (LID) Requirements, Incentives, and Street/ROW Standards, Impervious Cover Limits	Georgetown, TX – Impervious Cover	Caps impervious cover in residential subdivisions to minimize stormwater damage.	Limits impervious cover for all residential lots. Encourages the use of permeable surfaces, open space, and stormwater best management practices to protect environmental quality.
		Marble Falls, TX – Low Impact Development	Encourages environmentally friendly site design practices by offering incentives.	Apply to all properties, to use LID techniques to earn credits. The developer is responsible for the initial maintenance during development, and the landowner has long-term stewardship.
		San Antonio, TX – Low Impact Development and Natural Channel Design Protocol (LID/NCDP)	Voluntary guidelines for development that integrate stormwater management with environmental protection.	Allows flexible design to support city environmental policies. Offers incentives for stormwater fee reductions and density bonuses. Must manage at least 60% of sites water-quality volume with LID/NCDP measures to qualify.

	<i>Comprehensive Stormwater Management and Green Infrastructure Standards</i>	Tyler, TX – Low Impact Development Alternative	Promotes LID for rezoning, subdivision, or site plan projects by incentivizing stormwater controls.	Encourages preserving natural drainage by requiring all development projects to submit stormwater management plan and provide drainage easements.
Street Design	<i>Street Design for Flood Resilience</i>	San Antonio, TX – Pavement Drainage	Sets standards for street design to safely drain stormwater and prevent flooding,	Establishes flexible streets design to safely convey stormwater while remaining usable for access.
		Austin, TX – Street Drainage Types and Flexible Design Criteria	Sets standards for street design while allowing flexible adjustments.	Provides design criteria used for safe street and flexible designs to better fit surroundings, to meet multimodal standards while accommodating context-sensitive streets.
Conservation Development	<i>Conservation Subdivisions</i>	Georgetown, TX – Conservation Subdivision Standards	Clusters development to preserve permanent natural space.	Applies to properties using centralized wastewater systems and offers incentives (density bonuses, flexible lot, and street standards, etc.).

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Open Space and Environmentally Sensitive Areas				
Category	Type	Sample Codes	Description	Key Provisions
Open Space Preservation/ Growth Management	Conservation Subdivision and Transfer of Development Rights (TDR) Tools	San Antonio, TX – Conservation Subdivision Standards	Encourage clustering development to preserve natural areas.	Developers must preserve at least 40-50% of a site as permanent conservation area by clustering homes to minimize disturbance.
		Helotes, TX – Cluster Development	Allows smaller lots sizes in exchange for preserving natural areas.	Establishes three categories: multifamily, townhouse, and garden home; with specific requirements including an open space and homeowner association stewardship plans.
Sensitive Resource Protection	Conservation Buffers, Riparian Setbacks and Sensitive Area Protection	San Antonio, TX – Watershed / Aquifer Recharge Protection	Protects the Edwards Aquifer by limiting harmful development.	Protects the sensitive area by requiring strict environmental standards. Requires an Aquifer Protection Plan for any development in the aquifer area.
	Subdivision Natural Features	Selma, TX - Preservation of Natural Features	New subdivisions must contribute land or fees for green space.	Requires developers to support the city green space by fee or dedication. The city can require additional land or payments when an area lacks adequate services.

Best Practice Strategies for Flood Prevention in Development Codes: Sources

Built Environment			
Sample Codes	Reference	Website	Category
Cedar Hill, TX – Stormwater Management Ordinance	Code of Ordinances: Chapter 13, Natural and Environmental Resources: Article V, Stormwater Management Ordinance	https://library.municode.com/tx/cedar_hill/codes/code_of_ordinances?nodeId=PTIICOOR_CH13NAENRE_ARTVSTMAOR	Stormwater Management/ Low Impact Development
Frisco, TX – Multifamily Development Regulations	Code of Ordinances, Part 2: Chapter 63, Zoning Ordinance: Section 4, Site Development Requirements: Subsection 4.12, Multifamily Development Standards	https://ecode360.com/45146525?highlight=stormwater&searchId=7867047853876569#45146509	
Georgetown, TX – Impervious Cover	Unified Development Code: Chapter 11, Environmental Protection: Section 11.02, Impervious Cover	https://library.municode.com/tx/georgetown/codes/unified_development_code?nodeId=UNDECO_CH11ENPR_S11.02IMCO	
Marble Falls, TX – Low Impact Development	Code of Ordinances: Appendix B, Development Code: Article 5, Environmental Protection: Division 5.3, Low Impact Development	https://library.municode.com/tx/marble_falls/codes/code_of_ordinances?nodeId=COOR_APBXDECO_ART5ENPR_DIV5.3LOIMDE	
Richardson, TX – Rainwater Harvesting and Rain Barrel Regulation	Code of Ordinances: Chapter 6, Buildings and Building Regulations: Article XII, Rainwater Harvesting Systems	https://library.municode.com/tx/richardson/codes/code_of_ordinances?nodeId=PTIICOOR_CH6BUBURE_ARTXIIRAHASY	

San Antonio, TX – Low Impact Development and Natural Channel Design Protocol (LID/NCDP)	Unified Development Code: Article 2, Use Patterns: Section 35-210, Low Impact and Development and Natural Channel Design Protocol	https://library.municode.com/tx/san_antonio/codes/unified_development_code?nodeId=ARTIUSPA_S35-210LOIMDENACHDEPRLINC	
Texas Trees Foundation – Urban Streetscape Master Plan for the Southwestern Medical District	Urban Streetscape Master Plan for the Southwestern Medical District	https://www.texastrees.org/wp-content/uploads/2019/07/SWMD-Final-Project-Book-2016.pdf	
Tyler, TX – Low Impact Development Alternative	Code of Ordinances: Article VII, Environmental Regulations: Division B, Low Impact Development Alternative Standards	https://codelibrary.amlegal.com/codes/tyler/latest/tyler_tx/0-0-0-82507	Stormwater Management/ Low Impact Development
Austin, TX – Street Drainage Types and Flexible Design Criteria	Transportation Criteria Manual: Section 2, Street Cross Sections: 2.3, Street Drainage Types and 2.7, Flexible Design Criteria	https://library.municode.com/tx/austin/codes/transportation_criteria_manual?nodeId=TRCMA_S2STCRSE_2.3.0STDRTY	Street Design
San Antonio, TX – Pavement Drainage	Unified Development Code: Appendix H, Stormwater Design Criteria Manual: Chapter 6, Pavement Drainage	https://library.municode.com/tx/san_antonio/codes/unified_development_code?nodeId=APTOWADECRMA_CH6PADR	
Lewisville, TX – Minimum and Maximum Parking Requirements	Unified Development Code: Subpart 3 Design and Development Standards: Article VIII, Off-street Parking Standards: Section VIII. 1.3, Calculating Minimum and Maximum Parking Required	https://library.municode.com/tx/lewisville/codes/unified_development_code?nodeId=SP3DEST_ARTVIIIIOREPALOST_CHVIII.1OREPAST_SV_III.1.3CAMIMAPARE	Impervious Cover

Farmers Branch, TX – Sustainable Parking Lot Design	Code of Ordinances: Chapter 94, Zoning: Article 4, Site Development Standards: Section 4.3 Parking and Loading: Subsection-J Sustainable Parking Lot Design	https://library.municode.com/tx/farmers_branch/codes/code_of_ordinances?nodeId=PTIICOR_CH94ZO_ART4SIDE_4.3PALO	
Southlake, TX – Use of Permeable Pavement to Offset Impervious Coverage	Land Development Code: Zoning, Section 33 Supplementary District Regulations: Subsection 33.22	https://library.municode.com/tx/southlake/codes/development_ordinances?nodeId=Section%2033%20-%20Supplementary%20District%20Regulations	
Denton, TX – Cluster Subdivision Yield Plan Options	Development Code: Subchapter 7, Development Standards: 7.4 Environmentally Sensitive Areas	https://library.municode.com/tx/denton/codes/development_code?nodeId=CITY_DENTONCO_SUBCHAPTER_7DEST_7.4ENSEARES	Conservation Development
Flower Mound, TX – Cluster Subdivision & Open Space Planning Standards	Open Space Plan	https://www.flowermound.gov/DocumentCenter/View/755/60-Open-Space-Plan	Conservation Development
Flower Mound, TX – SMART Growth Conservation Zone Standards	Code of Ordinances: Subpart B, Land Development Regulations: Article II, SMART Growth Program	https://library.municode.com/tx/flower_mound/codes/code_of_ordinances?nodeId=SPBLADRE_CH98ZO_ARTIISMPR	
Georgetown, TX – Conservation Subdivision Standards	Unified Development Code: Chapter 11, Environmental Protection: Section 11.06, Conservation Subdivisions	https://library.municode.com/tx/georgetown/codes/unified_development_code?nodeId=UNDECO_CH11ENPR_S11.06COSU	

Southlake, TX – Rural Conservation Subdivision Zoning	Land Development Code: Zoning, Section 48, RCS Rural Conservation Subdivision Zoning District	https://library.municode.com/tx/southlake/codes/development_ordinances?nodeId=Section%2048%20-%20RCS%20Rural%20Conservation%20Subdivision%20Zoning%20District	
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Best Practice Strategies for Flood Prevention in Development Codes: Sources			
Open Space and Environmentally Sensitive Areas			
Sample Codes	Reference	Website	Category
Cedar Hill, TX – Landscape Standards	Code of Ordinances: Chapter 23, Zoning Ordinance: Article 5 Development Standards: Division 5.2 Landscape Requirements	https://library.municode.com/tx/cedar_hill/codes/code_of_ordinances?nodeId=PTIICOOR_C H23ZOOR_ART5DEST_DIV5.2LARE	Open Space Preservation / Growth Management
Flower Mound, TX – Conservation Development Standards	Code of Ordinances: Subpart B, Land Development Regulations: Article III, District Regulations: Division 3, Agricultural District, Conservation District, Rural Development: Section 98-277, Conservation Development Option and Standards	https://library.municode.com/tx/flower_mound/codes/code_of_ordinances?nodeId=SPBLADERE_CH98ZO_ARTIIIDIRE_DIV3AAGDICODIRUDE_S98-277CODEOPST	
Fort Worth, TX – Green Space Requirements	Code of Ordinances: Appendix A, Zoning Regulations: Chapter 4, District Regulations: Article 13, Form-Based Districts: Section 4.1302, High Intensity Mixed Use	https://codelibrary.amlegal.com/codes/ftworth/latest/ftworth_tx/0-0-0-36082	
Fort Worth, TX – Grading Permit	City Code: Chapter 12.5, Environmental Protection and Compliance: Article 10, Grading Permit	https://codelibrary.amlegal.com/codes/ftworth/latest/ftworth_tx/0-0-0-16177	

Frisco, TX – Voluntary Buffer Area Zoning Provision	Code of Ordinances: Chapter 63 Zoning Ordinance: Section 4 Site Development Requirements, Subsection 4.11 Voluntary Buffer Areas for Creeks, and Tributaries	https://ecode360.com/45146525	
Garland, TX – Existing Drainageways	Development Code: Chapter 3, Subdivision Regulations: Article 5, Subdivision Requirements and Standards: Division 8, Stormwater Management and Storm Sewer Requirements: Section 3.86, Existing Drainageways	https://ecode360.com/40083330	
Helotes, TX – Cluster Development	Code of Ordinances: Chapter 98, Zoning: Article III, District Regulations: Section 98.63, Cluster Development	https://library.municode.com/tx/helotes/code/s/code_of_ordinances?nodeId=CD_ORD_CH98_ZO_ARTIIIDIRE_S98-63CLDE	Open Space Preservation / Growth Management
Ponder, TX – Preservation of Natural Features	Subdivision Ordinance: Section 46, Preservation of Trees, and Native Vegetation	https://www.pondertx.com/sites/default/files/fileattachments/planning_amp_zoning/page/2475/subdivision_ordinance_version_2008.pdf	
San Antonio, TX – Conservation Subdivision Standards	Unified Development Code: Article 2, Use Patterns: Section 35-203, Conservation Subdivision	https://library.municode.com/tx/san_antonio/codes/unified_development_code?nodeId=ARTIIUSPA_S35-203COSU	
Dallas, TX – Neighborhood Forest Overlay	Code of Ordinances: Volume III: Chapter 51A Dallas Development Code, Ordinance NO. 19455: Article IV. Zoning Regulations: Division 51A-4.500. Overlay and Conservation District Regulations	https://codelibrary.amlegal.com/codes/dallas/latest/dallas_tx/0-0-0-83877	Sensitive Resource / Habitat Protection

Denton, TX – Environmentally Sensitive Areas Development Standards	Development Code: Subchapter 7, Development Standards: 7.4 Environmentally Sensitive Areas	https://library.municode.com/tx/denton/code/s/development_code?nodeId=CITY_DENTOND_ECO_SUBCHAPTER_7DEST_7.4ENSEARES	
Ponder, TX – Preservation of Natural Features	Subdivision Ordinance: Section 46, Preservation of Trees, and Native Vegetation	https://www.pondertx.com/sites/default/files/fileattachments/planning_amp_zoning/page/2475/subdivision_ordinance_version_2008.pdf	
San Antonio, TX – Watershed/ Aquifer Recharge Protection	Code of Ordinances: Chapter 34, Water and Sewers: Article VI. Water Quality Control and Pollution Prevention: Division 6. Aquifer Recharge Zone and Watershed Protection	https://library.municode.com/tx/san_antonio/codes/code_of_ordinances?nodeId=PTIICO_C_H34WASE_ARTVIWAQUCOPOPR_DIV6AQREZO_WAPR	
Selma, TX - Preservation of Natural Features	Code of Ordinance: Part II, Land Development Regulations: Chapter 78, Subdivisions: Article V Design Standards: Division 7, Public Sites and Open Spaces; Protection of Natural Features	https://library.municode.com/tx/selma/codes/code_of_ordinances?nodeId=PTIILADERE_CH_78SU_ARTVDEST_DIV7PUSIOPSPPRNAFE	

Higher Standards for Floodplain Management

Flood Risk Reduction				
Category	Type	Sample Codes	Description	Key Provisions
Freeboard Requirements	Fixed Freeboard Above BFE	Aurora, TX: Flood Damage Prevention Ordinance	Establishes additional elevation above FEMA minimum standards to reduce flood risk.	Residential structures and manufactured homes must be elevated a minimum of two feet (2') above the BFE. Nonresidential structures must either meet the same elevation standard or be floodproofed to that elevation.
		Johnson County, TX: Flood Damage Prevention Order	Establishes a three-foot (3') freeboard requirement above FEMA minimum standards.	Residential structures and manufactured homes must be elevated a minimum of three feet (3') above the BFE. Nonresidential structures must either meet the same elevation standard or be floodproofed to that elevation.
	Fully Developed Conditions Freeboard	Denton, TX: Development Code	Incorporates fully developed watershed conditions into freeboard requirements to account for future flood risk.	Minimum finished floor elevations must be established eighteen inches (18") above the 100-year water surface elevation based on fully developed watershed conditions or thirty inches (30") above the flood insurance study water surface elevation. Nonresidential structures must either meet the same elevation standard or be floodproofed to that elevation.
		Mansfield, TX: Flood Damage Prevention Ordinance	Incorporates fully urbanized hydrology studies into minimum elevation standards to account for future development conditions.	Residential structures and manufactured homes must be elevated a minimum of three feet (3') above the BFE or two feet (2') above elevations determined through fully urbanized hydrology studies. Nonresidential structures must either meet the applicable elevation standard or be floodproofed to that elevation.
	Dual-Criteria / Higher-of-Standard	Fort Worth, TX: Floodplain Provisions Ordinance	Applies the more restrictive of FEMA flood elevations and fully developed watershed conditions to determine minimum elevation standards.	Residential and nonresidential structures must be elevated a minimum of two feet (2') above the fully developed base flood elevation or FEMA regulatory base flood elevation, whichever is greater. Nonresidential structures may alternatively be floodproofed to the same elevation standard.

Flood Risk Reduction				
Category	Type	Sample Codes	Description	Key Provisions
Critical Facility Protection	Floodplain Avoidance Standards	Benbrook, TX: Flood Hazard Protection Regulations	Prohibits the placement of critical facilities within high-risk flood hazard areas to reduce potential impacts to public safety, emergency response, and essential services during flood events.	Critical facilities, including emergency centers, hospitals, fire stations, power stations, and hazardous materials storage sites, are prohibited within the 0.2-percent annual chance (500-year) floodplain.
	Elevated Protection Standards	Fort Worth, TX: Floodplain Provisions Ordinance	Establishes enhanced flood protection standards for critical facilities to ensure continuity of essential services during and after flood events.	Critical facilities must be protected to the higher of two feet (2') above the FEMA 0.2-percent annual chance (500-year) flood elevation or the city's 1-percent annual chance (100-year) flood elevation based on fully developed watershed conditions.
		Johnson County, TX: Flood Damage Prevention Order	Establishes enhanced elevation requirements for critical facilities to reduce the risk of flood-related disruption to essential services and emergency operations.	Critical facilities located within the floodplain must have the lowest floor elevated a minimum of three feet (3') above the base flood elevation (BFE).
	Conditional Siting Exceptions	Fort Worth, TX: Floodplain Provisions Ordinance	Prioritizes locating critical facilities outside flood hazard areas while allowing limited siting exceptions when no feasible alternative location exists.	Critical facilities shall be located outside the special flood hazard area whenever feasible. Where no feasible alternative site exists, construction may be permitted within the special flood hazard area provided applicable flood protection standards are met.
		Johnson County, TX: Flood Damage Prevention Order	Prioritizes locating critical facilities outside high-risk flood hazard areas while allowing limited exceptions when no feasible alternative site exists.	Critical facilities should be located outside the 0.2-percent annual chance (500-year) floodplain and A Zones whenever feasible. Where no feasible alternative site exists, development may be permitted provided enhanced flood protection standards are met.

Flood Risk Reduction				
Category	Type	Sample Codes	Description	Key Provisions
Safe Access / Ingress-Egress	Access Elevation Requirements	Benbrook, TX: Flood Hazard Protection Regulations	Establishes minimum elevation requirements for streets, driveways, and parking areas located within flood hazard areas.	Streets, driveways, and parking lots must be elevated a minimum of two feet (2') above the base flood elevation (BFE), unless otherwise approved.
	Emergency Access Standards	TFMA Model Language: <i>A Guide for Higher Standards in Floodplain Management</i>	Establishes access standards to maintain safe ingress and egress during flood events and ensure continued access to critical facilities.	Development should provide safe ingress and egress during flood events, and access routes serving critical facilities should be elevated to or above the base flood elevation (BFE) to the maximum extent practicable.
Match Pre-Development Runoff	Peak Discharge Matching	Denton, TX: Stormwater Design Criteria Manual	Maintains pre-development peak discharge rates through on-site stormwater controls.	On-site controls must be designed and constructed to maintain pre-development peak discharge rates from the site. Supporting calculations and documentation demonstrating compliance are required.
		Kennedale, TX: Public Works Design Manual	Maintains pre-development peak discharge rates to reduce downstream flooding impacts associated with development.	On-site stormwater detention basins must be designed to reduce post-development peak discharge rates to existing pre-development peak discharge rates for the 1-, 2-, 5-, 25-, and 100-year storm events at each point of discharge from the development site.
	Downstream Impact Evaluation	Denton, TX: Stormwater Design Criteria Manual	Requires evaluation of downstream conveyance systems to ensure adequate capacity and prevent adverse flood impacts.	Developers must provide supporting calculations and documentation demonstrating that downstream conveyance systems can safely convey full build-out flood mitigation storm discharges without increasing water surface elevations.
Match Pre-Development Runoff	Downstream Impact Evaluation	Kennedale, TX: Public Works Design Manual	Requires evaluation of downstream drainage systems to identify and mitigate	Developers must conduct a downstream assessment to evaluate post-development impacts. Where downstream post-development velocities

Flood Risk Reduction				
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			development-related increases in flow velocity and erosion potential.	exceed pre-development velocities, the existing downstream conveyance system must be improved, reinforced, or stabilized, and proposed velocities must not exceed the allowable range of the improved system.
		Denton, TX: Stormwater Design Criteria Manual	Requires stormwater controls to reduce downstream flood impacts and maintain existing drainage conditions.	Stormwater controls must be implemented to prevent increases in downstream peak discharges or water surface elevations resulting from development. Acceptable measures include on-site detention, regional controls, levees, floodwalls, and floodproofing.
		Kennedale, TX: Public Works Design Manual	Requires on-site stormwater management controls to reduce downstream impacts and maintain existing runoff conditions.	On-site stormwater management controls must be installed to ensure downstream post-development discharges are at or below pre-development discharges. Supporting documentation and calculations demonstrating compliance are required.

Floodplain Preservation

Category	Type	Sample Codes	Description	Key Provisions
Valley Storage Preservation	No Net Loss Standards	Benbrook, TX: Flood Hazard Protection Regulations	Preserves floodplain storage capacity by prohibiting reductions in valley storage below the base flood elevation.	Floodplain modifications may not result in any loss of valley storage below the base flood elevation.
		Fort Worth, TX: Floodplain Provisions Ordinance	Preserves floodplain storage capacity by prohibiting reductions in valley storage within regulated flood hazard areas.	No reduction in valley storage (0.0%) is permitted within FEMA Special Flood Hazard Areas (SFHAs) and regulated sump areas.
	Allowable Storage Reduction Standards	Denton, TX: Development Code	Establishes limits on floodplain valley storage loss to preserve stream and drainageway storage capacity and minimize downstream flooding impacts.	Valley storage loss is limited to zero percent (0%) for streams with drainage basins of one square mile or greater. For minor tributaries with drainage basins less than one square mile, valley storage reduction may not exceed fifteen percent (15%).
	Compensatory Storage Requirements	Benbrook, TX: Flood Hazard Protection Regulations	Requires replacement of displaced floodplain storage to maintain flood storage capacity within the affected hydrologic reach.	Fill placed within the special flood hazard area must be offset with compensatory storage within the effective hydrologic reach.
		Fort Worth, TX: Floodplain Provisions Ordinance	Requires replacement of displaced floodplain storage to maintain existing valley storage capacity and reduce downstream flood risk.	An equivalent volume of valley storage must be provided within the same watercourse reach or designated sump area as the proposed development.
No-Rise / No-Adverse Impact	Flood Elevation Impact Standards	Flower Mound, TX: Floodplain Regulations	Preserves existing flood elevations by prohibiting increases in the 1-percent annual chance water surface elevation.	Permitted construction or floodplain modifications must result in zero increase in the 1-percent annual chance water surface elevation on upstream, downstream, or adjacent properties.

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No-Rise / No-Adverse Impact	Flood Elevation Impact Standards	Fort Worth, TX: Floodplain Provisions Ordinance	Limits increases in base flood elevations resulting from development within the regulatory floodway.	Encroachments within the adopted regulatory floodway are prohibited unless hydrologic and hydraulic analyses demonstrate that the encroachment will not increase the base flood elevation during the 1-percent annual chance storm event under fully developed conditions.
		Richardson, TX: Floodplain Management Ordinance	Limits increases in base flood elevations resulting from development in areas where a regulatory floodway has not been designated.	Where a regulatory floodway has not been designated, development may only occur if cumulative impacts will not increase the base flood water surface elevation by more than one foot (1') at any point within the community.
		Wise County, TX: Flood Damage Prevention Ordinance	Preserves existing flood elevations by prohibiting increases in base flood elevations resulting from development within special flood hazard areas.	Development within Zone A and Zone AE special flood hazard areas must demonstrate that the difference between existing and proposed base flood elevations does not exceed 0.00 feet.
	Hydraulic Performance Standards	Flower Mound, TX: Floodplain Regulations	Preserves hydraulic performance by prohibiting increases in floodwater velocities resulting from development within flood hazard areas.	Permitted construction or floodplain modifications must result in zero increase in water velocity on upstream, downstream, or adjacent properties.
		Fort Worth, TX: Floodplain Provisions Ordinance	Preserves floodway conveyance and hydraulic performance by restricting encroachments that increase flood flows or flood damages.	Encroachments within the adopted regulatory floodway are prohibited unless hydrologic and hydraulic analyses demonstrate that flood flows and flood damages will not increase under fully developed conditions.

Floodplain Preservation				
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No-Rise / No-Adverse Impact	Hydraulic Performance Standards	Richardson, TX: Floodplain Management Ordinance	Preserves the flood-carrying capacity of altered or relocated watercourses to maintain flood conveyance.	Altered or relocated watercourses must be maintained so that their flood-carrying capacity is not diminished.
	Engineering Demonstration Requirements	Benbrook, TX: Flood Hazard Protection Regulations	Requires applicants to demonstrate that proposed floodplain encroachments will not increase flood risk or adversely affect floodplain function.	Fill and other encroachments within the special flood hazard area are prohibited unless the applicant demonstrates no rise in flood elevations and no adverse impact.
		Flower Mound, TX: Floodplain Regulations	Requires engineering analyses to demonstrate compliance with floodplain exception criteria.	A hydraulic study prepared by a licensed professional engineer must be submitted to verify compliance with floodplain exception requirements.
		Fort Worth, TX: Floodplain Provisions Ordinance	Requires detailed engineering analyses to establish floodplain conditions and support development within flood hazard areas.	Base flood elevations and regulatory floodways must be established through detailed engineering studies and hydrologic and hydraulic analyses where not otherwise provided.
Stream Setbacks	Fixed Distance Setbacks	Benbrook, TX: Zoning Ordinance	Establishes fixed setback distances from the Trinity River to protect natural features and vegetation along the river corridor.	Residential structures must be located at least twenty feet (20') from the upper bank of the Trinity River. Trees and natural vegetation with a trunk diameter of four inches DBH or greater may not be removed within ten feet (10') of the top of the riverbank without approval.
	Feature-Based Setbacks	Dallas, TX: Development Code	Establishes natural channel setbacks based on channel geometry and soil conditions.	Development must be located behind the natural channel setback line, which is determined using channel crest and toe locations, minimum setback distances, and designated side slopes based on soil conditions.

Floodplain Preservation				
Category	Type	Sample Codes	Description	Key Provisions
Stream Setbacks	<i>Resource Protection Buffers</i>	Denton, TX: Development Code	Establishes protective buffers around environmentally sensitive riparian and water-related habitat areas and limits disturbance within protected resources.	Disturbances exceeding allowable limits within protected riparian and water-related habitat areas require approved mitigation measures to offset impacts to ecological resources.
	<i>Floodway-Based Setbacks</i>	TFMA Model Language: <i>A Guide for Higher Standards in Floodplain Management</i>	Establishes development setbacks measured from floodway boundaries and stream channel features to preserve floodplain function and reduce flood risk.	Proposed development adjacent to riverine floodplains must be set back a specified distance from the floodway boundary, top of channel bank, or stream centerline where a floodway has not been delineated.