CITY OF EAGLE PASS
AGENDA
CITY COUNCIL SPECIAL MEETING
Council Chambers, City Hall
100 S. Monroe Street, Eagle Pass,
Maverick County, Texas
Monday, September 14, 2026 at 5:30 PM

CALL TO ORDER

PLEDGE OF ALLEGIANCE

MOMENT OF REVERENCE

ANNOUNCEMENTS

RECOGNITIONS

CITIZENS COMMUNICATIONS

Please submit a Citizens Communications form to the City Secretary and follow the instructions listed. Public Comments is limited to 3 minutes per speaker. In accordance with the Texas Open Meeting Act, the City of Eagle Pass, City Council cannot deliberate or take action on items not listed on the meeting agenda.

PUBLIC HEARING

1. Public Hearing of the adoption of a tax rate of $0.480052 per $100 of value for Tax Year 2026. The tax rate will provide revenue for the general fund and debt service. The rate includes $0.241526 per $100.00 of value for Maintenance and Operation and $0.238526 per $100.00 of value for the Interest and Sinking Fund of the Debt Service and is estimated to generate a tax levy of $12,711,326.

CONSENT AGENDA ITEMS

2. Third and final reading of an ordinance confirming the civil service classifications within the police and fire departments, respectively, establishing the number of authorized positions within each classification; establishing a uniform base pay and seniority pay.

3. Third and final reading of an ordinance of the City of Eagle Pass, Texas, amending Chapter 13.5, Article I, Sections 13.5-6 of the Code of Ordinances relating to flood damage prevention by adopting and incorporating the City of Eagle Pass stormwater design criteria manual, as amended from time to time; providing for the applicability of such specifications and design criteria within

the city limits and extraterritorial jurisdiction of the City of Eagle Pass.

4. Third and final reading of an ordinance of the City of Eagle Pass, Texas, amending Chapter 23 of the Code of Ordinances, Article IV-subdivision design standards and specifications, Section 23-68 storm drainage by adopting and enacting the July 2026 storm water design criteria manual as Appendix B; requiring compliance with said manual for all land development, subdivision, plat submittals, and construction activities within the City of Eagle Pass and its extraterritorial jurisdiction (ETJ); providing that this ordinance shall be cumulative; providing a severability clause; and declaring an effective date.

5. Third and final reading of an ordinance of the City of Eagle Pass, Texas, amending Chapter 23, Article II, Sections 23-25, Article III, Sections 23-35, and Article IV, Sections 23-61 and 23-68 of the Code of Ordinances relating to subdivision plat review and approval, engineering and geotechnical requirements, street design and construction standards, stormwater management, and drainage facilities; providing for the submission and review of certain plans, reports, and documentation; providing for the authority and responsibilities of city staff in the review and approval of subdivision development.

ORDINANCE(S)

6. Introductory ordinance of the City of Eagle Pass, Texas, amending Chapter 26 of the Code of Ordinances, Article V , Division 1., Sections 26-117, 26-117.1, and 26-117.2, stop intersections, allowing the City Manager or City Manager's designee to designate the location of all official traffic control devices as necessary of appropriate.

7. Third and final reading of an ordinance approving and adopting the budget of the City of Eagle Pass, Texas, for the 2026–2027 fiscal year and establishing procedures of formal approval by September 14, 2026; finding that the meeting at which this ordinance is passed is open to the public as required by law.

8. Consideration and ratification of the property tax revenue increase as reflected on the adopted City of Eagle Pass Budget for fiscal year 2026-2027.

9. Third and final reading of an ordinance for the adoption of a tax rate of $0.480052 per $100.00 of value for Tax Year 2026. The tax rate will provide revenue for the general fund and debt service. The rate includes $0.241526 per $100.00 of value for Maintenance and Operation and $0.238526 per $100.00 of value for the Interest and Sinking Fund of the Debt Service and is estimated to generate a tax levy of $12,711,326.

OTHER BUSINESS

10. Confirmation by City Council of Interim Fire Chief, Rodolfo Cardona, as per

Texas Local Government Code Chapter 143, Section 143.013(a)(1).

EXECUTIVE SESSION

The City Council reserves the right to adjourn into executive session at any time during this meeting to discuss any posted agenda item when authorized by Texas Government Code, Chapter 551, Subchapter D, Sections 551.071 (Consultation with Attorney), 551.072 (Deliberations about Real Property), 551.073 (Deliberations about Gifts and Donations), 551.074 (Personnel Matters), 551 .076 (Deliberations about Security Devices), and/or 551.087 (Economic Development). Following a closed session, the open meeting will reconvene at which time action, if any, may be taken.

11. Executive Session pursuant to Section 551.071 of Chapter 551, Texas Government Code–Consultation with attorney regarding the Fire and EMS Services Agreement with Maverick County; and any other matter incident thereto and possible action in open session regarding same.

12. Executive Session pursuant to Texas Government Code, Chapter 551, Section 551.071 discussion, and possible action regarding Cause No. 26-04-45528-MCV, in the 293rd District Court, Maverick County, Texas, Luis Alfonso Ruiz v. City of Eagle Pass, Texas; and any other matters incident thereto and possible action in open session regarding same.

13. Executive Session pursuant to Texas Government Code, Chapter 551 Sections 551.072 discussion and possible action in open session regarding the proposed granting of a 2.131 acres utility easement to AEP Texas North Company across City-owned property at 123 State Highway 131, Quemado, TX 78877, City of Eagle Pass Landfill.

14. Executive Session pursuant to Texas Government Code, Chapter 551 Section 551.074, discussion and possible action in open session regarding the finding of facts and conclusion of law of September 3, 2026, by the Ethics Commissions; and any other incident matter thereto.

ADJOURNMENT

Entrance and parking spaces for disabled persons are available in front of City Hall.

CERTIFICATION

I, the undersigned authority, do hereby certify that the above notice of the meeting of the City Council of the City of Eagle Pass is true and correct copy of said notice and was posted on the bulletin board located at City Hall in a convenient place to the public, 100 South Monroe Street, Eagle Pass, Texas, and said notice was posted on September 8, 2026.

Erika Rodriguez
City Secretary

NOTICE OF PUBLIC HEARING ON TAX INCREASE

A tax rate of $0.480052 per $100 valuation has been proposed by the governing body of CITY OF EAGLE PASS.

PROPOSED TAX RATE	$0.480052 per $100
NO-NEW-REVENUE TAX RATE	$0.449474 per $100
VOTER-APPROVAL TAX RATE	$0.524625 per $100

The no-new-revenue tax rate is the tax rate for the 2026 tax year that will raise the same amount of property tax revenue for CITY OF EAGLE PASS from the same properties in both the 2025 tax year and the 2026 tax year.

The voter-approval rate is the highest tax rate that CITY OF EAGLE PASS may adopt without holding an election to seek voter approval of the rate.

The proposed tax rate is greater than the no-new-revenue tax rate. This means that CITY OF EAGLE PASS is proposing to increase property taxes for the 2026 tax year.

A PUBLIC HEARING ON THE PROPOSED TAX RATE WILL BE HELD ON September 8, 2026 AT 5:30pm AT City Council Chambers at City Hall,100 S Monroe.

The proposed tax rate is not greater than the voter-approval tax rate. As a result, CITY OF EAGLE PASS is not required to hold an election at which voters may accept or reject the proposed tax rate. However, you may express your support for or opposition to the proposed tax rate by contacting the members of the City of Eagle Pass of CITY OF EAGLE PASS at their offices or by attending the public hearing mentioned above.

YOUR TAXES OWED UNDER ANY OF THE RATES MENTIONED ABOVE CAN BE CALCULATED AS FOLLOWS:

Property tax amount= (tax rate) x (taxable value of your property)/100

FOR the proposal: Aaron Valdez, Elias Diaz, William Davis, Jessica Rey Ramon, Mario E Garcia

AGAINST the proposal:

PRESENT and not voting:

ABSENT:

Visit Texas.gov/PropertyTaxes to find a link to your local property tax database on which you can easily access information regarding your property taxes, including information about proposed tax rates and scheduled public hearings of each entity that taxes your property.

The 86th Texas Legislature modified the manner in which the voter-approval tax rate is calculated to limit the rate of growth of property taxes in the state.

The following table compares the taxes imposed on the average residence homestead by CITY OF EAGLE PASS last year to the taxes proposed to be imposed on the average residence homestead by CITY OF EAGLE PASS this year.

	2025	2026	Change
Total tax rate (per $100 of value)	$0.480052	$0.480052	increase of 0.000000 per $100, or 0.00%
Average homestead taxable value	$201,820	$222,610	increase of $10.30%
Tax on average homestead	$968.84	$1,068.64	increase of $99.80, or 10.30%
Total tax levy on all properties	$12,053,251	$12,714,414	increase of $661,163, or 5.49%

For assistance with tax calculations, please contact the tax assessor for CITY OF EAGLE PASS at (830)773-1111 or , or visit www.eaglepasstx.gov for more information.

ORDINANCE NO. 2026-

AN ORDINANCE CONFIRMING THE CIVIL SERVICE CLASSIFICATIONS WITHIN THE POLICE AND FIRE DEPARTMENTS, RESPECTIVELY, ESTABLISHING THE NUMBER OF AUTHORIZED POSITIONS WITHIN EACH CLASSIFICATION; ESTABLISHING A UNIFORM BASE PAY AND SENIORITY PAY; FINDING THAT THE MEETING AT WHICH THIS ORDINANCE IS PASSED IS OPEN TO THE PUBLIC AS REQUIRED BY LAW; PROVIDING A SEVERABILITY CLAUSE; AND ESTABLISHING AN EFFECTIVE DATE

==========

WHEREAS, the City of Eagle Pass, Texas is a civil service municipality under, Chapter 143 of the Texas Local Government Code ("TLGC"); and,

WHEREAS, pursuant to Chapter 143, the City Council shall establish the classifications and specify the number of authorized positions in each classification pursuant to §143.021(a), TLGC; and,

WHEREAS, §143.041(b), TLGC provides that except for temporary duties in higher classification, all fire fighters and police offices in the same classification are entitled to the same base salary; and,

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EAGLE PASS, TEXAS, as follows:

Section 1: The appointed and classified positions in each recognized classification in the Police Department shall continue to be those specified below.

POLICE DEPARTMENT POSITIONS	BUDGETED POSITIONS	BASE PAY GRADE
Police Chief (Appointed)	1	35
Assistant Police Chief (Appointed)	1	29
Police Captain (Tested)	4	27
Police Lieutenant (Tested)	4	25
Police Sergeant (Tested)	8	23
Police Corporal (Tested)	18	21

Police Officer (Tested)	49	19

Section 2: The appointed and classified positions in each recognized classification in the Fire Department shall continue to be those specified below.

FIRE DEPARTMENT POSITIONS	BUDGETED POSITIONS	BASE PAY GRADE
Fire Chief (Appointed)	1	32
Assistant Fire Chief (Appointed)	1	29
Fire Marshal (Tested)	1	24
Fire Captain (Tested)	4	24
Fire Lieutenant (Tested)	10	22
Firefighter / EMT (Tested)	54	18

Section 3: Base Pay. For purposes of this satisfying the provisions of §143.041(b), TLGC pertaining to base pay, the provisions of the City's Grade & Step Plan for FY 2027 are hereby incorporated by reference. It is further hereby established that Step 1 of the Pay Grade applicable to each classified position sets the base pay amount pertaining to the classifications identified above.

Section 4: Seniority Pay. For purposes of the provisions of §143.041(c), TLGC pertaining to seniority pay, the provisions of the time-in-position increase as approved by the City Council as presented in the FY 2027 budget are hereby incorporated by reference. It is also hereby established that seniority pay shall be established by reference to the Step Pays designated for each applicable Pay Grade incorporated herein. Individual employees shall progress through the established Steps in the Grade & Step Plan on the annual anniversary date of the employee's designation to a specified Grade.

Section 5: Vacancies. It is further the intent of this Ordinance that the creation of any new classified positions by this Ordinance shall be filled in accordance with the requirements and standards established by Chapter 143, Texas Local Gov't Code, for the filling of any vacant positions and in accordance with the Civil Service Rules adopted by the Civil Service Commission.

Section 6: Severance. If any provision, section, clause, sentence, or phrase of this ordinance is for any reason held to be unconstitutional, void, invalid, or un-enforced, the validity of the remainder of this ordinance or its application shall not affected, it being the intent of the City Council in adopting and of the Mayor in approving this ordinance that no portion, provision, or regulation contained herein shall become inoperative or fail by way of reasons of any unconstitutionality or invalidity of any other portion, provision, or regulation.

Section 7: Preemption. That all other ordinances, sections, or parts of ordinances heretofore adopted by the City of Eagle Pass in conflict with the provisions set out above in this ordinance are hereby repealed or amended as indicated.

READ, PASSED, AND APPROVED ON FIRST READING on this ___th Day of August A.D., 2026.

AYES:
NAYS:
ABSTAINED:
ABSENT:

ATTEST:

_____	_____
Aaron Valdez	Erika Rodriguez
Mayor	City Secretary

READ, PASSED, AND APPROVED ON SECOND READING, this __th Day of September, A.D., 2026.

AYES:
NAYS:
ABSTAINED:
ABSENT:

ATTEST:

_____	_____
Aaron Valdez	Erika Rodriguez
Mayor	City Secretary

READ, PASSED, AND APPROVED ON THIRD AND FINAL READING this __th Day of September, 2026.

AYES:
NAYS:
ABSTAINED:
ABSENT:

ATTEST:

_____	_____
Aaron Valdez	Erika Rodriguez
Mayor	City Secretary

APPROVED AS TO LEGALITY:

_____
Ana Sophia Garcia
City Attorney

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF EAGLE PASS, TEXAS, AMENDING CHAPTER 13.5, ARTICLE I, SECTIONS 13.5-6 OF THE CODE OF ORDINANCES RELATING TO FLOOD DAMAGE PREVENTION BY ADOPTING AND INCORPORATING THE CITY OF EAGLE PASS STORMWATER DESIGN CRITERIA MANUAL, AS AMENDED FROM TIME TO TIME; PROVIDING FOR THE APPLICABILITY OF SUCH SPECIFICATIONS AND DESIGN CRITERIA WITHIN THE CITY LIMITS AND EXTRATERRITORIAL JURISDICTION OF THE CITY OF EAGLE PASS; PROVIDING THAT THIS ORDINANCE SHALL BE CUMULATIVE; PROVIDING A SEVERABILITY CLAUSE; AND DECLARING AN EFFECTIVE DATE.

WHEREAS, the City of Eagle Pass, Texas, is a home-rule municipality authorized by the Texas Constitution and applicable laws of the State of Texas to adopt ordinances and regulations necessary to protect the health, safety, and welfare of its residents; and

WHEREAS, the City Council finds that establishing and maintaining uniform construction specifications and stormwater design criteria is necessary to promote the proper design, construction, operation, and maintenance of drainage and stormwater infrastructure and to protect the public health, safety, and welfare; and

WHEREAS, the City Council desires to amend Chapter 13.5, Article I, Section 13.5-6 of the Code of Ordinances to expressly adopt by reference the City of Eagle Pass Public Works Construction Specifications and Stormwater Design Criteria Manual, including revisions thereto, and to provide for their application to applicable projects, work, and development within the City limits and the City's extraterritorial jurisdiction.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EAGLE PASS, TEXAS THAT:

Section 1. The City of Eagle Pass Code of Ordinances, ***Chapter 13.5***, ***Article I, Sections 13.5-6***, is hereby amended as follows:

This local chapter includes all revisions to the National Flood Insurance Program through November 1, 1989, and shall supersede all previous laws adopted for the purposes of flood damage

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

Not withstanding anything to the contrary in this chapter, the City of Eagle Pass [~~Public Works Construction Specifications~~] ***Stormwater Design Criteria*** Manual and any revisions thereto, are hereby adopted by reference and, as adopted, shall apply to the activities contemplated by this chapter. Any provision of this chapter, and any ordinance, resolution, or part thereof, in conflict with the construction specification hereby adopted is repealed to the extent of such conflict. The constructions specifications set forth in the Public Works Construction Specifications ***and the Stormwater Design Criteria Manual*** shall apply not only to any project, work or development located within the city limits of the City of Eagle Pass, but also to any such activities located within the extraterritorial jurisdiction of the City of Eagle Pass, Texas. A copy of the City of Eagle Pass Public Works Construction Specification Manual ***and the Stormwater Design Criteria Manual*** shall be available for inspections in the following offices of the City of Eagle Pass: Office of the City Secretary, Office of the Planning Department, [~~and~~] Office of the Public Works Department, ***and City Engineer Department***.

In the interpretation and application of this chapter, all provisions shall be:

(a) Considered as minimum requirements.

(b) Liberally construed in favor of the governing body.

(c) Deemed neither to limit nor repeal any other powers granted under state statues.

Section 2. This ordinance shall be cumulative of all provisions of ordinances of the City of Eagle Pass, Texas, except where the provisions of this ordinance are in direct conflict with the provisions of such ordinances, in which event the conflicting provisions of such ordinances are hereby repealed.

Section 3. It is hereby declared to be the intention of the City Council that the phrases, clauses, sentences, paragraphs and sections of this ordinance are severable, and if any phrase, clause, sentence, paragraph or section of this ordinance shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs and sections of this ordinance, since the same would have been enacted by the City Council without the incorporation in this ordinance of any such unconstitutional phrase, clause, sentence, paragraph or section.

Section 4. This Ordinance shall become effective immediately upon publication.

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR ON THIS_____DAY OF_____2026.

AARON VALDEZ
MAYOR

ATTESTED:

ERIKA RODRIGUEZ
CITY SECRETARY

APPROVED AS TO FORM:

ANA SOPHIA GARCIA
CITY ATTORNEY

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF EAGLE PASS, TEXAS, AMENDING CHAPTER 23 OF THE CODE OF ORDINANCES, ARTICLE IV-SUBDIVISION DESIGN STANDARDS AND SPECIFICATIONS, SECTION 23-68 STORM DRAINAGE BY ADOPTING AND ENACTING THE JULY 2026 STORM WATER DESIGN CRITERIA MANUAL AS APPENDIX B; REQUIRING COMPLIANCE WITH SAID MANUAL FOR ALL LAND DEVELOPMENT, SUBDIVISION, PLAT SUBMITTALS, AND CONSTRUCTION ACTIVITIES WITHIN THE CITY OF EAGLE PASS AND ITS EXTRATERRITORIAL JURISDICTION (ETJ); PROVIDING THAT THIS ORDINANCE SHALL BE CUMULATIVE; PROVIDING A SEVERABILITY CLAUSE; AND DECLARING AN EFFECTIVE DATE.

WHEREAS, the City of Eagle Pass seeks to protect public health, safety, and property by reducing the hazards associated with excessive stormwater runoff, promoting orderly and sustainable development, and ensuring the proper management, conveyance, and treatment of stormwater within its jurisdictional boundaries; and

WHEREAS, the City Council recognizes that increased impervious cover and construction activities can cause increased stormwater runoff, soil erosion, and sediment deposition which may degrade drainage capacity and lead to potential flooding and erosion hazards; and

WHEREAS, to establish uniform technical criteria, acceptable hydrologic and hydraulic design methodologies, and construction specifications, the City has compiled the comprehensive document entitled "City of Eagle Pass Storm Water Design Manual" dated July 2026; and

WHEREAS, adopting the Storm Water Design Manual by reference and establishing it as an official technical appendix to the Code of Ordinances provides clear, consistent, and binding guidelines for developers, engineers, and citizens; and

WHEREAS, the City Council finds that adopting and referencing the actual manual as appendix B is in the best interest of the citizens of Eagle Pass and necessary for the protection of property and public safety.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EAGLE PASS, TEXAS THAT:

Section 1. The City of Eagle Pass Code of Ordinances, Chapter 23, Article IV, Section 23-68, is hereby amended as follows:

Sec. 23-68. Storm drainage.

~~[(a) Easement. Where a subdivision is traversed by a watercourse, drainageway, natural channel, or stream, there shall be provided a storm water easement, or drainage right-of-way, conforming substantially with the limit line of such watercourse, and such additional width or construction, or both, as will be adequate for the purpose and to accommodate future needs. Parallel streets or parkways dedicated to the city on the plat may be required in connection therewith.~~

~~(b) Drainage facilities.~~

~~(1) Drainage facilities shall be constructed in accordance with the design criteria and construction standards of the Master Development Plan of the City of Eagle Pass.~~

~~(2) Drainage and drainage facilities shall be provided for in all instances and shall be approved by the city council and the planning and zoning commission under and subject to the requirements contained in this section, and subject also to other provisions relating to floodway, overflow and drainage areas, courses and easements in a manner such that natural watercourses shall not be so changed, ignored, filled or otherwise encroached upon as to reduce their effectiveness in carrying off surface storm water, and in a manner such that land use and development shall be effectively controlled for the purpose and to end eliminating and preventing property damage by flooding.~~

~~(c) Compliance with federal regulations.~~

~~(1) All subdivisions shall conform to the Flood Disaster Protection Act of 1973, Public Law 93-234, passed by the 93rd Congress, H.R. 8449, December 31, 1973, and the latest revisions thereof.~~

~~(2) The city is also required to comply with applicable portions of the Department of Housing and Urban Development requirements of Title 24, Housing and Housing Credit, delineating requirements for the review of building permits and subdivisions.~~

~~(3) Federal floodplains are delineated on the basis of one-hundred-year frequency discharges to be applied to only those areas where Official HUD—FIA Maps have been prepared, or where one-hundred-year water surface profile studies are available within the City of Eagle Pass and its extraterritorial jurisdiction.~~

~~(4) The official maps and floodplain reports are on file in the city secretary's office, City Hall.~~

~~(d) Construction prohibited. Hereafter, no property or land shall be developed, no premises shall be improved, and no building shall be erected or structurally altered, no land excavation or fill shall be authorized, permitted or done, no other encroachment of whatsoever nature or description shall be deposited, installed, constructed, erected or left, either within any natural drainage channel, natural watercourse or easement, or within such~~

~~distance of any such channel, course or easement as may reasonably be calculated or determined by the city manager, city council or the commission to:~~

~~(1) Reduce the function or effect thereof, in carrying off surface storm water;~~

~~(2) Subject any nearby or adjacent structure, property or premises to danger of being damaged by flooding or erosion;~~

~~(3) Otherwise make impracticable or impossible comportment with the requirements of this and other ordinances of the city, or with use, occupancy, building or other compliance regulations thereof.]~~

Section 2. The City of Eagle Pass Code of Ordinances, Chapter 23, Article IV, Section 23-68, is hereby created and established to adopt by reference the July 2026 Storm Water Design Criteria Manual as follows:

Sec. 23-68. Storm drainage.

(a) The document entitled "City of Eagle Pass Storm Water Design Manual" dated July 2026, a copy of which is attached hereto and formally designated as Appendix B to this Ordinance, is hereby approved, adopted, and incorporated by reference into the Code of Ordinances of the City of Eagle Pass as if fully set forth herein.

(b) Any and all stormwater drainage improvements, land development or redevelopment projects, subdivision planning, plats, replats, master development plans, public infrastructure works, and construction activities within the corporate limits of the City of Eagle Pass and its Extraterritorial Jurisdiction (ETJ) shall be designed, constructed, and maintained in strict accordance with the criteria, standards, methodologies, and submittal requirements set forth in the adopted Storm Water Design Criteria Manual.

(c) At least one (1) copy of the Storm Water Design Criteria Manual, adopted as Appendix B, shall be maintained on file in the office of the City Secretary and the office of the City Engineer, and shall be made available for public inspection, copying, and reference during normal business hours.

(d) The City Engineer shall have the administrative authority to interpret the provisions of the Storm Water Design Criteria Manual and to adopt necessary rules, procedures, or supplemental criteria to implement the intent of these regulations, provided such interpretations are consistent with the safety and drainage goals of the City Code.

Section 3. This ordinance shall be cumulative of all provisions of ordinances of the City of Eagle Pass, Texas, except where the provisions of this ordinance are in direct conflict with the provisions of such ordinances, in which event the conflicting provisions of such ordinances are hereby repealed.

Section 4. It is hereby declared to be the intention of the City Council that the phrases, clauses, sentences, paragraphs and sections of this ordinance are severable, and if any phrase, clause, sentence, paragraph or section of this ordinance shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs and sections of this ordinance, since the same would have been enacted by the City Council without the incorporation in this ordinance of any such unconstitutional phrase, clause, sentence, paragraph or section.

Section 5. This Ordinance shall become effective immediately upon passage.

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR ON THIS 14th DAY OF SEPTEMBER, 2026.

_____
AARON E. VALDEZ
MAYOR

ATTESTED:

_____
ERIKA RODRIGUEZ
CITY SECRETARY

APPROVED AS TO FORM:

_____
ANA SOPHIA GARCIA
CITY ATTORNEY

JULY 2026

STORM WATER
DESIGN CRITERIA MANUAL





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1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this Manual is to protect public health, safety, and property by reducing the hazards associated with excessive stormwater runoff, to promote orderly and sustainable development, and to ensure the proper management, conveyance, and treatment of stormwater within the jurisdictional boundaries of the City of Eagle Pass.

This Manual establishes the design criteria, construction standards, and maintenance requirements for stormwater drainage systems serving the City of Eagle Pass. These criteria shall regulate:

- Stormwater drainage improvements associated with the development and redevelopment of land located within the City of Eagle Pass and its Extraterritorial Jurisdiction (ETJ)
- Drainage and stormwater control systems installed during new construction, grading, and subdivision of parcels of land.
- Erosion and sediment control measures implemented during construction and land disturbance activities.
- The design, construction, and maintenance of permanent stormwater management and drainage facilities.
- Improvements or modifications to existing stormwater drainage systems where feasible and beneficial to public safety and infrastructure performance.

It is recognized that the existing stormwater drainage systems within the City of Eagle Pass may not possess sufficient capacity to receive, convey, and control stormwater runoff resulting from the conversion of natural or agricultural lands to developed urban conditions. It is further recognized that increased impervious cover and sediment deposition during and after construction activities can reduce the capacity of storm drains, channels, and other conveyance systems, resulting in potential flooding and erosion hazards.

Therefore, it shall be the policy of the **City of Eagle Pass** that all new development, redevelopment, and significant reconstruction projects shall incorporate provisions for the storage, control, and regulated release of stormwater runoff. The post-development release rate of stormwater runoff from any site shall not exceed the pre-development release rate associated with the existing natural or undeveloped land condition, unless otherwise approved by the City Engineer.

Because of the varied topography, soil characteristics, and availability of drainage outfalls throughout the City of Eagle Pass, drainage requirements for each project will necessarily vary depending on site specific conditions. Accordingly, the developer or engineer shall consult with the **City Engineer's Office** during the preliminary design phase of each project to determine the applicable requirements and appropriate design criteria for stormwater management, detention, and conveyance facilities.

1.2 Interpretation of Codes, Ordinances, and Articles

The **City Engineer** shall have the authority to interpret the provisions of this manual and related City ordinances. The City Engineer may adopt procedures or supplemental criteria to clarify or implement the intent of these regulations. Such interpretations shall be consistent with the objectives of the **City of Eagle Pass Code of Ordinances**, including Chapters governing subdivisions, drainage, stormwater, and floodplain management.

These interpretations may not waive or modify requirements expressly established by ordinance or other legally binding regulations.

1.3 City of Eagle Pass Storm Water Management Ordinance

The **City of Eagle Pass Code of Ordinances**, particularly **Chapter 2, 13.5, 22 and 23**, establishes the legal basis for stormwater management within the City.

Where discrepancy exists between this Design Manual and the Code of Ordinances, the Ordinance shall prevail. This manual serves as the technical companion to the adopted ordinances and outlines acceptable hydrologic and hydraulic design methodologies, construction standards, and plan submittal requirements.

All stormwater management activities must comply with:

- **City of Eagle Pass Code of Ordinances**
- **TCEQ – Texas Pollutant Discharge Elimination System (TPDES) General Permit TXR150000**
- **FEMA National Flood Insurance Program (NFIP)**
- **TWDB Region 15 Flood Planning Guidelines**
- **Maverick County Floodplain Regulations**
- **TxDOT Hydraulic Design Manual** for state rights-of-way when applicable

2.0 CITY OF EAGLE PASS STORM WATER MANAGEMENT POLICY

2.1 Purpose of Storm Water Management Policy

The purpose of the City of Eagle Pass Storm Water Management Policy is to protect the public health, safety, and welfare by minimizing flooding, erosion, and water quality degradation caused by stormwater runoff.

The policy establishes requirements for:

- Preventing property damage due to flooding or erosion
- Protecting natural waterways and drainage corridors
- Promoting infiltration, detention, and sustainable drainage systems (LID/GSI)
- Ensuring that post-development runoff conditions do not exceed pre-development conditions for corresponding design storms
- Maintaining compliance with **TCEQ** and **EPA NPDES Phase II** regulations applicable to small municipal storm sewer systems (MS4)

2.2 Application of Storm Water Management Policy

This manual governs the **planning, design, construction, operation, and maintenance** of all stormwater systems within the **City of Eagle Pass** and its **ETJ**.

All developments, redevelopments, public works projects, and drainage improvements must conform to this manual and the City's stormwater ordinance.

These requirements apply to:

- **All subdivisions** (residential, commercial, industrial)
- **Public infrastructure projects**
- **Detention or retention basins**
- **Channel improvements** and **culvert crossings**
- **Floodplain development permits**

The policy becomes effective upon adoption by the **Eagle Pass City Council** and shall apply to all plans submitted thereafter.

2.3 Responsibility to Accept and Convey Storm Water

The owner or developer of property proposed for development or redevelopment shall be responsible for safely accepting and conveying all stormwater entering, crossing, or otherwise flowing through the property. This responsibility includes stormwater discharged from other existing developed properties, off-site drainage generated under ultimate upstream watershed development conditions, and drainage that naturally enters or crosses the property because of existing topography.

Drainage facilities shall be designed to accommodate ultimate upstream watershed development conditions in accordance with this Manual. The owner or developer shall provide the drainage easements, conveyance facilities, detention facilities, grading, and other improvements necessary to convey the applicable design discharges through the property without increasing flood elevations, velocities, erosion hazards, or flood risk to upstream, downstream, or adjacent properties.

Existing detention facilities may be considered when establishing ultimate watershed conditions, provided that the facilities are existing, legally established, adequately maintained, and reasonably expected to remain operational. Any detention facility credited in the analysis shall be incorporated into the hydrologic and hydraulic models, and supporting documentation regarding its capacity, outlet configuration, maintenance responsibility, and continued operation shall be submitted for review and approval by the City Engineer.

2.4 Regional Storm Water Management

The City of Eagle Pass encourages watershed based and regional stormwater management solutions where such systems provide greater public benefit, improved hydraulic performance, or reduced long-term maintenance obligations.

Where master planned drainage improvements or regional detention facilities exist, the City Engineer may allow participation through construction contribution, proportional cost participation, or an approved fee-in-lieu-of detention program.

Fee-in-lieu participation may be considered only when:

- A regional facility exists or is planned.
- On-site detention is impractical or provides limited benefit.
- Downstream impacts are mitigated.
- The applicant contributes to a fair proportional share of drainage improvements.

Approval of fee-in-lieu participation shall be at the sole discretion of the City Engineer.

Fee schedule is located in The City of Eagle Pass Code of Ordinances, Chapter 27, Article VI, Section 27-21.

All regional drainage systems shall comply with this Manual.

2.5 Subdivision and Development Planning

All This section establishes the stormwater planning and drainage documentation requirements applicable to subdivisions, plats, replats, master development plans, planned developments, infill development, and redevelopment projects within the City of Eagle Pass and its Extraterritorial Jurisdiction (ETJ).

The drainage requirements associated with a development application shall be determined by the proposed land use, plat type, extent of land disturbance, increase in impervious cover, proposed grading, required public or private infrastructure, relationship to existing drainage facilities, and potential effects on upstream, downstream, or adjacent properties.

A **Storm Water Management Plan Report**, hereafter referred to as the **Drainage Report**, shall be prepared and sealed by a Professional Engineer licensed in the State of Texas. The Drainage Report shall document existing and proposed drainage conditions and demonstrate compliance with this Manual. The report shall include, as applicable, drainage-area maps, hydrologic calculations, hydraulic analyses, downstream assessments, floodplain information, detention calculations, overflow routing, proposed drainage facilities, easement requirements, maintenance responsibilities, and supporting plans and profiles.

The drainage information submitted with each application shall be proportional to the type and scale of the proposed development. The City Engineer may require additional information or a more detailed analysis when a proposed development may affect a floodplain, natural watercourse, existing drainage facility, public infrastructure, or neighboring property..

2.5.1 Major Plat

A Major Plat is a subdivision meeting the definition established by the City of Eagle Pass Code of Ordinances or otherwise requiring public or private infrastructure to facilitate development. A subdivision shall also be reviewed under the Major Plat requirements when it includes the construction or modification of streets, storm drains, channels, culverts, detention facilities, floodplain improvements, drainage easements, or other drainage-related infrastructure.

A Drainage Report shall be submitted with the Major Plat. The report shall establish the overall drainage plan for the subdivision and demonstrate that the proposed development will not adversely affect upstream, downstream, or adjacent properties. The report shall identify the drainage facilities required to serve the development, the proposed points of discharge, existing and ultimate-condition peak discharges, required detention, overflow pathways, floodplain impacts, drainage easements, and maintenance responsibilities.

Participation in an approved regional stormwater facility or fee-in-lieu program may be considered only when the downstream assessment demonstrates that the proposed development will not create an adverse impact and the City Engineer approves the proposed participation in accordance with Section 2.4 and the applicable City ordinance.

2.5.2 Minor Plat

A Minor Plat is a subdivision meeting the applicable definition established by the City of Eagle Pass Code of Ordinances and generally involving a limited number of lots without the extension of public infrastructure.

A Drainage Report shall be submitted with the Minor Plat unless the City Engineer determines that a reduced drainage submittal is appropriate based on the size, location, existing development

condition, and anticipated drainage effects of the subdivision. At a minimum, the submittal shall identify existing and proposed drainage patterns, contributing off-site drainage, proposed discharge locations, existing and proposed impervious cover, and any drainage facilities or easements required to serve the property.

Classification as a Minor Plat shall not exempt a development from detention, downstream assessment, floodplain, drainage easement, or no-adverse-impact requirements.

2.5.3 Replat

A replat applies to previously platted property that will be reconfigured, combined, or further subdivided. A Drainage Report shall be required when the replat changes the proposed land use, lot configuration, impervious cover, grading, drainage areas, points of discharge, drainage easements, or required infrastructure.

The Drainage Report shall evaluate the cumulative drainage effects of the previously approved development and the proposed replat. Previously approved drainage facilities may be credited only when their capacity, condition, ownership, maintenance responsibility, and continued availability have been documented to the satisfaction of the City Engineer.

Previous approval of a plat, drainage report, regional participation agreement, or fee payment shall not automatically exempt a replat from current stormwater requirements. Additional drainage improvements, detention, easements, or fees may be required when the replat increases runoff or changes the approved drainage plan.

2.5.4 Amending Plat

An Amending Plat is intended to correct an error or make a limited change to a previously approved or recorded plat without materially altering the approved development or drainage plan.

A drainage certification letter shall accompany the plat application. The letter shall be prepared by the project engineer and shall state whether the proposed amendment changes lot grading, drainage areas, impervious cover, drainage easements, points of discharge, floodplain limits, or public or private drainage infrastructure.

A revised Drainage Report shall be required if the proposed amendment changes any approved drainage condition or may affect upstream, downstream, or adjacent properties.

2.5.5 Master Development Plan

A Master Development Plan is a conceptual, long-range plan that establishes the overall arrangement and anticipated phasing of a residential, commercial, industrial, institutional, or mixed-use development.

A master Drainage Report shall be submitted with the Master Development Plan. The report shall evaluate the entire development area under ultimate development conditions and establish the overall drainage concept, including major drainage areas, receiving systems, points of discharge, detention strategy, regional facility participation, floodplain limits, major channels, trunk storm drains, drainage easements, overflow pathways, and phased improvements.

The master Drainage Report shall be updated when development density, land use, grading, drainage boundaries, discharge locations, infrastructure, floodplain information, or applicable design criteria change. When the report is referenced by a subsequent plat, the plat submittal shall identify the applicable portions of the master Drainage Report and include an exhibit showing the plat area and development phase relative to the overall Master Development Plan.

Reliance on a master Drainage Report shall not eliminate the requirement for detailed calculations and construction plans for each plat or development phase.

2.5.6 Planned Unit Development

A Planned Unit Development shall comply with all stormwater management requirements of this Manual regardless of whether its streets and drainage facilities are proposed for public or private ownership.

A Drainage Report shall be submitted for the entire Planned Unit Development. The report shall address the overall drainage concept, ultimate development conditions, proposed public and private drainage facilities, detention requirements, overflow pathways, drainage easements, and long-term maintenance responsibilities.

Private streets and private drainage facilities shall be designed to provide hydraulic performance and emergency overflow protection equivalent to the applicable City standards. Approval of a private drainage system shall not transfer maintenance responsibility to the City.

2.5.7 Private Street or Enclave Development

A subdivision or development served by private streets shall provide stormwater facilities meeting the applicable hydraulic and safety requirements for public infrastructure unless otherwise approved by the City Engineer.

A Drainage Report shall be required and shall address street drainage capacity, inlet and storm-drain design, roadside or internal drainage systems, positive overflow pathways, detention requirements, emergency access, drainage easements, and the point at which the private system connects to a public or natural drainage system.

The plat and associated property documents shall clearly identify ownership and maintenance responsibilities for all private streets and drainage facilities. A recorded maintenance agreement acceptable to the City shall be required before final acceptance or recording of the plat.

2.5.8 Master-Planned Community

A master-planned community shall be evaluated under the Master Development Plan requirements of Section 2.5.5. Streets within the development may be public or private, but all stormwater facilities shall comply with this Manual.

A master Drainage Report shall be required for the entire community. The report shall establish a coordinated drainage system for all phases and shall prevent individual phases from transferring unresolved drainage impacts to future phases, adjoining properties, or public facilities.

Each subsequent plat or phase shall demonstrate consistency with the approved master Drainage Report and identify any changes in land use, impervious cover, drainage boundaries, detention, discharge location, or infrastructure.

2.5.9 Development Phasing Plan

When a development will be constructed in multiple phases, a Development Phasing Plan shall be submitted as part of the master Drainage Report. The plan shall identify the sequence and timing of drainage improvements necessary to serve each phase.

Each phase shall function as a hydraulically complete and independent development unless temporary facilities are specifically approved by the City Engineer. Required downstream conveyance facilities, detention facilities, emergency spillways, overflow pathways, erosion protection, and drainage easements shall be constructed before or concurrently with the phase that depends upon them.

Temporary drainage facilities shall be identified in the construction plans and shall include provisions for operation, maintenance, removal, and replacement by permanent facilities.

2.5.10 Infill Development

Infill development shall comply with the stormwater management requirements of this Manual. The drainage submittal shall document existing site conditions, existing impervious cover, proposed impervious cover, existing and proposed drainage patterns, off-site drainage entering the property, discharge locations, and available downstream capacity.

The City Engineer may authorize a reduced Drainage Report for a small infill development when the project does not alter a floodplain or natural watercourse, does not require new drainage infrastructure, does not redirect runoff, and does not create an adverse drainage impact.

Infill status shall not exempt a project from providing positive drainage, accepting off-site runoff, protecting adjacent properties, preserving required drainage easements, or complying with applicable detention and floodplain requirements.

2.5.11 Special Planning or Redevelopment District

Development located within a special planning, reinvestment, historic, downtown, or redevelopment district established by the City shall comply with the stormwater requirements of this Manual unless a specific alternative standard has been adopted by ordinance.

A Drainage Report shall be required when development increases impervious cover, changes site grading or drainage patterns, modifies a point of discharge, affects a drainage easement or floodplain, or requires new or modified drainage infrastructure.

Any waiver or reduction of development fees authorized for a special district shall not constitute a waiver of drainage analysis, detention, conveyance, floodplain protection, or no-adverse-impact requirements.

2.5.12 Redevelopment Projects

A redevelopment project shall comply with the stormwater management requirements of this Manual. A Drainage Report shall be submitted when redevelopment changes land use, grading, impervious cover, drainage patterns, points of discharge, floodplain conditions, or drainage infrastructure.

Existing impervious cover may be recognized when it is lawful, documented, and directly associated with the existing development. The analysis shall compare proposed conditions with the applicable existing-condition criteria established by this Manual and shall demonstrate that redevelopment will not increase peak discharges or create adverse drainage impacts.

Existing stormwater facilities may be incorporated into the proposed design only when the engineer demonstrates that they have adequate structural condition, hydraulic capacity, positive overflow protection, and legal access for continued operation and maintenance. Deficient facilities shall be replaced, rehabilitated, or supplemented as required by the City Engineer.

2.6 Drainage Plan Submittals

All development applications must include **Preliminary and Final Drainage Plans** prepared and sealed by a **Texas Licensed Professional Engineer** experienced in hydrology and hydraulics.

Preliminary Drainage Plan – submitted with the preliminary plat:

- Conceptual layout of drainage areas and proposed facilities
- Flow paths and discharge points
- Existing topography and proposed grading
- Initial sizing of conveyance systems and detention requirements

Final Drainage Plan – submitted with the final plat or construction plans:

- Full hydrologic and hydraulic computations (HEC-HMS, HEC-RAS, or Rational Method)
- Storm drain and open channel profiles with hydraulic grade line (HGL) analysis
- Detailed plan sheets for inlets, manholes, detention ponds, spillways, and outfalls
- Certification of compliance with City standards and TCEQ TPDES permitting

Drainage plans shall be reviewed by the **City Engineer** or designee and approved prior to construction.

2.7 Drainage System Classifications

2.7.1 Major Drainage Systems

Major drainage systems convey floodwater from large watershed areas and must safely carry the 100-year storm event within dedicated rights-of-way or easements.

Major systems include:

- Natural or improved channels
- Regional detention reservoirs
- Bridges and culverts
- Roadway overflow sections or swales
- Storm drains serving sump areas

2.7.2 Minor Drainage Systems

Minor drainage systems convey frequent flows from local catchments, streets, and developed surfaces during the **25-year design storm**.
Minor systems consist of:

- Storm drain pipes, inlets, and laterals
- Roadside ditches and driveway culverts
- Street gutters and alleys

Minor systems must be designed to prevent flooding of streets or property and to discharge into a designated major system or outfall.

2.8 Floodplain Development

All developments located within a FEMA mapped Special Flood Hazard Area (SFHA), regulatory floodway, or other identified flood-prone area shall comply with the City Floodplain Management Ordinance and National Flood Insurance Program (NFIP) requirements.

Any project that alters floodplain storage, conveyance, channel geometry, bridge opening, culvert capacity, or base flood elevations shall submit supporting hydrologic and hydraulic analyses prepared by a Texas Licensed Professional Engineer.

Developments shall not increase base flood elevations, floodway velocities, flood hazards, or flood risk to adjacent properties.

Where required by the City Floodplain Administrator, the developer shall obtain and fully fund any applicable FEMA submittals including:

- No-Rise Certification
- Conditional Letter of Map Revision (CLOMR)
- Letter of Map Revision (LOMR)
- Letter of Map Amendment (LOMA), if applicable

No final acceptance shall occur until required FEMA actions are complete.

2.9 Drainage Structure Aesthetics

Drainage design must consider **aesthetics and community character** in addition to hydraulic function.

Where feasible:

- Preserve and enhance **natural waterways** as greenbelts
- Integrate **LID** features (bio-swales, vegetated buffers, detention wetlands)
- Use natural stone, textured concrete, or vegetated slopes to blend with surroundings
  The City may require **landscape restoration or buffer planting** for visible channels and detention ponds.

2.10 Drainage Design Computations

All stormwater computations must be:

- Based on **ultimate watershed conditions** using **Atlas 14 rainfall data** for Maverick County
- Prepared using approved hydrologic and hydraulic software (HEC-HMS, HEC-RAS, FlowMaster, or equivalent FEMA-approved models)
- Sealed and signed by a **Texas Licensed Professional Engineer**

Design sheets shall summarize:

- Time of concentration paths
- Peak discharges for multiple storm frequencies
- Hydraulic grade lines
- Pipe sizes, velocities, and slopes
- Detention basin routing and stage-storage relationships

2.11 Construction of Drainage Facilities

Construction must minimize erosion, sedimentation, and pollutant discharge in compliance with **TCEQ TPDES Construction General Permit TXR150000**.

Contractors shall implement appropriate **Best Management Practices (BMPs)** and **Stormwater Pollution Prevention Plans (SWPPP)** during all construction phases. Tree preservation, slope stabilization, and revegetation are strongly encouraged to maintain drainage function and water quality.

2.12 Maintenance of Drainage Facilities

Drainage facilities dedicated to and formally accepted by the City shall be maintained by the City of Eagle Pass.

Privately owned drainage facilities, including detention ponds, retention basins, private storm drains, swales, and associated appurtenances, shall be maintained by the property owner, developer, HOA, or responsible entity.

Private facilities require a recorded maintenance agreement acceptable to the City. Failure to maintain private facilities may result in enforcement action by the City.

2.13 Drainage Plan Requirements

The **Drainage Plan** shall include all maps, profiles, computations, and design documentation necessary for City review, following the same standards detailed in the City of Eagle Pass manual.

This includes:

- Drainage area maps
- Plan and profile sheets for storm drains and channels
- Bridge and culvert design details
- Environmental impact summary and permitting documentation
- Detention/retention basin design and emergency spillway analysis
- Levee and interior drainage details if applicable

2.14 Erosion Hazard Setback Regulation

An **Erosion Hazard Setback Zone (EHSZ)** shall be established along all natural streambanks to minimize structural loss from erosion:

1. Locate the **toe of the natural bank**.
2. Project a line upward at a **4H:1V slope** until it meets natural ground.
3. Extend **15 ft** horizontally from this intersection away from the stream to define the setback.

For rocky or cemented banks, a **3H:1V slope** may be used with approval by a licensed geotechnical engineer.

No permanent structures may be built within the erosion hazard setback without City Engineer approval.

The Erosion Hazard Setback Zone (EHSZ) may be modified when supported by a geotechnical analysis, hydraulic analysis, bank stabilization design, or other engineering study acceptable to the City Engineer.

3.0 DETERMINATION OF DESIGN DISCHARGE

3.1 General

The purpose of this section is to establish the overall framework for determining design discharges to be used in the planning, analysis, and design of stormwater infrastructure within the City of Eagle Pass. Design discharges shall be based on accepted hydrologic and hydraulic engineering methods using the rainfall criteria, watershed conditions, and computational procedures contained in the City of Eagle Pass Stormwater Design Criteria Manual.

Because stormwater facilities serve different functions and are subject to varying levels of risk, the required design storm frequency, hydraulic performance criteria, freeboard, allowable encroachment, overflow routing, storage requirements, and other design parameters shall vary by facility type. Accordingly, detailed design criteria are provided within the individual sections applicable to each drainage element.

3.2 Applicability by Facility Type

The engineer shall refer to the respective sections of the City of Eagle Pass Stormwater Design Criteria Manual for the specific design discharge requirements and criteria applicable to the proposed improvement. These include, but are not limited to, the following:

- **Section 6 Street Flow:** allowable spread, gutter flow, roadway encroachment, and major storm overflow routing.
- **Section 7 Inlet Design:** inlet interception capacity, spacing, sag conditions, and clogging considerations.
- **Section 8 Storm Drain Design:** pipe system design flows, hydraulic grade line analysis, surcharge limits, velocities, and outfall requirements.
- **Section 9 Open Channel Design:** channel conveyance capacity, freeboard, side slopes, velocity limits, shear stress, and lining requirements.
- **Section 10 Detention and Retention Facilities:** required storage volume, allowable release rates, outlet structure sizing, emergency spillways, and drainage time requirements.
- **Section 11 Culvert Design:** design storm frequency, headwater limitations, inlet and outlet control, barrel capacity, and outlet protection.
- **Section 12 Bridges and Crossings:** bridge opening capacity, backwater limitations, scour protection, debris clearance, and freeboard requirements.
- **Section 13 Erosion and Sediment Control:** temporary and permanent stabilization measures, allowable velocities, and sediment control requirements.

3.3 Hydrologic Basis of Design

All design discharges shall be determined using the hydrologic procedures contained in Section 5 of the City of Eagle Pass Stormwater Design Criteria Manual. Methods may include the Rational Method, Modified Rational Method where approved, unit hydrograph procedures, detention routing, or other methods approved by the City Engineer. Rainfall data shall be based on NOAA Atlas 14 criteria as provided in Secton 4.

3.4 Existing and Ultimate Conditions

Unless otherwise approved by the City Engineer, drainage analyses shall consider existing downstream constraints and ultimate upstream watershed development conditions where such future development may reasonably affect the proposed system.

3.5 Engineer Responsibility

The design engineer shall be responsible for selecting the appropriate design methodology, storm frequency, and analysis limits based on the proposed facility type and the requirements of the applicable section of the City of Eagle Pass Stormwater Design Criteria Manual. Where unusual conditions exist, the City Engineer may require additional analyses or more stringent criteria to protect public safety and adjacent property.

4.0 DESIGN RAINFALL

4.1 Rainfall Intensity–Duration–Frequency

Design rainfall intensities shall be based on **NOAA Atlas 14, Volume 11**, precipitation-frequency data for **Maverick County, Texas**.

The **City of Eagle Pass** shall use the following equation to compute rainfall intensity:

$$I = \frac{b}{(T_d + d)^e}$$

Equation 4-1

Where:

- ***I*** = Rainfall intensity (in/hr)
- T_d = Rainfall duration (minutes)
- b, d, e= Coefficients from Table 4-1

Table 4-1 Rainfall IDF Equation Coefficients (City of Eagle Pass – Atlas 14)

Return Period (years)	b	d	e
2	79.6540	14.1321	0.8577
5	105.9990	14.8039	0.8570
10	127.8018	15.4138	0.8525
25	158.3243	16.2285	0.8455

In September 2018, the National Oceanic and Atmospheric Administration (NOAA) released updated precipitation frequency estimates for Texas. These estimates are available through NOAA's Precipitation Frequency Data Server.

(PFDS) website and the report documenting the approach is also available at the same website – NOAA Atlas 14, Volume 11: Precipitation-Frequency Atlas of the United States. This new rainfall data is considered best available data and should be used for all projects. Tabular IDF data are available from the PFDS, but linear interpolation or curve generation is needed to obtain intensity values between tabular durations. Ongoing TxDOT research will produce future e, b, d coefficients to better automate intensity calculations. However, barring significant project implementation concerns, Atlas 14 IDF data should be used. Exceptions must be approved by the DHE or DES HYD and noted on the plans or drainage report.

Currently, the coefficients in Equation 4-1 can be found in the EBDLKUP-019vc6.2.10.xlsx spreadsheet lookup tool (developed by Cleveland et al. 2015) for specific frequencies listed by county. This spreadsheet is based on prior rainfall frequency-duration data contained in the Atlas of Depth-Duration Frequency (DDF) of Precipitation of Annual Maxima for Texas (TxDOT 5-1301-01-1).

4.2 Rainfall Depth-Duration-Frequency

For the Design Rainfall, a twenty-four (24) hour rainfall distribution shall be applied for hydrograph based runoff calculations. Rainfall intensities as adopted for the City of Eagle Pass are given in Table 4-2.

Table 4-2 Design Rainfall Values (inches)

Duration	2-year	5-year	10-year	25-year	50-year	100-year
5 min	0.540	0.702	0.845	1.05	1.22	1.40
10 min	0.855	1.11	1.34	1.67	1.95	2.24
15 min	1.09	1.42	1.70	2.11	2.45	2.80
30 min	1.57	2.02	2.42	3.00	3.46	3.94
1 hr	2.04	2.65	3.19	3.97	4.61	5.29
2 hr	2.44	3.24	3.98	5.08	6.04	7.08
3 hr	2.66	3.56	4.44	5.77	6.94	8.26
6 hr	3.02	4.08	5.14	6.79	8.29	10.0
12 hr	3.37	4.50	5.67	7.52	9.23	11.2
24 hr	3.73	4.93	6.19	8.20	10.1	12.3

4.3 Probable Maximum Precipitation (PMP)

The **Probable Maximum Precipitation (PMP)** for Maverick County shall be estimated using **Hydrometeorological Report (HMR) Nos. 51 and 52**.
The PMP represents the theoretical maximum precipitation for a given area and duration under modern meteorological conditions. PMP data shall be obtained using **USACE HMR52 software**, distributing rainfall across sub-basins for reservoir and dam safety studies.

Storm centers shall be positioned at the basin centroid and shifted incrementally (0.1 mi) to identify the **critical PMP location** producing the greatest average rainfall.

4.4 Rainfall Loss Rates

Effective design rainfall equals total rainfall minus initial losses due to interception, infiltration, and depression storage.

Loss rates depend on the method used for flow computation:

- **Rational Method** losses represented by the runoff coefficient I.
- **Unit Hydrograph Methods (SCS or Snyder)** losses represented by:
    - **Initial and constant loss rate**
    - **SCS Curve Number** method.

The SCS method shall use curve numbers corresponding to **ultimate land-use conditions**, adjusted for local **soil hydrologic groups (A–D)** per the **NRCS Soil Survey for Maverick County**.

5.0 HYDROLOGIC COMPUTATION METHODS

5.1 General

Hydrologic computations transform rainfall into runoff for the purpose of designing stormwater facilities such as storm drains, culverts, detention basins, and channels.

This section establishes the acceptable procedures and parameters for calculating design discharges within the **City of Eagle Pass** and its **ETJ**.

All hydrologic analyses shall:

- Be based on **fully developed** watershed conditions.
- Use **Atlas 14 rainfall data for Maverick County** in Section 4.0.
- Be performed by a **Texas Licensed Professional Engineer** experienced in hydrology and hydraulics.
- Hydrologic analyses shall generally include the 5-year, 25-year, and 100-year storm events unless otherwise approved by the City Engineer.
- Use methods and computer programs approved by the **City Engineer**.

For channels, floodplains, and large drainage areas, **HEC-HMS** or **HEC-RAS** shall be used for hydrologic and hydraulic modeling.

For smaller areas (<200 acres), the **Rational Method** is required.

5.2 Downstream Hydrologic Assessment

The purpose of downstream assessment is to prevent adverse impacts on existing systems and properties.

Each project must demonstrate that:

- **Post-development peak discharge** does not exceed **pre-development peak discharge** for the same storm frequency.
- The **volume and timing** of runoff do not increase flooding downstream.
- Detention or flow control structures are properly located and sized according to **hydrograph timing** and **watershed influence**.

5.3 Rational Method

The **Rational Method** is required for areas up to **200 acres** and provides a simple but reliable means of estimating peak discharge for urbanized basins.

$$Q = C\ I\ A$$

Equation 5-1

Where:
Q = Peak discharge (cfs)
C = Runoff coefficient (dimensionless)
I = Rainfall intensity (in/hr) during the time of concentration for the selected return period
A = Drainage area (acres)

5.3.1 Runoff Coefficient

Runoff coefficients represent the fraction of rainfall that becomes runoff and shall be selected from **Table 5-1** for fully developed (ultimate) land use conditions.

Table 5-1 Runoff Coefficients (C value) – City of Eagle Pass

Character of Area	Up to 1%	Over 1% up to 3%	Over 3% up to 5%	Over 5%
Business or commercial areas (90% or more impervious), Existing Pavement / Buildings or Zoning Districts O, C, I-1, I-2	95	96	97	97
Densely developed areas (80% to 90% impervious) or Zoning Districts D, MX, NC, TOD, Use Pattern TND	85	88	91	95
Closely built residential areas and school sites or Zoning Districts MF, R-4	75	77	80	84
Undeveloped areas* – Present land is undeveloped, and ultimate land use is unknown. C values for use in ultimate development calculations.	68	70	72	75
Large lot residential area or Zoning Districts R20, RE	55	57	62	64
Undeveloped areas* – Existing conditions.	-	-	-	-
Average residential area or Zoning Districts R-5, R-6	65	67	69	72

Cultivated or Range (Grass Cover < 50% of Area)	44	47	53	55
Range (Grass Cover 50–75% of Area)	37	41	49	53
Forest or Range (Grass Cover > 75% of Area)	35	39	47	52

When a drainage area includes multiple land uses, calculate a **weighted runoff coefficient**:

$$C_\omega = \frac{\sum(A_i C_i)}{\sum A_i}$$

Equation 5-2

Where A_i and C_i are the area (acres) and coefficient for each sub-area.

5.3.2 Time of Concentration (Tc)

The time of concentration shall be defined as the travel time from the hydraulically most distant point of the drainage area to the design point. TR-55 "Urban Hydrology for Small Watersheds," SCS 1986 may be used, please consider the maximum and minimum allowable time when defining overland flow length (L).

$$T_c = T_o + T_s + T_h$$

Equation 5-3

Where:
T_o = Overland flow time (min)
T_s = Shallow concentrated flow time (min)
T_h = Channelized flow to inlet (min)

Overland Flow

Sheet flow shall be limited to a maximum length of **100 feet**. Flow paths exceeding 100 feet shall be analyzed as shallow concentrated flow or channelized flow for the remaining distance. Maximum allowable time is twenty (20) minutes. Minimum is five (5) minutes.

$$T_o = 0.007\left(\frac{n\,L^{0.8}}{R^{0.5}\,S^{0.4}}\right)$$

Equation 5-4

Where:
n = Manning's coefficient for sheet flow (see Table 5-2)
L = Flow length (ft)
R = 3.73 in (2-year, 24-hr rainfall depth (in))
S = Slope (ft/ft)

Table 5-2 Roughness Values for Overland Flow

Surface Description	n
Smooth surface (concrete, asphalt, gravel or baresoil)	0.011
Cultivated soils:	
Residue cover < 20%	0.06
Residue cover ≥ 20%	0.17
Grass:	
Short grass prairie	0.15
Dense grasses	0.24
Bermudagrass	0.41
Range (natural)	0.13
Woods:	
Light underbrush	0.40
Dense underbrush	0.80

Shallow Concentrated Flow

$$V_s = K\ S^{0.5}$$

Equation 5-5

Where:
V_s = Flow velocity (ft/s)
K = 16.1 (unpaved), 20.3 (paved)
S = Slope (ft/ft)

$$T_s = \frac{L}{60\ V_s}$$

Equation 5-6

Channelized Flow

$$T_h = \frac{L}{60\ V_h}$$

Equation 5-7

Where:
V_h = Velocity using Manning's Equation for open channel or conduit flow.

Channel flow velocities shall be determined using existing hydraulic models where available or Manning's Equation. For ultimate development hydrologic analyses, a minimum channel velocity of 6 fps may be used when estimating time of concentration in non-floodplain channels.

5.3.3 Modified Rational Method

For small developments and detention facilities where approved by the City Engineer, the Modified Rational Method may be used to estimate runoff volume and required detention storage.

This method applies to the Rational Method peak discharge relationship over varying storm durations to estimate hydrograph volume.

Use of the Modified Rational Method is generally limited to drainage areas of approximately 20 acres or less unless otherwise approved.

All assumptions, rainfall durations, runoff coefficients, and storage calculations shall be clearly documented.

5.4 Unit Hydrograph Methods

For drainage basins **larger than 200 acres**, use the **SCS (NRCS)** or **Snyder Unit Hydrograph** methods to convert rainfall excess into runoff hydrographs. Acceptable hydrologic models are HEC-HMS or FEMA approved models.

5.4.1 *Snyder Unit Hydrograph*

$$t_p = C_t\left(\frac{L\,L_h}{S^{0.5}}\right)^{0.33}$$

Equation 5-9

$$Q_p = C_p\,\frac{640\,A}{t_p}$$

Equation 5-10

Where:
t_p = Lag time (hours)
C_t = Regional coefficient (use 1.3 for Eagle Pass)
C_p = Peaking coefficient (use 0.72)
L = Main channel length (miles)
L_c = Distance from basin outlet to centroid (miles)
S = Main channel slope (ft/ft)
A = Drainage area (mi²)

5.4.2 SCS (NRCS) Unit Hydrograph Method

The NRCS method is recommended for **detention pond routing**, **floodplain modeling**, and **watershed master planning**.

$$Q_p = \frac{484\ A\ P_e}{T_p}$$

Equation 5-11

Where:
Q_p = Peak discharge (cfs)
A = Drainage area (mi²)
P_e = Effective rainfall (in)
T_p = Time to peak (hr)

The **time to peak** is computed as:

$$T_p = 0.6T_h + 0.5D$$

Equation 5-12

Where D = duration of rainfall (hr).

5.4.3 Runoff Curve Number (CN)

The CN method accounts for infiltration and land use.
Use **Table 5-4** for typical curve numbers applicable to **Eagle Pass soil groups** (A–D).

Table 5-4 Representative NRCS Curve Numbers (City of Eagle Pass)

Cover Description: Hydrologic condition / average percent impervious area	A	B	C	D
Cultivated land				
without conservation treatment	72	81	88	91
with conservation treatment	62	71	78	81
Pasture or range land				
poor condition	68	79	86	89
good condition	39	61	74	80
Meadow				
good condition	30	58	71	78
Wood or forest land				
thin stand, poor cover	45	66	77	83
good cover	30	55	70	77
Open space (lawns, parks, golf courses, cemeteries, etc.)				
Poor condition (grass cover <50%)	68	79	86	89
Fair condition (grass cover 50% to 75%)	49	69	79	84
Good condition (grass cover >75%)	39	61	74	80
Impervious areas				
Paved parking lots, roofs, driveways	98	98	98	98
Streets and roads				
Paved; curbs and storm drains	98	98	98	98
Paved; open ditches (including right-of-way)	83	89	92	93
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Urban districts				
Commercial and business (85%)	89	92	94	95
Industrial (72%)	81	88	91	93
Residential districts by average lot size				
1/8 acre or less (town houses) (65%)	77	85	90	92
1/4 acre (38%)	61	75	83	87
1/3 acre (30%)	57	72	81	86
1/2 acre (25%)	54	70	80	85
1 acre (20%)	51	68	79	84
2 acres (12%)	46	65	77	82
Developing urban / newly graded areas (pervious areas only, no vegetation)	77	86	91	94

5.4.4 Weighted Curve Number

If multiple land uses exist:

$$CN_{\omega} = \frac{\sum A_i \, C \, N_i}{\sum A_i}$$

Equation 5-13

5.5 Hydrologic Computer Programs

Approved software for hydrologic computations includes:

- **HEC-HMS (v4.12 or newer)** — primary hydrologic model
- **HEC-RAS** — for routing and unsteady flow analysis
- **FlowMaster, CulvertMaster, StormCAD, or PondPack** — for design checks
- **TR-55** or **WinTR-55** — for simplified hydrograph generation

All submitted models must include:

- **Digital input/output files (.hms, .ras, .xml, etc.)**
- **Watershed maps, Tc flow paths, and cross-sections**
- **Tabulated summary of peak flows shall generally include the 5-year, 25-year, and 100-year storm events unless otherwise approved by the City Engineer.**
- **Routing results for detention and outlet control**

Hydrologic models shall be reviewed by the **City Engineer** for compliance with local conditions and parameter selection.

5.6 Documentation and Submittal

Each drainage report shall include:

1. Methodology summary and assumptions.
2. Time of concentration calculations and flow path maps.
3. Rainfall data (Atlas 14 tables used).
4. Hydrograph plots and stage discharge relationships.
5. Existing and proposed conditions drainage area map.
6. Comparison of pre-development and post-development discharges.
7. Detention basin routing and HGL analyses.
8. Digital model files for verification.

6.0 STREET FLOW

6.1 Introduction

The street system is an integral component of the City of Eagle Pass drainage system and is intended to function as both a transportation facility and a stormwater conveyance system. Streets may be utilized to convey stormwater runoff when the capacity of the underground storm drain system is exceeded.

Street drainage systems shall be designed to safely convey runoff from both the minor and major storm events while maintaining public safety, minimizing disruption to traffic, and preventing damage to public and private property. Street flow calculations shall be performed using Manning's Equation and procedures contained in the latest edition of FHWA Hydraulic Engineering Circular No. 22 (HEC-22).

The use of public streets as components of the major drainage system is acceptable provided that runoff remains within the public right-of-way and does not result in structural flooding.

6.2 Design Guidelines

6.2.1 Design Frequency and Spread

Streets draining a watershed greater than one hundred (100) acres shall be designed using the one hundred (100) year design storm event. Street widths shall not be increased beyond the roadway width established by the applicable street classification solely to accommodate stormwater runoff. Pavement widths, longitudinal street grades, and pavement cross slopes shall conform to the latest City of Eagle Pass roadway design standards and applicable transportation design criteria.

6.2.1.1 Street Classification – Primary and Secondary Arterial Streets

A Primary or Secondary Arterial Street is a street designated on the current Thoroughfare Plan of the City of Eagle Pass. One (1) lane in each direction on an arterial street shall remain passable with a flow depth not to exceed 0.30 feet in the passable lane during the twenty-five (25) year design storm event or the one hundred (100) year design storm event when the street drains a watershed greater than one hundred (100) acres.

The maximum depth of water within the street section shall not exceed seven (7) inches, corresponding to the height of a standard curb.

6.2.1.2 Street Classification – Collector Streets and Local “B” Streets

Collector Streets and Local "B" Streets are intended to convey traffic between residential areas and the arterial roadway system. During the twenty-five (25) year design storm event,

stormwater runoff may encroach into the pavement section provided that one lane of traffic remains passable.

The maximum depth of water within the passable lane shall not exceed 0.30 feet. The maximum depth of water within the street section shall not exceed seven (7) inches.

6.2.1.3 Street Classification – Local “A” Streets

Local "A" Streets are low-volume residential streets intended primarily to provide access to adjacent properties. During the twenty-five (25) year design storm event, stormwater runoff may spread to the crown of the roadway.

The maximum depth of water within the street section shall not exceed seven (7) inches. Flow during the one hundred (100) year design storm event shall remain within the public right-of-way and shall not result in structural flooding.

6.2.1.4 Street Classification – Alley

Alleys may be utilized as stormwater conveyance facilities when approved by the City Engineer. The maximum depth of flow within an alley during the twenty-five (25) year design storm event shall not exceed six (6) inches.

Flow shall remain within the alley section and shall not create flooding conditions on adjacent private property.

6.2.1.5 Street Classification – Traditional Street Design

Traditional street designs shall conform to the storm frequency requirements of the standard street classifications listed above as follows:

- Trails, Alleys, and Lanes shall utilize the Alley design criteria.
- Local Streets or Avenues shall utilize the Local "A" Street design criteria.
- Main Streets shall utilize the Local "A", Local "B", or Collector Street design criteria depending on pavement width and roadway function. Local "A" Street criteria shall be used where pavement width is less than thirty-four (34) feet.
- Boulevards and Parkways shall utilize the Primary and Secondary Arterial Street design criteria.
- County-type roadway sections without curbs and utilizing roadside ditches shall be designed to contain the twenty-five (25) year design storm event within the public right-of-way.

6.2.2 Street Capacity

Streets may be utilized for stormwater conveyance only when the calculated runoff does not exceed the maximum allowable flow depth and velocity established for the applicable street classification.

Where streets are not capable of conveying the required design discharge, inlets, curb openings, or storm drain facilities shall be provided. These facilities shall discharge to an approved storm drain system, drainage channel, detention facility, or other approved drainage conveyance system. Partial bypass of upstream inlets may be permitted when the cumulative capacity of the downstream drainage system is sufficient to safely convey the design discharge.

The design criteria for inlets and storm drain systems are presented in Chapters 7 and 8 of this Manual.

Curb cuts associated with driveways shall be designed to maintain the stormwater conveyance function of streets. The design storm runoff shall remain within the public right-of-way. Consideration shall be given to cross streets, driveway approaches, and other roadway features that may influence drainage patterns.

Where dwelling units are located on the downhill side of a T-intersection, cul-de-sac, knuckle, or other roadway configuration receiving street runoff, the roadway shall be graded to prevent water from overtopping the curb and leaving the public right-of-way. Hydraulic calculations shall be provided demonstrating that the design discharge remains within the street section.

No flow capacity tables are provided for traditional street sections due to the variety of geometric characteristics associated with these roadway types. When proposing traditional street designs, project-specific hydraulic calculations shall be submitted for review and approval by the City Engineer.

Table 6-1 Manning's Roughness Coefficient

Pavement Description	Manning's "n" Value
Concrete Pavement (Wood Float Surface Finish)	0.015
Asphalt Pavement	0.018

Longitudinal Slope	Marginal Street 27' Pavement Width		Minor Street 31' Pavement Width		Collector Street 39' Pavement Width		Arterial Street 27' Width per Roadway	
	wp=28.17 ft, A=12.02 sf, r=0.43		wp=32.17 ft, A=13.18 sf, r=0.41		wp=40.17 ft, A=15.02 sf, r=0.37		wp=28.17 ft, A=12.02 sf, r=0.43	
Slope	Q (cfs)	Vel. (fps)	Q (cfs)	Vel. (fps)	Q (cfs)	Vel. (fps)	Q (cfs)	Vel. (fps)
0.40%	35.65	2.97	38.04	2.89	40.79	2.72	35.65	2.97
0.45%	37.81	3.15	40.35	3.06	43.27	2.88	37.81	3.15
0.50%	39.85	3.32	42.53	3.23	45.61	3.04	39.85	3.32
0.55%	41.80	3.48	44.61	3.39	47.83	3.19	41.80	3.48
0.60%	43.66	3.63	46.59	3.54	49.96	3.33	43.66	3.63
0.65%	45.44	3.78	48.49	3.68	52.00	3.46	45.44	3.78
0.70%	47.15	3.92	50.32	3.82	53.96	3.59	47.15	3.92
0.75%	48.81	4.06	52.09	3.95	55.86	3.72	48.81	4.06
0.80%	50.41	4.20	53.80	4.08	57.69	3.84	50.41	4.20
0.85%	51.96	4.32	55.46	4.21	59.46	3.96	51.96	4.32
0.90%	53.47	4.45	57.06	4.33	61.19	4.08	53.47	4.45
0.95%	54.93	4.57	58.63	4.45	62.86	4.19	54.93	4.57
1.00%	56.36	4.69	60.15	4.57	64.50	4.30	56.36	4.69
1.50%	69.03	5.75	73.67	5.59	78.99	5.26	69.03	5.75
2.00%	79.71	6.63	85.06	6.46	91.21	6.07	79.71	6.63
2.50%	89.11	7.42	95.10	7.22	101.98	6.79	89.11	7.42
3.00%	97.62	8.12	104.18	7.91	111.71	7.44	97.62	8.12
3.50%	105.44	8.78	112.53	8.54	120.66	8.04	105.44	8.78
4.00%	112.72	9.38	120.30	9.13	128.99	8.59	112.72	9.38
4.50%	119.56	9.95	127.60	9.68	136.82	9.11	119.56	9.95
5.00%	111.59	10.00	127.63	10.00	144.22	9.60	111.59	10.00
5.50%	103.68	10.00	118.61	10.00	148.47	10.00	103.68	10.00
6.00%	96.96	10.00	110.94	10.00	138.92	10.00	96.96	10.00
6.50%	91.17	10.00	104.34	10.00	130.69	10.00	91.17	10.00
7.00%	86.12	10.00	98.58	10.00	123.51	10.00	86.12	10.00
7.50%	81.68	10.00	93.52	10.00	117.19	10.00	81.68	10.00

8.00%	77.74	10.00	89.02	10.00	111.57	10.00	77.74	10.00
8.50%	74.22	10.00	84.99	10.00	106.54	10.00	74.22	10.00
9.00%	71.04	10.00	81.36	10.00	102.01	10.00	71.04	10.00
9.50%	68.17	10.00	78.08	10.00	97.91	10.00	68.17	10.00
10.00%	65.55	10.00	75.09	10.00	94.17	10.00	65.55	10.00

Figure 6-1 Storm Drainage, Flow Velocities & Capacities for Typical Conventional Street

6.2.3 High Velocity Flow

Street flow velocities shall be evaluated for all roadway drainage analyses. Excessive flow velocities may create hazardous conditions for motorists and pedestrians and may result in pavement deterioration or erosion.

The maximum allowable street flow velocity shall be ten (10) feet per second. Where calculated velocities exceed this limit, additional storm drain facilities, inlets, or alternative drainage improvements shall be provided.

6.2.4 Longitudinal Slope

Longitudinal slopes of a roadway are determined by its street classification as described in Sections 6.2.1. City of Eagle Pass Engineering Design Standards shall be used as the latest design standards.

6.2.4.1 Minimum

The minimum longitudinal street grade shall be 0.50 percent to provide positive drainage and prevent excessive ponding within the gutter section.

6.2.4.2 Maximum

The maximum longitudinal street grade shall comply with the City of Eagle Pass roadway design standards. Street drainage calculations shall demonstrate that runoff velocities remain within the allowable limits established by this Manual.

Where steep street grades result in flow velocities exceeding ten (10) feet per second, storm drain inlets or other drainage improvements shall be provided to intercept runoff and reduce street flow velocities.

6.2.5 Inverted Crown

Streets with inverted crowns may be acceptable when approved by the City Engineer.

Inverted crown street sections shall be designed to safely convey the applicable design storm runoff without creating hazardous traffic conditions or increasing flood risks to adjacent properties. The maximum depth of flow within an inverted crown street section shall not exceed seven (7) inches during the applicable design storm event.

Hydraulic calculations demonstrating compliance with the design criteria of this Manual shall be submitted for review and approval.

6.2.6 Flow in Sag – Vertical Curves

Sag vertical curves shall be designed to prevent excessive ponding and maintain safe roadway operation. A minimum of two inlets shall be provided at sag locations.

Ponding analyses shall be performed assuming one inlet is completely clogged. The resulting water surface elevation shall remain below adjacent finished floor elevations and shall not create hazardous traffic conditions.

6.2.7 Unflooded Public Road Access

Public roadways serving developed areas shall provide reasonable emergency access during major storm events. Where practical, at least one public access route shall remain passable during the one hundred (100) year design storm event.

When unflooded access cannot be provided, the design engineer shall demonstrate that no additional flood hazards are created and that emergency access can be reasonably maintained during storm events.

6.3 Adverse Impact

Minimum standards for identifying Dangerous Roadway conditions are identified in **Figure 6-2** below.

Note: The City of Eagle Pass contends that any runoff crossing a roadway creates a potentially dangerous condition. **Figure 6-2** represents the maximum flow depth over roadways that the City will accept in adverse impact analyses signed and sealed by the licensed professional engineers.

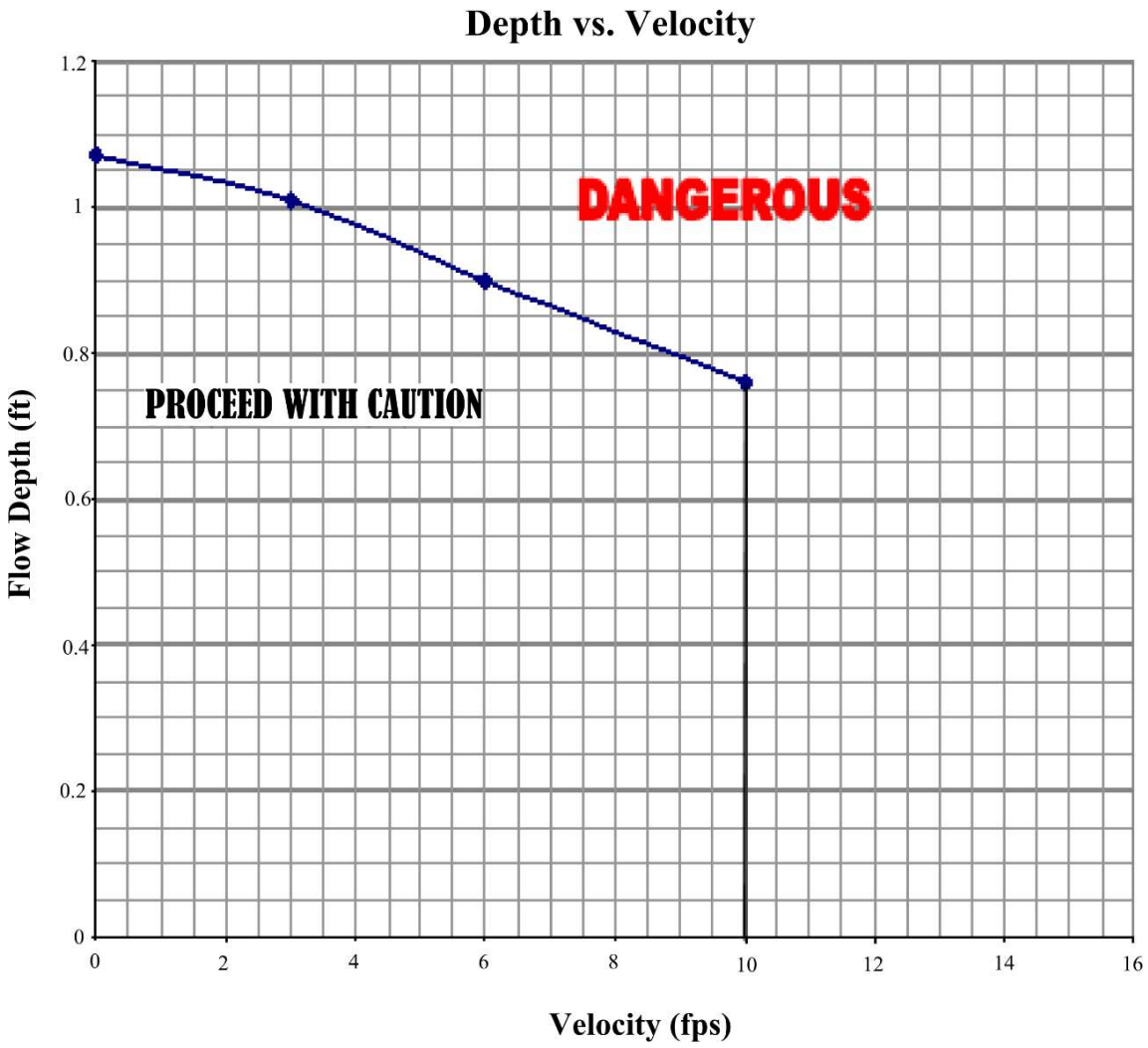

Figure 6-2 Roadway Flow Depth vs. Velocity

6.4 References

- FHWA Hydraulic Engineering Circular No. 22 (HEC-22), Urban Drainage Design Manual.
- TxDOT Hydraulic Design Manual.
- City of Eagle Pass Engineering Design Standards.
- NOAA Atlas 14 Precipitation Frequency Estimates for Maverick County, Texas.
- AASHTO Policy on Geometric Design of Highways and Streets.

7.0 INLET DESIGN

7.1 General

Storm drain inlets are a key part of the minor drainage system and serve to intercept surface runoff and convey it into underground storm drain pipes.

Proper design ensures that inlets maintain roadway serviceability, minimize ponding, and prevent localized flooding during design storm events.

Inlets design and spacing shall be in accordance with the **Hydraulic Design Manual of the Texas Department of Transportation**, **FHWA HEC-22 Urban Drainage Design Manual**, or other approved design procedures.

7.2 Inlet Types

The following inlet types are permitted within the **City of Eagle Pass**:

1. **Curb Opening Inlets** – typically used along curbed roadways and designed to intercept sheet flow from street gutters.
2. **Grate Inlets** – used in uncurbed areas, alleys, or sags; may be located within gutters or depressed sumps.
3. **Combination Inlets** – consist of both a curb opening and a grate inlet to improve efficiency at sags or intersections.
4. **Slotted Drain Inlets** – used where longitudinal space is limited, or on bridges or driveways.
5. **Median and Bridge Inlets** – must conform to **TxDOT Bridge Drainage Manual** requirements.

Inlets located at sag points must include **multiple units** or **overflow provisions** to maintain operation during partial blockage.

7.3 Design Criteria

7.3.1 Design Frequency

Street Classification / Condition	Design Storm Frequency
Arterial and Collector Streets	25-year storm
Local Residential Streets	25-year storm
Sag or Depressed Areas	25-year storm
Inlets Serving Sump Areas	Must prevent ponding above curb height

7.3.2 Manning's Roughness Coefficient

The hydraulic performance of gutter flow approaching inlets shall use **n = 0.016–0.017**, depending on pavement texture and maintenance conditions.

7.3.3 Allowable Spread

Inlet spacing must be designed so that the **allowable flow spread** (T) determined in Section 6.0 is not exceeded. When the spread exceeds the limits for the design storm, additional inlets must be added upstream.

7.4 Curb Opening Inlets

Curb inlets are the most common inlet type within the **City of Eagle Pass** and are hydraulically evaluated using the following formulas derived from **FHWA HEC-22 Urban Drainage Design Manual**.

7.4.1 On-Grade Curb Inlet Efficiency

For flow along a continuous grade, inlet efficiency (E) is the fraction of approaching flow captured by the inlet.

$$E = 1 - e(-K \frac{L}{Q^{0.42}})$$

Equation 7-1

Where:
E = Inlet efficiency (fraction)
K = Coefficient dependent on gutter slope and cross slope (from Table 7-1)
L = Inlet length (ft)
Q = Flow in gutter (cfs)

Table 7-1 Coefficient K for Curb Opening Inlets

Longitudinal Slope (S)	K
0.2%	0.35
0.5%	0.45
1.0%	0.50
2.0%	0.55

For typical City of Eagle Pass streets (0.3–0.7% slope), K=0.45 is recommended.

7.4.2 On-Grade Curb Inlet Intercepted Flow

$$Q_i = E\ Q$$

Equation 7-2

Where Q_i = flow intercepted (cfs).

The bypass flow is then:

$$Q_b = Q - Q_i$$

Equation 7-3

7.4.3 Sag Curb Inlet Capacity

At sags, curb inlets must pass the **100-year storm flow** with no ponding beyond the top of curb.

$$Q_i = C_\omega (L + 1.8W) y^{1.5}$$

Equation 7-4

Where:
$\boldsymbol{Q_i}$ = Inlet capacity (cfs)
$\boldsymbol{C_w}$ = Weir coefficient (3.0 for curb opening)
$\boldsymbol{L}$ = Total curb opening length (ft)
$\boldsymbol{W}$ = Width of flow path in front of inlet (ft)
$\boldsymbol{y}$ = Depth of flow at curb (ft)

When the inlet becomes submerged, flow behaves as an orifice:

$$Q_i = C_o A (2gy)^{0.5}$$

Equation 7-5

Where:
$\boldsymbol{C_o}$ = Orifice coefficient (0.67 typical)
$\boldsymbol{A}$ = Inlet throat area (ft²)
$\boldsymbol{g}$ = 32.2 ft/s²

7.4.4 Transition from Weir to Orifice Flow

The **transition point** occurs when the flow depth at the inlet throat equals **1.4 times the throat height**.

Below this point, weir flow dominates; above it, orifice flow controls.
Designers shall check both and use the smaller of the two values for capacity.

7.5 Grate Inlets

Grate inlets are often used in alleys, sags, or areas without curbs.
Grate efficiency depends on gutter flow velocity, grate length, and longitudinal slope.

7.5.1 On-Grade Grate Efficiency

$$E = 1 - e^{(-0.6\frac{Ly^{1.8}}{Q})}$$

Equation 7-6

Where:
E = Inlet efficiency
L = Grate length (ft)
y = Depth of flow at curb (ft)
Q = Approach flow (cfs)

7.5.2 Sag Grate Inlet Capacity

At sag locations, grate inlets operate as a combination of weir and orifice flow.

Weir Flow:

$$Q_i = C_\omega P y^{1.5}$$

Equation 7-7

Orifice Flow:

$$Q_i = C_o A (2gy)^{0.5}$$

Equation 7-8

Where:
P = Perimeter of grate opening (ft)
C_w = Weir coefficient = 2.3
C_o = Orifice coefficient = 0.67
A = Grate opening area (ft²)

7.5.3 Clogging Factors

Grate inlets are subject to debris blockage.
The **City of Eagle Pass** requires all grate inlets to be designed assuming a **50% clogging factor**, consistent with **TxDOT** design practice.

$$Q_{effective} = 0.5\ Q_i$$

Equation 7-9

Combination inlets (curb + grate) may use a **25% clogging reduction** when properly maintained.

7.6 Combination Inlets

Combination inlets improve interception in sags and high-debris locations.
Total captured flow equals the sum of flows captured by each component:

$$Q_{total} = Q_{curb} + Q_{grate}$$

Equation 7-10

When located on grade, the grate typically captures the initial portion of flow while the curb opening captures bypassed runoff.

Combination inlets shall be placed:

- At all sag points
- Immediately upstream of pedestrian crossings and intersections
- At grade breaks on low slopes (< 0.4%)

Each sag shall include **at least two combination inlets** to ensure redundancy during clogging.

7.7 Slotted Drains

Slotted drains may be used in constrained locations such as:

- Bridge decks
- Driveways
- Medians
- Parking lots

Design flow capacity:

$$Q = C_\omega L_s y^{1.5}$$

Equation 7-11

Where:
$\boldsymbol{L_s}$ = Slot length (ft)
$\boldsymbol{C_w}$ = Weir coefficient (2.6 typical)

The slot width shall be **not less than 1.75 inches** and must comply with **ADA and TxDOT** requirements.

7.8 Design Checks

Each inlet design shall include:

- Summary of flow, spread, and capacity at each inlet
- Identification of sag inlets and redundancy provisions
- Tables showing upstream/downstream flow balance
- Clogging factor application
- Final plan sheet annotations with structure IDs and stationing

All calculations must be sealed by a **Texas Licensed Professional Engineer** and included in the **Drainage Report**.

8.0 STORM DRAIN DESIGN

8.1 General

This section establishes the requirements for the design, analysis, and construction of **storm drain systems** within the **City of Eagle Pass**.

Storm drains are designed to safely convey runoff from streets, inlets, and other collection points to an approved outfall without causing surface flooding, surcharging, or excessive velocities.

Design of storm drains shall comply with:

- **City of Eagle Pass Stormwater Ordinance**
- **TxDOT Hydraulic Design Manual**
- **TCEQ and EPA stormwater discharge regulations (TPDES)**
- **FEMA NFIP floodplain requirements**

The hydraulic design shall consider both **minor system (25-year)** and **major system (100-year)** conditions.

All storm drains shall be designed using sound hydraulic principles and must be sealed by a **Texas Licensed Professional Engineer**.

8.2 Design Storms

Storm drains shall be designed for the **25-year design storm**, using **Atlas 14 rainfall intensities for Maverick County**.

Systems in sump areas, underpasses, or critical facilities (e.g., emergency routes, hospitals, or schools) shall be checked for the **100-year storm**.

8.3 Design Flow

The flow entering a storm drain system shall be determined using approved hydrologic methods (Section 5.0).

The **Rational Method** is acceptable for areas up to 200 acres; larger systems require **HEC-HMS hydrograph routing**.

$$Q = C\ I\ A$$

Equation 8-1

Where:
Q = Design discharge (cfs)
C = Runoff coefficient
I = Rainfall intensity (in/hr)
A = Drainage area (acres)

Runoff values shall reflect **ultimate land use** conditions.

8.4 Pipe Capacity

Storm drain pipes shall be designed to flow **full under design discharge** without exceeding allowable HGL elevations.

$$Q = \frac{1.49}{n} A\, R^{2/3} S^{1/2}$$

Equation 8-2

Where:
Q = Flow (cfs)
n = Manning's roughness coefficient
A = Flow area (ft²)
R = Hydraulic radius (ft)
S = Slope of pipe (ft/ft)

Typical Manning's n Values for Pipe Materials

Material	Manning's n
Reinforced Concrete Pipe (RCP)	0.013
Corrugated Metal Pipe (CMP)	0.024
HDPE Smooth Interior	0.012
PVC	0.011

8.5 Pipe Velocities

The design must maintain self-cleansing velocity and prevent scouring.

Condition	Minimum Velocity (ft/s)	Maximum Velocity (ft/s)
Concrete Pipe	2.5	15
Corrugated Metal Pipe	2.5	12
HDPE or PVC	2.0	12

8.6 Minimum Pipe Size and Cover

- **Minimum pipe diameter:** 12 inches (local streets); 24 inches (collectors and arterials).
- **Minimum cover:** 2.0 ft from finished grade to top of pipe for RCP; 3.0 ft for CMP or HDPE. Or as provided by manufacturer's recommendations.
- **Design life:** Reinforced concrete pipes shall have a minimum design life of 75 years, while high-density polyethylene (HDPE) pipes shall have a minimum design life of 50 years. The use of other pipe materials shall be subject to review and approval by the City of Eagle Pass.
- **Loading:** All storm drain systems beneath roadways shall be designed for HS-20.
- In roadway crossings, maintain **1 ft minimum clearance** to all utilities.
- For shallow installations, encase the pipe in reinforced concrete per **TxDOT Item 464.3**.

8.7 Storm Drain Alignment

Pipes shall follow straight alignments between manholes. Horizontal and vertical deflections are not permitted within pipe runs except with manufactured bends or junction structures.

The following standards apply:

- Minimum slope to maintain velocity (see Section 8.5)
- Maintain alignment within right-of-way or drainage easement
- Minimum 1 ft vertical separation from other utilities (per TCEQ §290.44)

When an upstream conduit is smaller than the downstream conduit, it is preferable to match conduit soffits unless the upstream conduit must avoid utility conflicts or satisfy minimum cover requirements.

8.8 Manholes and Junction Boxes

Manholes shall be placed:

- At all changes in alignment, grade, or pipe size
- At junctions with lateral connections
- At maximum spacing intervals as shown below

Pipe Diameter (in)	Maximum Spacing (ft)
12–48	400
≥ 48	600

8.9 Hydraulic Grade Line (HGL) Analysis

A hydraulic grade line (HGL) analysis shall be performed for all storm drain systems to verify that:

- The **HGL** remains below the **top of curb** or **rim elevation** for the design storm.
- The **energy grade line (EGL)** remains below ground level.

8.9.1 HGL Computation

$$HGL = E_{inlet} - h_L - V^2/(2g)$$

Equation 8-3

Where:
HGL = Hydraulic grade line elevation (ft)
E_{inlet}= Total energy head at upstream inlet (ft)
h_L = Head loss due to friction and junctions (ft)
V = Flow velocity (ft/s)
g = 32.2 ft/s²

8.9.2 Energy Losses

Energy losses occur due to pipe friction, bends, junctions, and transitions.

$$h_L = h_f + h_j + h_m$$

Equation 8-4

Where:
h_f = Friction loss
h_j = Junction loss
h_m = Miscellaneous losses (entrance, exit, bends)

Friction loss:

$$h_f = f\frac{L}{D}\frac{V^2}{2g}$$

Equation 8-5

Where:
f = Darcy friction factor (depends on Reynolds number and pipe roughness)
L= Pipe length
D = Pipe Diameter
V = Mean velocity
g = acceleration due to gravity 32.2 ft/s²

Junction loss:

$$h_j = K_j \frac{V^2}{2g}$$

Equation 8-6

Where:
K_j = Junction loss coefficient

Junction Type	K_j
Straight-through	0.2
45° bend	0.3
90° bend	0.5
Lateral connection	0.3–0.5
Manhole (surcharge)	0.7–1.0

8.10 Entrance and Exit Losses

Entrance loss h_e:

$$h_e = K_e \frac{V^2}{2g}$$

Equation 8-7

Where:
K_e = Entrance loss coefficient

Exit loss h_x:

$$h_x = K_x \frac{V^2}{2g}$$

Equation 8-8

Where:
K_x = Exit loss coefficient

Condition	K_e	K_x
Flush pipe into manhole	0.5	—
Mitered to slope end	0.7	—

Headwall with wingwalls	0.2	1.0
Flared end section	0.3	1.0

8.11 Outfalls

Storm drain outfalls must discharge into:

- **Open channels**,
- **Detention ponds**, or
- **Natural watercourses** (with erosion protection).

All outfalls shall include:

- Headwall or flared end section (TxDOT Std. DS series)
- **Riprap or energy dissipation** sized per outlet velocity
- **Tailwater consideration** in design HGL analysis

The outlet velocity shall not exceed the permissible limit of the receiving channel (see **Table 8-1**).

Table 8-1 Maximum Permissible Outlet Velocities

Channel Material	Max Velocity (ft/s)
Earth (sandy loam)	4
Earth (stiff clay)	6
Grass-lined	5
Riprap-lined	15
Concrete	20

If outlet velocity exceeds permissible limits, energy dissipation must be provided using riprap aprons, stilling basins, or impact blocks per **TxDOT Hydraulic Design Manual**.

8.12 Surcharged Flow

Pipes shall be designed so that:

- HGL does not exceed **0.5 ft below curb** during the design storm, and
- The 100-year HGL does not exceed ground level.

Surcharged flow conditions must be analyzed for all enclosed systems using **HEC-RAS (unsteady)** or **StormCAD hydraulic grade calculations**.

8.13 Storm Drain Computation Sheet (Recommended Format)

Each storm drain design submission shall include:

1. Inlet locations and contributing drainage areas
2. Design discharge per inlet (cfs)
3. Pipe size, slope, and length
4. Hydraulic capacity (full flow)
5. Velocity check (min/max)
6. Head loss summary (junction, friction, entrance, exit)
7. HGL and EGL elevations
8. Outfall and tailwater condition

All results must be documented in tabular form, referencing **station chainage** along the mainline.

8.14 Materials and Construction Standards

All storm drain materials shall meet or exceed **TxDOT Standard Specifications (latest edition)** and **City of Eagle Pass Standard Details**.

Acceptable materials:

- Reinforced Concrete Pipe (ASTM C76)
- Corrugated Metal Pipe (ASTM A760, galvanized or aluminized)
- HDPE Pipe (AASHTO M294)
- PVC Storm Sewer Pipe (ASTM D3034 SDR 35)

Joint sealing, bedding, and backfill must comply with **ASTM C1479** and **TxDOT Item 400**.

8.15 Maintenance and Access

All manholes and junction boxes must be accessible from paved right-of-way or permanent maintenance easement (minimum 15 ft width).
Storm drains shall not pass under buildings or private structures.
Private storm drains that connect to public systems must provide an access manhole at the point of connection.

8.16 As-Built and Record Requirements

Upon completion, the contractor must submit:

- As-built plans certified by a **Registered Professional Land Surveyor.**
- Invert and rim elevation tables.
- Pipe material and slope verification.
- CCTV inspection records if required by City Engineer.

No system will be accepted by the City without approval of the **as-built drainage record**.

9.0 OPEN CHANNEL DESIGN

9.1 General

Open channels convey runoff from urban and rural watersheds to receiving streams, detention basins, or major drainage outfalls.

Channels may be **natural**, **improved**, or **constructed**.

The design of open channels in the **City of Eagle Pass** must ensure stability, adequate capacity, safety, and compatibility with surrounding land uses.

All open channels shall:

- Convey the **ultimate-development 25-year design storm** for drainage areas up to and including **200 acres**.
- Convey the **ultimate-development 100-year design storm** for drainage areas greater than **200 acres**.
- Provide freeboard above the design water-surface elevation. The required freeboard shall be based on the **design depth of flow**.
- Contain the design discharge and required freeboard within designated rights-of-way or drainage easements.
- Prevent excessive erosion and sedimentation.
- Incorporate natural features and vegetation where feasible.

Interceptor channels shall be provided where necessary to intercept off-site runoff greater than 3 acres or prevent sheet flow from crossing proposed lots, streets, or developed areas. The location, alignment, dimensions, design discharge, and required drainage easement for each interceptor channel shall be clearly identified on the subdivision plat and associated construction plans.

Designers must coordinate with the **City Engineer** for any proposed channel modification, regrading, or lining.

9.2 Design Flow

The design discharge for channels shall be determined in accordance with **Section 5.0 (Hydrology)**.
For most applications, the **100-year storm event** is used for capacity design, while the **10- and 25-year storms** may be used for performance checks.

9.3 Channel Geometry

Permitted cross-section geometries include:

1. **Trapezoidal** – most common in Eagle Pass; suitable for earth, grass-lined, or concrete channels.
2. **Rectangular** – used for concrete-lined or structural channels.
3. **Triangular or V-shaped** – typically for roadside ditches or shallow grass swales.
4. **Parabolic** – used where gradual transitions and aesthetics are desired.

Side slopes must be stable for the expected soil type and flow velocity (see Table 9-1).

Table 9-1 Recommended Channel Side Slopes

Channel Type	Lining	Maximum Side Slope (H:V)
Earth (sandy or loam)	Unlined	3:1
Clay	Unlined	2:1
Grass-lined	Vegetated	3:1
Riprap-lined	Rock	2:1
Concrete-lined	Structural	1.5:1

9.4 Flow Computations

Channel capacity shall be computed using **Manning's Equation**:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Equation 9-1

Where:
Q = Flow (cfs)
n = Manning's roughness coefficient
A = Flow area (ft²)
R = Hydraulic radius = ***A/P*** (ft)
S = Longitudinal slope (ft/ft)

Table 9-2 Typical Manning's n Values for Open Channels

Channel Type	n
Concrete	0.015
Smooth finished concrete	0.013
Grouted riprap	0.030
Natural earth (clean, straight)	0.025
Natural earth (weedy, winding)	0.045
Grass-lined (good condition)	0.035
Gabion-lined	0.030
Asphalt-lined	0.018

9.5 Trapezoidal Channel Geometry

For trapezoidal sections:

$$A = y\,(b + z\,y)$$

Equation 9-2

$$P = b + 2y(1 + z^2)^{0.5}$$

Equation 9-3

Where:
A = Flow area (ft²)
P = Wetted perimeter (ft)
b = Bottom width (ft)
y = Flow depth (ft)
z = Side slope (H:V)

Substitute ***A***, ***P***, and ***R = A/P*** into Equation 9-1 to solve for discharge or flow depth.

9.6 Design Criteria

1. **Design Frequency**:
   - 25-year storm for minor ditches.
   - 100-year storm for major outfall channels.
2. **Freeboard**:
   - Minimum 1 ft above 100-year water surface
   - Additional 0.5 ft recommended for areas near structures or utilities
3. **Flow Velocity**:
   - Minimum 2.0 ft/s to prevent sediment deposition
   - Maximum limited by Table 9-3

Channel side slopes shall be designed for long-term stability, maintenance access, and public safety.

Preferred maximum side slopes:

- Earthen channels: **4H:1V**
- Improved channels with stabilization: **3H:1V**
- Steeper slopes require geotechnical justification and City approval.

Table 9-3 Maximum Permissible Velocities for Channel Linings

Lining Type	Max Velocity (ft/s)
Unlined (sandy soil)	3.5
Unlined (clay soil)	5.0
Grass (good stand)	6.0
Riprap (6 in. rock)	10.0
Riprap (12 in. rock)	15.0
Concrete	20.0
Gabion	12.0

9.7 Shear Stress Analysis

To ensure lining stability, compute **boundary shear stress (τ)**:

$$\tau = \gamma\, R\, S$$

Equation 9-4

Where:
$\boldsymbol{\tau}$ = Shear stress (lb/ft²)
$\boldsymbol{\gamma}$ = Unit weight of water (62.4 lb/ft³)
$\boldsymbol{R}$ = Hydraulic radius (ft)
$\boldsymbol{S}$ = Channel slope (ft/ft)

Compare computed τ to allowable τ from **Table 9-3**.

Table 9-4 Allowable Shear Stresses

Lining Type	Allowable τ (lb/ft²)
Grass (established)	2.0
Grass (poor cover)	0.5
Topsoil (bare earth)	0.3
Riprap (6 in.)	6.0
Riprap (12 in.)	12.0
Gabion	10.0
Concrete	> 20.0

If computed τ exceeds allowable, the design must incorporate a **more resistant lining** or **energy dissipation measures**.

9.8 Channel Lining Selection

Channel linings are selected based on velocity, shear, and site conditions.

Condition	Recommended Lining
Low velocity (<4 ft/s)	Grass or vegetative cover
Moderate velocity (4–8 ft/s)	Turf reinforcement mat or riprap
High velocity (>8 ft/s)	Concrete or gabion
Flood control channels or confined sections	Reinforced concrete or grouted riprap
Environmentally sensitive areas	Bioengineered lining (coir mat, vegetated geotextile)

9.9 Transition Design

Channel transitions (bends, junctions, expansions) must be gradual to minimize energy losses.

- Expansion ratio ≤ 1:4 (width change per length)
- Contraction ratio ≤ 1:3
- Bends: centerline radius ≥ 2 × channel width
- Drop structures or stilling basins shall be used to dissipate energy when slope > 1%

9.10 Channel Freeboard and Right-of-Way

Minimum freeboard: **1 ft above 100-year WSEL**.

Minimum right-of-way width = channel top width + 10 ft (5 ft each side).

Where maintenance access roads are required:

- Provide 10-ft-wide all-weather surface (gravel or concrete).
- Slope ≤ 10% for vehicular access.

9.11 Erosion Protection

Outfalls, transitions, bends, and high-velocity areas shall include erosion protection.

Discharge velocities entering unlined grass areas shall be reduced to **6 feet per second or less** unless a reinforced lining system is provided.

Acceptable protection includes energy dissipators, riprap, turf reinforcement mat, concrete, gabions, or engineered alternatives approved by the City.

9.12 Floodplain Coordination

Any channel construction, modification, or regrading within the **Special Flood Hazard Area (SFHA)** requires:

- A **Floodplain Development Permit** from the City.
- Compliance with **FEMA NFIP.**
- **No-Rise Certification** by a Texas PE.
- Hydraulic analysis using **HEC-RAS.**

All 100-year water surface elevations and floodway boundaries must be clearly shown on the plans.

9.13 Maintenance Requirements

Channel maintenance is essential for long-term performance:

- Inspect after each major rainfall event.
- Remove debris, sediment, and vegetation blockages.
- Repair eroded banks and replace damaged linings.
- Maintain mowing and access roads per City schedule.

Privately maintained channels such as HOAs and developments must have a **recorded maintenance covenant** approved by the City of Eagle Pass.

9.14 As-Built Certification

Upon completion, the Engineer of Record shall submit:

- As-built cross-sections and profiles (surveyed)
- Final flow capacity verification
- Photographic documentation of lining and outlet conditions
- Maintenance access certification

10.0 DETENTION AND RETENTION FACILITIES

10.1 General

Detention and retention facilities are required to control post-development peak runoff and to mitigate downstream impacts.

Their primary purposes are to:

- Limit post-development peak discharge to pre-development levels.
- Reduce downstream flooding and erosion.
- Improve water quality through sedimentation and infiltration.

This section establishes the **City of Eagle Pass (CoEP)** standards for the design of all **detention ponds, retention basins, and related outlet control structures**.

All facilities must comply with:

- **City of Eagle Pass Stormwater Ordinance**
- **TCEQ TPDES MS4 requirements**
- **TWDB Region 15 Flood Plan guidelines**
- **FEMA floodplain development criteria**

10.2 Detention Requirements

Detention shall be required where post-development runoff exceeds pre-development runoff rates, increases downstream water surface elevations, overloads public drainage systems, or as otherwise determined by the City Engineer.

Unless waived in writing, developed discharge rates shall not exceed pre-development discharge rates for the applicable design storms.

10.3 Minimum Standards

1. **Design Storm Frequency:**
   5-year and 25-year storm for peak control and 100-year storm for overflow routing.
2. **Storage Requirement:**
   Detention volume shall be based on hydrograph routing (Section 10.4).
3. **Outflow Control:**
   Use a combination of **orifice, weir, or culvert outlet** to meet target discharge.
4. **Freeboard:**
   The basin should contain the 100-year ultimate water surface.
5. **Maintenance Access:**
   Provide a 12’ wide all-weather maintenance road to inlet/outlet and spillway.

6. **Safety:**
   Side slopes not steeper than 4H:1V preferred, 3H:1V maximum.

10.4 Storage Volume Determination

The required storage volume is determined by **hydrograph routing**, comparing inflow (I) and outflow (O) hydrographs. The volume is equal to the area between the two curves:

$$V = \int (I - O)\, dt$$

Equation 10-1

This analysis may be performed using:

- **HEC-HMS**
- **PondPack**
- **HydroCAD**
- **TR-55 Tabular Method**

10.4.1 Level Pool Routing Equation

The continuity equation governs storage routing:

$$I - O = \frac{dS}{dt}$$

Equation 10-2

Where:
I = Inflow (cfs)
O = Outflow (cfs)
S = Storage (ft^3)
t = Time (s)

Integrated for discrete time intervals:

$$S_2 = S_1 + \frac{(I_1 + I_2)}{2}\,\Delta t - \frac{(O_1 + O_2)}{2}\,\Delta t$$

Equation 10-3

Iterate until continuity is satisfied and outflow hydrograph is defined.

10.4.2 Stage–Storage Relationship

The relationship between pond depth and storage volume is developed from geometry or survey data. For typical basins:

$$S = A_{avg}\Delta h$$

Equation 10-4

Where:
Aavg **=** average surface area between two contour elevations (ft²)
Δ*h* = elevation difference (ft)

For irregular basins, calculate by CAD volume computations or field survey.

10.4.3 Stage–Discharge Relationship

Develop using outlet control devices:

- **Orifices (Equation 10-5)**
- **Weirs (Equation 10-6)**
- **Culverts:** Manning's or inlet control equations (TxDOT culvert nomographs)

These relationships define the **outflow curve (Q vs. stage)** required for routing.

10.4.4 Modified Rational Method

For drainage areas of twenty (20) acres or less, the Modified Rational Method may be used to estimate runoff volume and determine required detention storage.

The Modified Rational Method applies the Rational Method peak discharge relationship over varying rainfall durations to develop an inflow hydrograph and estimate detention storage requirements. This method may be used as an alternative to hydrograph-based routing methods for small drainage areas where the assumptions of the method are applicable.

Use of the Modified Rational Method shall be limited to drainage areas of approximately twenty (20) acres or less unless otherwise approved by the City Engineer.

All calculations shall clearly document drainage area boundaries, runoff coefficients, rainfall intensities, storm durations, inflow hydrographs, allowable release rates, and detention storage computations. The design engineer shall demonstrate that post-development discharge rates comply with the detention requirements of this chapter.

10.5 Outlet Control Design

The outlet structure regulates discharge from the basin and may include:

- **Low-flow orifice** for small storm events
- **Rectangular or V-notch weir** for intermediate flows
- **Culvert or riser** for large events
- **Emergency spillway** for extreme conditions

10.5.1 Orifice Flow

$$Q = C_d\, A\, (2gh)^{0.5}$$

Equation 10-5

Where:
Q = flow rate (cfs)
C_d = discharge coefficient (0.60–0.70)
A = area of orifice (ft²)
h = head above orifice center (ft)

10.5.2 Weir Flow

$$Q = C_\omega\, L\, h^{1.5}$$

Equation 10-6

Where:
Cw = weir coefficient
L = weir length (ft)
h = head over crest (ft)

Use ***Cw*** coefficient 3.33 for sharp-crested rectangular weirs and 2.6 for broad-crested weirs.

10.5.3 Combined Outlet

For structures combining both orifice and weir control:

$$Q_{total} = Q_{orifice} + Q_{weir}$$

Equation 10-7

Select combination parameters so that $Q_{post} < Q_{pre}$ for each design storm.

10.6 Retention Facilities

Retention basins are designed to permanently store runoff and promote infiltration or reuse. They may serve as detention and retention but must include:

- **Permanent pool** with volume ≥ 10% of total storage.
- **Safety shelf** around water surface perimeter.
- **Aeration or recirculation system** to prevent stagnation.
- **Emergency overflow** designed as for detention basins.

Retention basins must meet **TCEQ water quality** requirements for permanent impoundments and must include provisions for mosquito control.

10.7 Water Quality Volume (WQV)

In accordance with **TCEQ TXR150000 (MS4 Permit)**, developments ≥ 1 acre must provide **water quality treatment** for the **first flush** (first 1 inch of runoff).

Water Quality Volume:

$$WQV = \frac{1}{12} R_v A$$

Equation 10-8

Where:
R_v = 0.05+0.009 I
I = percent imperviousness (%)
A = site area (acres)

Treatment may be achieved through:

- **Extended detention** (24-hour drawdown)
- **Bio-retention or vegetated filter basins**
- **Infiltration trenches or porous media**
- **Constructed wetlands**

10.8 Basin Geometry

10.8.1 Side Slopes

- Maximum 3H:1V
- Recommended 6H:1V for safety and maintenance.
- Basin floor graded to drain to outlet.

10.8.2 Depth

- Maximum 6 ft without fencing.
- Basins deeper than 6 ft require fencing and signage.

10.8.3 Bottom Width

- Minimum 8 ft for maintenance vehicle access.
- Signed and Sealed Engineer's Certification shall be provided after installation.

10.9 Erosion and Sediment Control

All inlet and outlet points must include:

- **Riprap aprons** or **stilling basins** per HEC-15.
- **Slope protection**.
- **Energy dissipation** where outlet velocity > 6 ft/s.
- **Silt traps or forebays** to capture sediment at inflow points.

During construction, temporary sediment basins and perimeter controls must comply with **TCEQ SWPPP** requirements.

10.10 Private Maintenance Requirements

The owner of a private detention or retention facility shall be responsible for perpetual maintenance including:

- Mowing and vegetation control
- Sediment removal
- Trash and debris removal
- Outlet inspection and repair
- Embankment maintenance
- Erosion repair
- Access maintenance

The City may require proof of maintenance or perform enforcement action if deficiencies exist.

10.11 Inspection and Certification

Upon completion:

1. Basin shall be surveyed to verify stage–storage curve.
2. Outlet structures must be field-measured and inspected.
3. As-built report sealed by a **Texas Licensed Professional Engineer** must be submitted to the City of Eagle Pass.
4. City of Eagle Pass will issue **Certificate of Compliance** prior to acceptance.

10.12 Typical Details

Required Drawings:

- Plan view showing contours, inlet/outlet locations, emergency spillway, access road.
- Cross-sections showing side slopes, safety bench, and outlet structure.
- Stage–storage and stage–discharge curves.
- Erosion control and landscaping details.
- Fence and signage locations (if applicable).

11.0 CULVERT DESIGN

11.1 General

Culverts are structures that convey stormwater through roadway embankments or under driveways, railroads, and other obstructions.

They form a critical part of the storm drainage system and are designed to safely pass design flows without overtopping the roadway or causing excessive backwater.

Culvert design within the **City of Eagle Pass** shall conform to:

- **TxDOT Hydraulic Design Manual (HDM)**
- **TxDOT Drainage Design Criteria (DDC)**
- **City of Eagle Pass Stormwater and Roadway Standards**

11.2 Design Objectives

Culverts shall be designed to:

1. Convey the **design storm flow** (See section 11.5 Design Storm Frequency).
2. Minimize headwater depth to acceptable levels.
3. Limit outlet velocity to prevent downstream erosion.
4. Accommodate debris passage without blockage.
5. Maintain hydraulic efficiency and structural integrity.

11.3 Design Methodology

The hydraulic performance of culverts depends on whether the flow is governed by:

- **Inlet control** (limited by headwater and entrance geometry), or
- **Outlet control** (limited by tailwater, pipe friction, and losses).

The controlling condition shall be determined by comparing both cases; the greater headwater governs the design.

11.4 Culvert Types

Acceptable culvert types in the City of Eagle Pass include:

Type	Typical Use	Material Options
Circular Pipe	Small to medium drainage crossings	RCP, CMP, HDPE, PVC
Box Culvert	High-flow crossings with limited headroom	Reinforced concrete (TxDOT Std. Box)
Arch or Elliptical	Aesthetic or low-profile applications	Concrete, CMP, structural plate
Bridge-class Culvert	Large crossings > 20 ft span	TxDOT standard bridge class

All materials must conform to **TxDOT Standard Specifications (Items 462, 464, 465, and 466)** and **ASTM C76, A760, M294** as applicable.

11.5 Design Storm Frequency

Roadway Classification	Design Frequency	Overtopping Check
Freeways	50-year	100-year
Arterial / Major	25-year	100-year
Collector Street	10-year	100-year
Local Street	10-year	100-year
Driveways / Private Crossings	10-year	25-year

11.6 Inlet Control

When a culvert operates under inlet control, discharge depends only on the headwater elevation, culvert shape, area, and inlet configuration.

Neglecting downstream conditions, the flow is controlled by the inlet geometry and entrance conditions.

11.6.1 Inlet Control Equation

$$Q = C_i \, A \, (2gh)^{0.5}$$

Equation 11-1

Where:
Q = Discharge (cfs)
$\boldsymbol{C_i}$ = Inlet coefficient (dimensionless)
A = Cross-sectional area of culvert (ft²)
h = Headwater depth above inlet invert (ft)
g = 32.2 ft/s²

Typical C_i values:

Inlet Type	C_i
Sharp-edged	0.50
Mitered to slope	0.70
Headwall (square edge)	0.80
Wingwall or flared inlet	0.90

11.7 Outlet Control

For outlet control, flow is affected by tailwater elevation, friction losses, and velocity head through the culvert barrel.

11.7.1 Energy Equation

$$H_W = h_e + h_f + h_o + (h_t - h_i)$$

Equation 11-2

Simplified as:

$$H_W = h_t + h_f + K_e \frac{V^2}{2g}$$

Equation 11-3

Where:
H_w = Headwater elevation above outlet invert (ft)
h_t = Tailwater depth (ft)
h_f = Friction loss (ft)
K_e = Entrance loss coefficient
V = Velocity in barrel (ft/s)

Typical K_e values:

Entrance Type	K_e
Mitered to slope end	0.7
Headwall, square edge	0.5
Headwall, rounded	0.2
Flared end section	0.3

11.7.2 Friction Loss

$$h_t = S_f + L$$

Equation 11-4

Where:
S_f = Friction slope (ft/ft)
L = Length (ft)

$$S_f = \left(\frac{Q\ n}{1.49\ A\ R^{\frac{2}{3}}} \right)^2$$

Equation 11-5

11.7.3 Tail Water Condition

Tailwater depth (h_t) depends on downstream channel conditions:

Tailwater / Channel Condition	Flow Condition and Design Guidance
Receiving channel depth greater than the crown of culvert	Full flow shall be assumed within the culvert barrel.
Tailwater elevation lower than culvert crown	Flow shall be considered partially full; compute using gradually varied flow methods.

The design shall verify that headwater does not exceed the **top of roadway**.

11.8 Headwater Limitations

For design storms:

Roadway Classification / Crossing Type	Maximum Allowable Headwater Depth
Local Streets	Headwater ≤ 1.5 × culvert diameter (or rise)
Collector and Arterial Streets	Headwater ≤ 1.2 × culvert diameter (or rise)
Critical Crossings (Schools, Hospitals, Emergency Routes)	Headwater ≤ 1.0 × culvert diameter (or rise)

Headwater–depth ratio exceeding these limits requires upsizing or inlet improvement.

11.9 Barrel Flow Capacity

Flow capacity shall be verified using **Manning's Equation** for full flow:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Equation 11-6

Manning's n Values for Culverts:

Material	n
RCP	0.013
CMP (annular corrugation)	0.024
HDPE (smooth interior)	0.012
PVC	0.011
Box Culvert (smooth concrete)	0.015

11.10 Outlet Velocity and Erosion Protection

Velocity at the culvert outlet shall be computed as:

$$V = \frac{Q}{A}$$

Equation 11-7

Compare with allowable outlet velocities (Table 11-1).

If exceeded, provide energy dissipation.

Table 11-1 Allowable Outlet Velocities

Channel Material	Max Velocity (ft/s)
Bare earth	4
Grass-lined	6
Riprap	15
Concrete	20

11.10.1 Riprap Apron Design

Riprap apron design follows **FHWA HEC-14** and **TxDOT SDHPM** criteria.

$$L_a + 3\,D_{50}$$

Equation 11-8

$$D_{50} = \frac{V^2}{2g(S-1)}$$

Equation 11-9

Where:
L_a = apron length (ft)
D_{50} = median stone size (ft)
V = outlet velocity (ft/s)
S = specific gravity of stone

Apron width = 2 × culvert width (minimum).
Install geotextile filter fabric beneath riprap (TxDOT DMS-6200).

11.11 Multiple Barrel Culverts

Multiple barrels may be used when required width or height exceeds single-barrel capacity.
Spacing between barrels shall be ≥ 1 ft (center to edge).
Hydraulic capacity is slightly reduced due to interference; assume a 5% reduction for 2-barrel systems and 10% for 3-barrel systems unless modeled.

11.12 Structural and Safety Requirements

- Design per **AASHTO LRFD Bridge Design Specifications**.
- Provide headwalls or wingwalls for all reinforced concrete culverts.
- For CMP or HDPE, provide flared end sections or concrete collars.
- For culverts ≥ 36 in diameter within pedestrian zones, provide safety grates or guardrails.

11.13 Floodplain Considerations

Culverts located within FEMA floodplains must:

- Be analyzed for **no-rise condition** using **HEC-RAS**.
- Include both **inlet control and tailwater backwater effects**.
- Provide **100-year flow capacity** below roadway elevation with at least **1 ft freeboard**.

All results must be certified by a **Texas Licensed Professional Engineer**.

11.14 Maintenance and Inspection

Routine inspections must be performed annually and after major storms:

- Remove sediment, debris, and vegetation obstructions.
- Inspect joint seals, headwalls, and end treatments for erosion or cracking.
- Repair concrete spalling or corrosion as necessary.
- Maintain access easements for cleaning and inspection equipment.

Private developments shall maintain all on-site culverts until dedicated to the City.

11.15 Submittal Requirements

Culvert design plans must include:

1. Plan and profile with inlet/outlet elevations.
2. Headwater and tailwater computations.
3. Hydraulic design summary (inlet vs outlet control).
4. Energy dissipation and erosion protection details.
5. Structural drawings (headwalls, wingwalls, or collars).
6. As-built survey verification.

12.0 BRIDGES AND CROSSINGS

12.1 General

Bridges and major drainage crossings provide hydraulic conveyance for natural channels, creeks, or drainageways intersected by roadways.

Design of these structures must ensure:

- Safe passage of design storm flows without roadway overtopping.
- Stability against scour and erosion.
- Conformance with **TxDOT Bridge Design Manual (Hydraulics)**, **AASHTO LRFD**, and **FEMA NFIP** requirements.
- Compatibility with adjacent channel and floodplain geometry.

All bridge and crossing designs within the **City of Eagle Pass** shall be sealed by a **Texas Licensed Professional Engineer** experienced in hydraulic and structural bridge design.

12.2 Design Frequency

Bridge and crossing design frequency shall be selected according to roadway classification and importance.

Roadway Classification	Design Storm (Minimum)	Check Storm
Local Streets	50-year	100-year
Collectors	100-year	100-year
Arterials / Highways	100-year	500-year
Emergency / Evacuation Routes	100-year	500-year

The **100-year flood** shall pass with at least **1 ft freeboard** below the low chord (bottom of bridge girder or slab).

Critical facilities or floodway crossings must also evaluate the **500-year event** for structural resilience.

12.3 Hydrologic Analysis

Bridge design flows shall be computed using:

- **HEC-HMS** for watershed hydrology,
- **Atlas 14 rainfall data for Maverick County**, and
- **TWDB Region 15 Flood Planning guidance** for regional inflow parameters.

Hydrographs for 10-, 25-, 50-, 100-, and 500-year storms shall be developed and used for flow routing and backwater modeling.

12.4 Hydraulic Analysis

Hydraulic performance shall be evaluated using **HEC-RAS (steady or unsteady flow)**.

Each model must include:

- Existing and proposed conditions geometry.
- Cross-section spacing ≤ 200 ft near structures.
- Contraction and expansion coefficients per **HEC-RAS defaults (0.1 / 0.3)**.
- Tailwater conditions based on downstream water surface elevations.

12.4.1 Energy Equation

The basic open channel energy equation applies between upstream (1) and downstream (2) sections:

$$z_1 + y_1 + \frac{V_1^2}{2g} = z_2 + y_2 + \frac{V_2^2}{2g} + h_L$$

Equation 12-1

Where:
z = channel invert elevation (ft)
y = depth of flow (ft)
V = mean velocity (ft/s)
h_L = head loss (ft)
g = 32.2 ft/s²

12.5 Headwater and Backwater Limitations

Headwater (HW) elevation during the design storm shall not:

- Exceed the **bottom of bridge deck (low chord)** minus **1 ft freeboard**, and
- Increase upstream 100-year water surface by more than **0.1 ft** for FEMA-regulated floodways (per NFIP "no-rise" requirement).

Designers shall evaluate and document:

1. Existing condition backwater profile.
2. Proposed bridge condition profile.
3. Difference ≤ 0.00 ft rise within mapped floodway; ≤ 1.0 ft within floodplain fringe.

12.6 Waterway Area Determination

The required waterway area (A_w) is determined by continuity:

$$A_\omega = \frac{Q}{V}$$

Equation 12-2

Where:
A_w = Required waterway area
Q = Design discharge (cfs)
V = Mean velocity (ft/s), based on Manning's equation:

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$

Equation 12-3

For bridge openings, adjust area for piers and abutments:

$$A_{effective} = A_{gross} - A_{obstruction}$$

Equation 12-4

12.7 Velocity and Shear Criteria

Outlet velocities at bridge openings must be evaluated to ensure channel stability.

Compare computed velocity ($V = Q/A_{effective}$) with allowable channel limits (from Section 9.0).

If exceeded, provide **riprap, gabions, or cutoff walls** for energy dissipation.

Maximum allowable shear stress shall not exceed lining resistance (see Section 9.7).

12.8 Scour Analysis

Bridges must be designed to resist local and contraction scour per **FHWA HEC-18 (Evaluating Scour at Bridges)**.

12.8.1 Total Scour Depth

$$Y_t = Y_1 - Y_2 + Y_3$$

Equation 12-5

Where:
Y_t= Total scour (ft)
Y_1 = Long-term degradation (ft)
Y_2 = Contraction scour (ft)
Y_3 = Local scour (ft)

12.8.2 Contraction Scour (Laursen Equation)

$$\frac{Y_2}{Y_0} = \left(\frac{Q_2}{Q_0}\right)^{6/7}$$

Equation 12-6

Where:
Y_0 = Original flow depth (ft)
Q_0= Discharge prior to contraction (cfs)
Q_2 = Discharge at contracted section (cfs)

12.8.3 Local Scour at Piers (HEC-18)

$$Y_3 = 2.0\, K_1\, K_2\, K_3\, (Y_1)(F_r)^{0.43}$$

Equation 12-7

Where:
F_r = Froude Number
K_1= Pier shape factor
K_2 = Angle of attack factor
K_3 = Bed condition factor

Typical values:

- K_1 = 1.1 (round nose)
- K_2 = 1.0 (aligned flow)
- K_3 = 1.1 (sand bed)

Provide pier foundations below total scour depth Y_t + safety factor (≥ 2 ft).

12.9 Abutment Design

Bridge abutments must be located outside the channel's main flow region wherever feasible.

Provide riprap protection for the entire abutment face and wingwall extensions up to 2 ft above design high water.

Wingwalls shall extend beyond projected side slopes to prevent flanking.

For erodible soils, incorporate cutoff walls with depth $\geq 2 \times D_{50}$ of channel bed material.

12.10 Debris and Freeboard Requirements

Bridges must provide:

- **Minimum freeboard = 1 ft above 100-year WSEL** (excluding debris).
- Additional **1 ft debris clearance** for creeks with vegetative drift or woody debris.

For small drainage crossings ($Q < 500$ cfs), minimum freeboard may be reduced to 0.5 ft if supported by hydraulic modeling and approved by the City Engineer.

12.11 FEMA Coordination

Any bridge, culvert, crossing, or grading project located within a FEMA floodplain or floodway shall comply with City floodplain regulations.

Where the project causes any rise, encroachment, or modification to mapped flood hazards, the applicant shall prepare and fund all required FEMA documentation including No-Rise Certification, CLOMR, and/or LOMR as determined by the City Floodplain Administrator.

All supporting data shall include:

- Existing and proposed HEC-RAS models.
- Floodway and floodplain delineations.
- Supporting topographic and survey data (NAVD 88).
- Digital GIS shapefiles in FEMA-compliant format.

12.12 Structural Considerations

Bridge structure selection must account for:

- Hydraulic opening requirements.
- Vertical clearance above 100-year WSEL.
- Foundation stability and scour depth.
- Traffic and loading per **AASHTO LRFD**.

- Constructability and maintenance access.

Preferred structural types for Eagle Pass include:

- Reinforced concrete slab or slab-beam bridges for spans < 40 ft.
- Prestressed concrete I-beam bridges for spans 40–120 ft.
- Multi-cell box culverts for low clearance crossings.

12.13 Erosion Protection and Energy Dissipation

- Provide riprap or gabion aprons downstream of bridge openings per **HEC-15**.
- Extend protection at least one channel width downstream.
- Design riprap per Equation 9-5 using outlet velocity.
- Install geotextile filter fabric beneath all protection.
- Where velocities exceed 15 ft/s, use grouted riprap or concrete lining.

12.14 Maintenance Requirements

Bridge crossings shall be inspected at least annually and after major flood events:

- Remove debris accumulation at piers and abutments.
- Repair scouring or undermining promptly.
- Maintain vegetation on embankments.
- Inspect expansion joints, deck drains, and approach slabs.
- Replace damaged riprap or gabions.

All inspection findings must be documented and retained by the **City Engineer**.

12.15 Submittal Requirements

Bridge and major crossing designs must include:

1. **Hydrology Report** – storm frequency, inflow hydrographs, and assumptions.
2. **HEC-RAS Model** – existing and proposed profiles.
3. **Hydraulic Summary Table** – headwater, tailwater, velocities, freeboard.
4. **Scour Calculations** – total, contraction, and local scour depths.
5. **Structural Plans** – foundation, abutments, and erosion protection details.
6. **Floodplain Documentation** – CLOMR/LOMR submittals if applicable.

All submittals must be reviewed and approved by the **City Engineer** prior to permitting.

13.0 EROSION AND SEDIMENT CONTROL

13.1 General

Erosion and sediment control measures are required on all development and construction projects within the **City of Eagle Pass** to:

- Prevent soil loss and sediment transport into streets, storm drains, and waterways.
- Protect downstream water quality and maintain compliance with **TCEQ TPDES General Permit TXR150000**.
- Preserve long-term functionality of drainage systems and detention basins.

Designers and contractors are responsible for implementing both **temporary** and **permanent** control measures consistent with this section.

13.2 Regulatory Framework

All erosion and sediment control practices must comply with:

- **Texas Commission on Environmental Quality (TCEQ)** – Construction General Permit TXR150000
- **City of Eagle Pass Stormwater Management Program (SWMP)**
- **Texas Pollutant Discharge Elimination System (TPDES)**
- **TxDOT Stormwater Management Guidelines**
- **EPA Construction General Permit (CGP)**

Developers disturbing **1 acre or more** (or part of a common plan ≥ 1 acre) must prepare a **Stormwater Pollution Prevention Plan (SWPPP)**, implemented before soil disturbance.

13.3 Design Objectives

The following objectives guide the selection of erosion and sediment controls:

1. Minimize disturbed areas and protect natural vegetation where possible.
2. Convey runoff in a non-erosive manner.
3. Retain sediment on-site through physical, vegetative, or chemical stabilization.
4. Protect downstream drainage features and water bodies.
5. Maintain BMPs until permanent stabilization is achieved.

13.4 Erosion Control Principles

1. **Minimize Disturbance** – Phase construction to limit exposed soil areas.
2. **Stabilize Slopes Quickly** – Apply mulch, seeding, sod, or erosion control blankets.
3. **Intercept Runoff** – Use diversions, berms, or check dams to control flow paths.
4. **Trap Sediment** – Install silt fences, sediment basins, or inlet protection.

5. **Protect Inlets and Outfalls** – Prevent direct sediment discharge to storm drains.
6. **Inspect and Maintain** – Keep BMPs functional during all construction stages.

13.5 Design Criteria

13.5.1 Slope Protection

Slopes shall be stabilized within **14 days** of final grading or temporary cessation of work.

Table 13-1 Recommended Erosion Control for Slopes

Slope Ratio (H:V)	Recommended Control
Flatter than 4:1	Seeding / Mulching
3:1 to 4:1	Erosion Control Blanket or Hydroseeding
2:1 to 3:1	Turf Reinforcement Mat (TRM)
Steeper than 2:1	Rock Riprap or Retaining System

Seeding Mixture: Use drought-tolerant grasses suited for **Maverick County**.

13.5.2 Velocity and Shear Criteria

Design for non-erosive flow velocities using **Manning's Equation** and verify allowable shear stress on soil or lining.

$$\tau = \gamma \, R \, S$$

Equation 13-1

Where:
$\boldsymbol{\tau}$ = boundary shear (lb/ft²)
γ =62.4 lb/ft^3 (unit weight of water)
$\boldsymbol{R}$ = hydraulic radius (ft)
$\boldsymbol{S}$ = slope (ft/ft)

Table 13-2 Allowable Shear Stress for Erosion Control Linings

Lining Type	Allowable Shear (lb/ft²)	Max Velocity (ft/s)
Bare earth (sand)	0.3	3.5
Bare earth (clay)	0.5	5.0
Grass (good cover)	2.0	6.0
TRM (reinforced)	6.0	10.0
Riprap (6 in.)	6.0	10.0
Riprap (12 in.)	12.0	15.0
Concrete	> 20	> 20

13.6 Temporary Erosion Control Measures

Temporary measures are used during active construction to minimize erosion and sediment transport.

13.6.1 Silt Fence

A permeable geotextile barrier installed downslope of disturbed areas to intercept sediment-laden runoff.

- Max drainage area: 0.25 acre per 100 ft of fence
- Height: 24–36 in
- Posts: 6 ft o.c. with 12 in embedment
- Toe: buried 6 in minimum

Silt fence shall not be installed across concentrated flow paths.

13.6.2 Check Dams

Small rock, sandbag, or wattles placed across drainage channels to reduce velocity.

$$H_{max} = 2ft$$

Spacing:

$$S = 100H_{max} \; / \; S_{channel}$$

Equation 13-2

Use clean rock (4–8 in) or pre-manufactured fiber rolls.

Install perpendicular to flow, with center 6 in lower than edges.

13.6.3 Inlet Protection

Temporary devices installed around storm drain inlets to trap sediment.

Protection Types:

- Gravel bag barriers
- Silt fence drop inlet protection
- Curb inlet socks or weighted fabric inserts

Inlets must be inspected after each rainfall ≥ 0.5 in.

13.6.4 Construction Entrances

Stabilized pads of coarse aggregate to reduce sediment tracking onto roadways.

- Minimum length: 50 ft
- Width: full driveway or lane width
- Thickness: 6 in
- Aggregate size: 3–6 in (TxDOT Grade 1 rock)
- Filter fabric underlayment required

Sweep and wash adjacent pavement daily as needed.

13.6.5 Sediment Basins

Temporary ponds that capture sediment before runoff leaves site.

$$V_s = 1800\ ft^3\ /\ acre\ disturbed$$

Equation 13-3

Provide outlet with perforated riser pipe and emergency spillway.

Clean out when sediment fills 50% of design volume.

13.6.6 Diversion Berms / Dikes

Constructed ridges of compacted soil to intercept and redirect runoff.

- Minimum height: 18 in
- Side slopes: 3H:1V
- Flowline slope: 0.5%–2%
- Provide stable outlet (rock pad or pipe).

13.7 Permanent Erosion Control Measures

Permanent stabilization shall be applied to all disturbed areas upon completion of construction.

13.7.1 Vegetative Stabilization

- Apply topsoil (minimum 4 in depth).
- Seed with **Bermuda**, **Buffalo**, **Blue Grama**, or **Native Mix** per TxDOT Item 164.
- Mulch rate: 2 tons/acre with tackifier.
- Maintain watering until 70% coverage achieved.

13.7.2 *Riprap Protection*

Install riprap at outfalls, culverts, and steep slopes per **TxDOT Item 432**.

- Minimum rock thickness: $1.5 \times D_{50}$
- Extend riprap apron beyond outlet for 1 culvert diameter.
- Install geotextile filter beneath.

13.7.3 *Gabion Baskets*

Used for slope stabilization and energy dissipation.

Wire mesh baskets filled with angular rock (6–8 in).

Conform to **TxDOT Item 432 and 556**.

13.7.4 *Retaining Structures*

For slopes steeper than 1.5:1 or space-limited sites, use structural walls or reinforced earth systems designed by a structural engineer.

13.7.5 *Bioengineering Methods*

For environmentally sensitive areas, apply:

- Live staking and brush layering
- Coir fiber rolls
- Vegetated geogrids
- Reinforced turf mats (TRMs)

All bioengineering methods shall use native, drought-tolerant vegetation.

13.8 Stormwater Pollution Prevention Plan (SWPPP)

A **SWPPP** shall be required for all construction projects disturbing ≥ 1 acre.

Minimum contents:

1. Project description and site map.
2. Description of potential pollutants and control measures.
3. BMP layout and maintenance schedule.
4. Inspection frequency (≥ once per 14 days and after 0.5 in rain).
5. Spill prevention and response plan.
6. Recordkeeping and reporting per TCEQ TXR150000.
7. Certification by owner/operator and PE (if applicable).

13.9 Inspection and Maintenance

- Inspect all BMPs weekly and after rainfall ≥ 0.5 in.
- Replace damaged or silted barriers immediately.
- Remove accumulated sediment when 50% capacity is reached.
- Maintain vegetative cover through re-seeding as needed.
- Document inspections and corrective actions for City review.

13.10 Construction Site Closeout

Prior to final acceptance:

1. All disturbed areas shall be permanently stabilized.
2. Temporary BMPs shall be removed after vegetation is established.
3. Final inspection will verify compliance with **City of Eagle Pass** erosion and stormwater requirements.
4. Record documentation of BMP maintenance and as-built stabilization must be submitted to the City Engineer.

13.11 Enforcement

Failure to implement or maintain adequate erosion and sediment controls constitutes a violation of **Ord. No. 06-13, § 2, 7-11-2006**, and may result in:

- Stop-work order,
- Fines or penalties per ordinance, and/or
- Revocation of permits until compliance is achieved.

APPENDIX A – LIST OF REFERENCES

Federal References

- **Federal Emergency Management Agency (FEMA)**.
  Floodplain Management Regulations (44 CFR Parts 59–78).
  Washington, D.C.
- **FEMA (2009).** *Flood Insurance Study for Maverick County, Texas, and Incorporated Areas.*
  U.S. Department of Homeland Security, Federal Emergency Management Agency.
- **U.S. Department of Transportation – Federal Highway Administration (FHWA)**.
  - *HEC-15 – Design of Stable Channels in Erodible Materials*, 3rd Edition, 2005.
  - *HEC-18 – Evaluating Scour at Bridges*, 5th Edition, 2012.
  - *HEC-22 – Urban Drainage Design Manual*, 3rd Edition, 2013.
  - *HEC-14 – Hydraulic Design of Energy Dissipators for Culverts and Channels*, 3rd Edition, 2006.
  - *HEC-24 – Storm Drain Inlets and Access Structures*, 2nd Edition, 2012.
- **U.S. Environmental Protection Agency (EPA)**.
  National Pollutant Discharge Elimination System (NPDES) Stormwater Program.
  Code of Federal Regulations, Title 40, Part 122.
- **U.S. Department of Agriculture, Soil Conservation Service (USDA-SCS)**.
  National Engineering Handbook, Section 4 – Hydrology (NEH-4).
  Washington, D.C., 1972.
- **Natural Resources Conservation Service (NRCS).**
  Technical Release No. 55 (TR-55): Urban Hydrology for Small Watersheds.
  U.S. Department of Agriculture, 1986.

State of Texas References

- **Texas Commission on Environmental Quality (TCEQ).**
  - *Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (TXR150000).*
  - *Stormwater Pollution Prevention Plan (SWPPP) Guidelines for Construction Activities.*
  - *Edwards Aquifer Protection Program Technical Guidance.*
  - *Rules and Regulations for Public Drinking Water Systems (30 TAC Chapter 290).*
- **Texas Water Development Board (TWDB).**
  Region 15 – Lower Rio Grande Flood Planning Region Flood Plan (2023).
  Austin, Texas.
- **Texas Department of Transportation (TxDOT).**
  - *Hydraulic Design Manual,* 2022 Edition.
  - *Bridge Design Manual (Hydraulics),* 2023 Edition.
  - *Roadway Design Manual,* 2021 Edition.
  - *Stormwater Management Guidelines for Construction Activities.*

  - *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges.*
  - *TxDOT Drainage Design Criteria Manual.*
  - *TxDOT Standard Sheets: BC, BR, DS, and SW series (Drainage, Safety, and Erosion Control Details).*
- **Texas A&M Transportation Institute (TTI).**
  Guidelines for Design of Roadside Channels and Culverts in Texas.
- **Texas Administrative Code (TAC).**
  Title 30 – Environmental Quality, Chapters 213, 327, 331, and 335.

Regional and Local References

- **City of Eagle Pass (CoEP).**
  - *City of Eagle Pass Code of Ordinances,* Chapter 13.5 – Floodplain Management Standards; Chapter 22 – Streets, Sidewalks and other Public Places; Chapter 23 – Subdivisions and Chapter 27 – Water and Sewers.
  - *City of Eagle Pass Standard Construction Specifications and Details,* latest edition.
  - *City of Eagle Pass Drainage Criteria and Design Standards,* Engineering Department, 2025.
  - *City of Eagle Pass Comprehensive Plan,* 2023 Update.
  - *City of Eagle Pass Floodplain Development Ordinance.*
- **Maverick County Flood Control District.**
  Stormwater and Floodplain Management Policies, 2024 Edition.
- **South Central Texas Regional Water Planning Group (Region 15).**
  Regional Flood Hazard Mitigation and Watershed Master Plan (TWDB).
- **City of San Antonio (CoSA) Department of Public Works.**
  Storm Water Design Criteria Manual, 2022.
  (Referenced for technical comparison and design structure adaptation.)
- **City of Laredo Public Works Department.**
  Stormwater Design Manual, 2019.
  (Referenced for cross-regional design consistency and hydrologic assumptions.)
- **Harris County Flood Control District (HCFCD).**
  Policy, Criteria, and Procedure Manual (PCPM), 2021.
  (Referenced for detention, conveyance, and modeling standards.)

Hydrologic and Hydraulic Modeling References

- **NOAA Atlas 14, Volume 11: Texas Precipitation Frequency Data.**
  National Weather Service, Silver Spring, MD, 2018.
  (Used to define rainfall intensities and IDF relationships for Maverick County.)
- **HEC-HMS (Hydrologic Modeling System) Version 4.12.**
  U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, CA, 2023.
- **HEC-RAS (River Analysis System) Version 6.5.**
  U.S. Army Corps of Engineers, Hydrologic Engineering Center, Davis, CA, 2024.

- **FlowMaster (Stormwater Hydraulic Calculator).**
  Bentley Systems, 2022.
- **CulvertMaster (Culvert Hydraulics Program).**
  Bentley Systems, 2022.
- **StormCAD / CivilStorm.**
  Bentley Systems, 2023.

Construction and Maintenance Standards

- **TxDOT Item 432 – Riprap.**
- **TxDOT Item 464 – Reinforced Concrete Pipe.**
- **TxDOT Item 465 – Junction Boxes, Manholes, and Inlets.**
- **TxDOT Item 466 – Headwalls and Wingwalls.**
- **TxDOT Item 556 – Gabions and Reno Mattresses.**
- **TxDOT Item 164 – Seeding for Erosion Control.**
- **TxDOT Item 506 – Temporary Erosion, Sedimentation, and Environmental Controls.**
- **TxDOT DMS-6200 – Geotextile Fabrics for Erosion Control.**
- **TxDOT Standard Sheets: EC, SW, and BC series (latest revisions).**

Professional Guidelines and Manuals

- **American Society of Civil Engineers (ASCE).**
  Manual of Practice No. 77 – Design and Construction of Urban Stormwater Management Systems, 1992.
- **Water Environment Federation (WEF) and ASCE.**
  Design of Urban Stormwater Controls, WEF Manual of Practice No. 23, 2012.
- **American Association of State Highway and Transportation Officials (AASHTO).**
  LRFD Bridge Design Specifications, 10th Edition, 2023.
- **Texas Floodplain Management Association (TFMA).**
  Floodplain Administrator's Handbook for Texas Communities, 2020.
- **National Association of Flood & Stormwater Management Agencies (NAFSMA).**
  Urban Flood Risk Reduction and Design Standards, 2019.

Cited Equations and Design References

The following key sources were used to establish design equations and technical methodologies contained in this manual:

Topic	Primary Reference
Rational Method	TxDOT Hydraulic Design Manual; CoSA Storm Water Manual
Manning's Equation	FHWA HEC-15; TxDOT HDM
Culvert Flow	FHWA HDS-5; TxDOT HDM

Topic	Primary Reference
Inlet Design	FHWA HEC-22
Open Channel Design	HEC-15; HEC-14
Detention Routing	HEC-HMS; TR-55
Spillway Design	HEC-14; TxDOT Drainage Design Criteria
Scour and Bridge Hydraulics	HEC-18; HEC-20
Erosion Control and Shear Limits	TxDOT Items 432, 506; FHWA HEC-15
Water Quality BMPs	TCEQ TPDES TXR150000; EPA SWPPP Guidelines

APPENDIX B – LIST OF ABBREVIATIONS

Θ	Angle.
a	Gutter depression.
ac	Acres.
A	Area.
AMC	Antecedent moisture condition.
ASCE	American Society of Civil Engineers.
b	Width of partial flow in circular conduit.
C	Dimensionless weighted runoff coefficient used in the Rational Method to account for ground cover and/or land use within the watershed.
CA	Product of runoff coefficient and drainage area used in Rational Method.
cfs	Cubic feet per second.
CLOMR	Conditional letter of map revision.
C_p	Coefficient of peak discharge used in Snyder's unit hydrograph method to account for flood wave and storage conditions.
C_t	Dimensionless coefficient used in Snyder's unit hydrograph method related to the watershed slopes and storage.
D	Diameter.
D_c	Critical depth.
FEMA	Federal Emergency Management Agency.
fps	Feet per second.
Ft	Feet.
g	Acceleration due to gravity (32.2 fps).
h, H	Head.
H_b	Headloss at a bend.

H_j	Headloss at a junction.
HL	Total headloss.
HW	Headwater depth.
I	Rainfall intensity.
K	Dimensionless coefficient used in the Ration Method to account for antecedent precipitation.
K_b	Headloss coefficient at a bend.
K_e	Entrance loss coefficient.
K_j	Headloss coefficient at a junction.
L	Length.
L_a	Length of curb inlet require for 100% interception.
L_{ca}	River mileage from design point to center of gravity of drainage area.
L_g	Gutter flow length.
L_o	Overland flow length.
Min.	Minimum or minutes
MSL	Mean sea level
n, N	Roughness coefficient used in Manning's formula
P	Wetted perimeter of flow.
PMF	Probable Maximum Flood
q	Peak design discharge per unit area
Q, Q_p	Peak design discharge
Q_a	Approach flow in gutter upstream of curb inlet
q_p	Peak rate of discharge of unit hydrograph for unit rainfall duration
q_{pR}	Peak rate of discharge of unit hydrograph for unit rainfall duration, tR

ROW	Right-of-way
S, S_o, S_g	Ground slope, overland ground slope, or gutter flow ground slope
SCS	Soil Conservation Service
S_e	Slope of energy gradient
S_f	Slope of frictional gradient
S_p	Spread of water from curb toward the street centerline for peak flow
S_w	Slope of hydraulic gradient
SWMP	Storm Water Master Plan
T_c	Tme of concentration
t_p	Hydrograph lag time from midpoint of rainfall duration, tr, to peak of unit hydrograph
t_{pR}	Lag time from midpoint of unit rainfall duration, tR, to peak of unit hydrograph
tr	Standard unit rainfall duration
t_R	Unit rainfall duration in hours other than the standard unit tr
T	Top width of flow
v, V	Velocity
w, W	Width
y, Y	Flow depth
z	Reciprocal of street cross slope

APPENDIX C – DEFINITIONS OF TECHNICAL TERMS

Abstractions The fractions of precipitation lost to evaporation, transpiration, interception, depression storage and infiltration.

Abutment A wall supporting the end of a bridge or span and sustaining the pressure of the abutting earth.

Apron A floor or lining of concrete, timber, or other suitable material at the toe of a dam, entrance or discharge side of spillway, a chute, or other discharge structure, to protect the waterway from erosion from falling water or turbulent flow.

Backwater The rise of the water level upstream due to an obstruction or constriction in the channel.

Backwater Curve The term applied to the longitudinal profile of the water surface in an open channel when flow is steady but non-uniform.

Baffle Chute A drop structure in a channel with baffles for energy dissipation to permit the lowering of the hydraulic energy gradient in a short distance to accommodate topography.

Baffles Deflector vanes, guides, grids, gratings, or similar devices constructed or placed in flowing water, to: (a) check or effect a more uniform distribution of velocities; (b) absorb energy; (c) divert, guide, or agitate the liquids; and (d) check eddy currents.

Base Flood The base flood for the City of Del Rio is defined as the 100-year frequency flood based on fully developed watershed conditions. The base flood elevation is the water surface elevation developed using the base flood as defined in part II of this manual. The City of Del Rio base flood elevation will not necessarily correspond FEMA base flood elevation.

Calibration Process of checking, adjusting, or standardizing operating characteristics of instruments and model appurtenances on a physical model or coefficients in a mathematical model. The process of evaluating the scale readings of an instrument in terms of the physical quantity to be measured.

Channel Roughness Irregularities in channel configuration which retard the flow of water and dissipate its energy.

Chute An inclined conduit or structure used for conveying water to a lower level.

Conduit Any open or closed device for conveying flowing water.

Continuity Continuity of flow exists between two sections of a pipe or channel when the same quantity of water passes the two cross sections and all intermediate cross sections at any one instant.

Critical Flow The state of flow which exhibits the following characteristics: (a) the specific energy is a minimum for a given discharge; (b) the discharge is a maximum for a given specific energy; (c) the specific force is a minimum for a given discharge; (d) the velocity head is equal to half the hydraulic depth in a channel of small slope; (e) the Froude Number is equal to unity.

Crown (a) The highest point on a transverse section of conduit; (b) the highest pointof a roadway cross section.

Culvert Large pipe or other conduit through which a storm water flows under a roador street.

Curb A vertical or sloping rim along the edge of a roadway, normally constructed integrally with the gutter, which strengthens and protects the pavement edge and clearly defines the pavement edge to vehicle operators.

Curb Inlet A vertical opening in a curb through which the gutter flow passes. The gutter may be undepressed or depressed in the area of the curb opening.

Curb Split The elevation difference between curbs on opposite sides of astreet.

Dam A barrier constructed across a watercourse for the purposes of (a) creating a reservoir; (b) diverting water from a conduit or channel.

Degradation The progressive general lowering of a stream channel byerosion.

Depression Storage Collection and storage of rainfall in natural depressions (small puddles) after exceeding infiltration capacity of the soil.

Design Storm or Flood The storm or flood which is used as the basis for design, i.e., against which the structure is designed to provide a stated degree of protection or other specified result.

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

a. Off-site detention - A detention pond located outside the boundary of the area it serves.

b. On-site detention - A detention pond which is located within and serves only a specific site or subdivision.

c. On-stream detention - Detention facilities provided to control excess runoff based on a watershed-wide hydrologic analysis.

Drainage System Drainage systems must include streets, alleys, storm drains, drainage channels,culverts, bridges, overflow swales and any other facility through which or over which storm water flows.

Drop Inlet A storm drain intake structure typically located in unpaved areas. The inlet may extend above the ground level with openings on one or more sides or it may be flush with the ground with a grated cover

Drop Structures A sloping or vertical section of a channel designed to reduce the elevation of flowing water without increasing its velocity.

Entrance Head The head required to cause flow into a conduit or other structure; it includes both entrance loss and velocity head.

Entrance Loss Head lost in eddies or friction at the inlet to a conduit, headwall or structure.

Exceedance Probability The statistical probability that an event will equal or exceed a specific magnitude.

Flash Flood A flood of short duration with a relatively high peak rate of flow, usually resulting from high intensity rainfall over a small area.

Flexible Pipe Any corrugated metal pipe, pipe-arch, sectional plate pipe, sectional plate pipe- arch or plastic (polyethylene) pipe.

Flood Control The elimination or reduction of flood damage by the construction of flood storage reservoirs, channel improvements, dikes and levees, bypass channels, or other engineering works.

Flood Hazard Area Area subject to flooding by 100-year frequency floods.

Flood Hazard Mitigation See Storm WaterManagement.

Flood Management See Storm WaterManagement.

Floodplain Geographically the entire area subject to flooding. In usual practice, it is the area subject to flooding by the 100-year frequency flood. In this manual, the "100- year floodplain" refers to the floodplain resulting from a 100-year flood based on ultimate watershed development conditions. The "FEMA floodplain" must refer to the area subject to flooding resulting from the 100-year flood for current watershed development conditions.

Floodway The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation by more than a designated height. In this manual, the floodway refers to the floodway resulting from a 100-year flood event based on ultimate development conditions with a cumulative increase of no more than one foot.

Floodway Fringe Part of the flood hazard area within the floodplain but outside of the floodway.

Freeboard The distance between the normal operating level and the top of the side of an open conduit left to allow for wave action, floating debris, or any other condition or emergency without overtopping the structure.

Frequency (storms, floods) Average recurrence interval of a given flood event over long periods of time.Mathematically, frequency is the reciprocal of the exceedance probability.

Froude Number A flow parameter which is a measure of the extent to which gravitational

action affects the flow. A Froude Number greater than one indicates supercritical flow and a value less than one indicates subcritical flow.

Gabion A wire basket containing earth or stones, deposited with others to provide protection against erosion.

Grade (a) The inclination or slope of a channel, canal, conduit, etc., or natural ground surface, usually expressed in terms of the percentage of number of units of vertical rise (or fall) per unit of horizontal distance. (b) The elevation of the bottom of a conduit, canal, culvert, drains, etc. (c) The finished surface of a canal bed, road bed, top of an embankment, or bottom of excavation.

Grate Inlet An opening in the gutter covered by one or more grates through which the water falls. As with all inlets, grated inlets may be either

	depressed or undepressed and may be located either on a continuous grade of in a sump.
Gutter	A generally shallow waterway adjacent to a curb, used or suitable for drainage of water.
Head	The amount of energy per pound of fluid.
Headwater	(a) The upper reaches of a stream near its sources; (b) the region where ground waters emerge to form a surface stream; (c) the water upstream from a structure.
High Intensity Node	Areas of existing or proposed development that contain a large concentration of buildings and large amounts of pavement. High Intensity nodes typically generate large volumes of storm water runoff.
Histogram	Representation of statistical data by means of rectangles whose widths represent rainfall, runoff, etc. and whose height represents frequency.
Hydraulic Control	The hydraulic characteristic which determines the stage-discharge relationship in a flowing stream or conduit. The control is usually critical depth, tailwater depth or uniform depth.
Hydraulic Grade Line	A line representing the pressure head available at any given point within the system.
Hydraulic Gradient	A hydraulic profile of the piezometric level of the water, representing the sum of the depth of flow and the pressure head. In open channel flow it is the water surface.
Hydraulic Jump	The hydraulic jump is an abrupt rise in the water surface which occurs in an open channel when water flowing at supercritical velocity is retarded by water flowing at subcritical velocity. The transition through the jump results in a marked loss of energy, evidenced by turbulence of the flow within the area of the jump. The hydraulic jump is sometimes used as a means of energy dissipation.
Hydraulics	A branch of science that deals with practical applications of the mechanics of water movement.
Hydrograph	A graph showing flow (or sometimes stage, velocity or other properties of water) versus time at a given point on a stream orconduit.

Hydrology The science that deals with the processes governing the depletion and replenishment of the water resources of the land areas of the earth.

Hyetograph A histogram or graph of rainfall intensity versus time usually during a storm.

Impervious A term applied to a material through which water cannot pass, or through which water passes with great difficulty.

Infiltration a) The entering of water through the interstices or pores of a soil or other porous medium; (b) the quantity of groundwater which leaks into a sanitary or combined sewer or drain through defective joints, breaks or porous walls; (c) The absorption of water by soil, either as it falls as precipitation or from a stream flowing over the surface.

Inlet (a) An opening into a storm drain system for the entrance of surface storm runoff, more completely described as a storm sewer inlet; (b) a structure at the diversion end of a conduit; (c) the upstream connection between the surface of the ground and a drain or sewer, for the admission of surface or storm water.

Intensity As applied to rainfall, a rate usually expressed in inches per hour.

Interception As applied to hydrology, refers to the process by which precipitation is caught and held by foliage, twigs, and branches of trees, shrubs and buildings, never reaching the surface of the ground, and then lost by evaporation.

Invert The floor, bottom, or lowest portion of the internal cross section of a conduit. Used particularly with reference to storm drains, sewers, tunnels, channels and swales.

Lag Time The time difference between two occurrences, such as between rainfall and runoff or pumping of a well and effect on the stream. See Time of Concentration.

Lining Impervious material such as concrete, clay, grass, plastic, etc., placed on the sides and bottom of a ditch, channel, and reservoir to prevent or reduce seepage of water through the sides and bottom and/or to prevent erosion.

Lip A small wall on the downstream end of an apron, to break the flow from the apron.

Manning Coefficient (n) The coefficient of roughness used in the Manning Equation for flow in open channels.

Manning Equation A uniform flow equation used to relate velocity, hydraulic radius and the energy gradient.

Model Mathematical systems analysis by computer, applied to evaluate rainfall-runoff relationships; simulate watershed characteristics; predict flood and reservoir routings; or for other aspects of planning.

Nappe The sheet or curtain of water overflowing a weir or dam. When freely overflowing any given structure, it has a well-defined upper and lower surface.

100-year Event Event (rainfall or flood) that statistically has a one percent chance of being equaled or exceeded in any given year.

Open Channel A conduit in which water flows with a free surface.

Orifice (a) An opening with closed perimeter and regular form in a plate, wall, or partition, through which water may flow; (b) the end of a small tube, such as a Pitot tube, piezometer, etc.

Peak Flow The maximum rate of runoff during a given runoff event.

Percolation To pass through a permeable substance such as ground water flowing through an aquifer.

Permeability The property of a material which permits movement of water through it when saturated and actuated by hydrostatic pressure.

Pervious Applied to a material through which water passes relatively freely.

Porosity (a) An index of the void characteristics of a soil or stratum as pertaining to percolation; degree of perviousness; (b) the ratio, usually expressed as a percentage, of the volume of the interstices in a quantity of material to the total volume of the material.

Post-development The condition of the given site and drainage area after the anticipated development has taken place.

Precipitation Any moisture that falls from the atmosphere, including snow, sleet, rain and hail.

Pre-development The condition of the given site and drainage area prior to development.

Prismatic Channel	A channel with unvarying cross section and constant bottom slope.
Probable Maximum Flood (PMF)	The flood that may be expected from the most severe meteorological and hydrologic conditions that are reasonably possible in the region.
Probable Maximum Precipitation (PMP)	The critical depth-duration-area rainfall relationship for a given area during a storm containing the most critical meteorological conditions considered probable of occurring.
Rainfall Duration	The length of time over which a single rainfall event occurs.
Rainfall Frequency	The average recurrence interval of rainfall events, averaged over long periods of time.
Rainfall Intensity	The rate of accumulation of rainfall, usually in inches or millimeters per hour.
Rational Formula	A traditional means of relating runoff from a drainage basin to the intensity of the storm rainfall, the size of the basin, and the characteristics of the basin (such as land use, impervious cover).
Reach	Any length of river or channel. Normally refers to sections which are uniform with respect to discharge, depth, area or slope, or sections between gaging stations.
Recurrence Interval	The average interval of time within which a given event is statistically predicted to be equaled or exceeded once. For an annual series (as opposed to a partial duration series), it is the probability of occurrence interval. Thus a flood having a recurrence interval of 100 years has a one percent probability of being equaled or exceeded.
Return Period	See Recurrence Interval.
Rigid Pipe	Any concrete, clay or cast iron pipe.
Riprap (Revetment)	Forms of bank channel protection, usually using rock or concrete. Riprap is a term sometimes applied to stone which is dumped rather than placed more carefully.

Routing Routing is a technique used to predict the temporal and spatial variations of a flood wave as it traverses a river reach or reservoir. Generally, routing technique may be classified into two categories - hydrologic routing and hydraulic routing.

Right-of-Way (ROW) A strip of land dedicated for public streets and/or related facilities, including utilities, drainage systems and other transportation uses.

ROW Width The shortest horizontal distance between the lines which delineate the limits of right-of-way of a street.

Runoff That part of the precipitation that exceeds abstractions and reaches a stream or storm drain.

Runoff Coefficient A decimal number used in the Rational Formula, which defines the runoff characteristics (i.e., land use impervious cover) of the drainage area under consideration. It may be applied to an entire drainage basin as a composite representation or it may be applied to a small individual area such as one residential lot.

Runoff Total The total volume of flow from a drainage area for a definite period of time such as a day, month, year, or for the duration of a particular storm.

Runoff Curve Number Index number used in the Soil Conservation Service unit hydrograph method as a measure of the tendency of rainfall to run off into streams rather than evaporate or infiltrate.

Scour The erosive action of running water in streams or channels in excavating and carrying away material from the bed and banks.

Sediment Material of soil and rock origin transported, carried, or deposited by flowing water.

Sidewalk A paved area within the street right-of-way specifically designed for pedestrians and/or bicyclists.

Slope, Critical (a) The slope or grade of a channel that is exactly equal to the loss of head per foot resulting from flow at a depth that will give uniform flow at critical depth; (b) the slope of a conduit which will produce critical flow.

Slope, Friction The friction head or loss per unit length of channel or conduit. For uniform flow the friction slope coincides with the energy gradient. Where a distinction is made between energy losses due to bends, expansions, impacts, etc., a distinction must also be made between

	the friction scope and the energy gradient. The friction slope is equal to the bed or surface slope only for uniform flow in uniform open channels.
Soffit	The top of the inside of a pipe. In a pipe, the uppermost point on the inside of the structure.
Spillway	A waterway in or about a dam or other hydraulic structure for the escape of excess water.
Steady Flow	Open channel flow is said to be steady if the depth of flow does not change and can be assumed to be constant during the time interval under consideration.
Stilling Basin	Pool of water conventionally used, as part of a drop structure or other structure, to dissipate energy.
Storm Hydrology	The branch of hydrology that concentrates on the calculation of runoff from storm rainfall.
Storm water	
Management	The control of storm runoff by means of land use restrictions, detention storage, erosion control, and/or drainage systems.
Storm water Model	Mathematical method of solving storm water problems by computer Technology.

Street Classifications

Type A – Major Type B – Major Type C – Secondary Major	Carries traffic from one urban area to another and serves the major activity centers of the urbanized areas. A major thoroughfare is used for longer urban trips and carries a high portion of the total traffic with a minimum of mileage.
Type D - Collector Street	Carries traffic from local streets to thoroughfares. Uses served would include medium and high density residential, limited commercial facilities, some small offices, and as direct access within industrial parks.
Type E – Residential Type F - Estate	Distributes traffic to and from residences. Short in length, non-continuous to discourage through traffic. Low-density residential areas.
Subcritical Flow	Relatively deep, tranquil flow with low flow velocities. The Froude number is less than 1.0 for subcritical flow conditions.
Supercritical Flow	Relatively shallow, turbulent flow with high velocities. The Froude Number is greater than 1.0 for supercritical flow conditions.
Tailwater	The depth of flow in the stream directly downstream of a drainage facility or other man-made control structure.
Time of Concentration	The estimated time in minutes required for runoff to flow from the most hydraulically remote section of the drainage area to the point at which the flow is to be determined. Hydraulically remote refer to the travel path with the longest flow travel time, not necessarily the longest linear distance.
Total Head Line **(Energy Line)**	A line representing the energy in flowing water. The elevation of the energy line is equal to the elevation of the flow line plus the depth plus the velocity head plus the pressure head.
Trash Rack	Racks, gratings, or mesh designed so as to prevent tree limbs, water-borne debris and rubbish from plugging the outlets from a dam or detention basin.
Trunk Line	The main line of a storm drain system, extending from manhole to manhole or from manhole to outlet structure.

Ultimate Development The condition of the watershed after the entire watershed has undergone development.

Uniform Channel A channel with a constant cross section, slope and roughness.

Uniform Flow Open channel flow is said to be uniform if the depth of flow is the same at every section of the channel.

Unit Hydrograph The direct runoff hydrograph resulting from one inch of precipitation excess,distributed uniformly over a watershed for a specified duration.

Velocity Head The energy per unit weight of water due to its velocity. The velocity head also represents the vertical distance water must fall freely under gravity to reach its velocity.

Warped Headwall The wingwalls are tapered from vertical at the abutment to a stable bank slope at the end of the wall.

Water Year The water year commonly used in the United States is the period from October 1 of the previous calendar year to September 30 of the numbered calendar year.

Watershed The area contributing storm runoff to a stream or drainage system. Other terms are drainage area, drainage basin and catchment area.

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY OF EAGLE PASS, TEXAS, AMENDING CHAPTER 23, ARTICLE II, SECTIONS 23-25, ARTICLE III, SECTIONS 23-35, AND ARTICLE IV, SECTIONS 23-61 AND 23-68 OF THE CODE OF ORDINANCES RELATING TO SUBDIVISION PLAT REVIEW AND APPROVAL, ENGINEERING AND GEOTECHNICAL REQUIREMENTS, STREET DESIGN AND CONSTRUCTION STANDARDS, STORMWATER MANAGEMENT, AND DRAINAGE FACILITIES; PROVIDING FOR THE SUBMISSION AND REVIEW OF CERTAIN PLANS, REPORTS, AND DOCUMENTATION; PROVIDING FOR THE AUTHORITY AND RESPONSIBILITIES OF CITY STAFF IN THE REVIEW AND APPROVAL OF SUBDIVISION DEVELOPMENT; PROVIDING THAT THIS ORDINANCE SHALL BE CUMULATIVE; PROVIDING A SEVERABILITY CLAUSE; AND DECLARING AN EFFECTIVE DATE.

WHEREAS, the City of Eagle Pass, Texas (the "City"), is a home-rule municipality authorized by the Texas Constitution and applicable state law to adopt ordinances necessary to protect the health, safety, and welfare of its residents and to regulate the development and use of property within the City; and

WHEREAS, Chapter 23 of the City of Eagle Pass Code of Ordinances establishes requirements and standards governing the subdivision and development of property within the City, including requirements relating to preliminary and final plats, engineering plans and reports, street construction, stormwater management, and drainage facilities; and

WHEREAS, the City Council finds that amendments to Chapter 23 are necessary and appropriate to update and clarify the City's subdivision development standards and to ensure that proposed developments are reviewed in accordance with the City's current development plans, construction specifications, stormwater design criteria, and applicable engineering standards; and

WHEREAS, the amendments provided herein are intended to clarify the review responsibilities of City staff, update the technical documentation required in connection with subdivision applications, and establish consistent requirements for geotechnical engineering, lot grading, stormwater pollution prevention, utility layouts, street design, and drainage facilities; and

WHEREAS, the City Council further finds that the amendments to Chapter 23 will promote orderly development, protect public infrastructure, improve stormwater

and drainage management, and protect the health, safety, and welfare of the citizens of the City of Eagle Pass; and

WHEREAS, the City Council has determined that the amendments set forth herein are in the best interest of the City and its residents and should be adopted as provided herein.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EAGLE PASS, TEXAS THAT:

Section 1. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article II, Sections 23-25(g)(1)&(2)*** , is hereby amended as follows:

(g) Processing of the preliminary plat.

(1) Prior to formal application to the planning commission by the subdivider, the city manager shall check the preliminary plat as to its conformity with the Eagle Pass Master Development Plan, [~~major street plan,~~] ***latest version of the City of Eagle Pass Construction Manual, latest revision of the City of Eagle Pass Stormwater Design Criteria Manual, latest revision of the City of Eagle Pass Thoroughfare Master Plan,*** land use plan, zoning districts, and the standards and specifications set forth herein or referred to herein.

(2) The city manager shall submit copies of the preliminary plat to the following for review and comment:
a. The water works ***and sewer*** system;
b. [~~The city chief building official~~] ***The Chief Building Official of the City of Eagle Pass***;
c. The director of parks and recreation;
d. The director of public works~~.~~**;**
e. [~~The sanitary sewer division the water works system.~~] ***The City Engineer***
f. The fire chief;
g. The city attorney.

The city manager may submit copies of the preliminary plat to others for review, if he deems it necessary.

Section 2. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article III, Sections 23-35(a)(4)c***, is hereby amended as follows:

c. Final engineering report. The final plat shall be accompanied by an engineering report bearing the signed and dated seal of a professional engineer registered in the State of Texas. The engineering report shall discuss the availability and methodology of providing water facilities and wastewater treatment and other to individual lots within the subdivision. A detailed cost estimate per lot acceptable to the county shall be provided for those unconstructed water

supply and distribution facilities and wastewater collection and treatment facilities which are necessary to serve each lot of the subdivision. The plan shall include a construction schedule for each significant element needed to provide adequate water or wastewater facilities. If financial guarantees are to be provided, the schedule shall include the start dates and completion dates.

An engineering report bearing the signed and dated seal of a professional engineer registered in the State of Texas. The report will contain a summary description of:

- The significant drainage problems associated with the project;
- The analysis procedure used to evaluate these problems and to propose solutions;
- Any assumptions or special conditions associated with the use of these procedures;
- The proposed design of the drainage control system; and
- The result of the analysis of the proposed drainage control systems that it does solve the project's drainage problems. The report will summarize the hydraulic design and detailing how this design satisfies the ***latest version of the City of Eagle Pass Stormwater Design Criteria Manual and the*** Eagle Pass Storm Water and Sediment Control Ordinance.

Section 3. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article III, Sections 23-35(b)(1)d,*** is hereby amended as follows:

d. To the [~~director of public works~~] ***Public Works Director and City Engineer***:

Section 4. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article III, Sections 23-35 (b)(1)d.4.-11.***, is hereby amended as follows:

4. [~~Two (2) copies of the utilities layout showing proposed locations of utilities, street lights, fire hydrants and sidewalks shall be submitted.~~] ***Geotechnical Engineering Report. Report shall be completed by a Texas Licensed Professional Engineer and must be utilized as a basis for pavement design of proposed streets unless proposed pavement sections adhere to "Appendix A-1" of the City of Eagle Pass Construction Specifications Manual. Proposed pavement design deviating from recommended pavement sections in the City of Eagle Pass Construction Specifications Manual must be submitted for City's Engineer review and approval. Pavement Design must be in accordance with the latest revision to the City of Eagle Pass Construction Specification Manual. Geotechnical Engineering Report shall serve as a basis for foundation design of residential and/or commercial developments.***

5. [~~Two (2) copies of detailed cost estimates of all required improvements within the subdivision other than gas and electric lines.~~] ***Lot Grading Plan. Lot grading plan shall be completed per Sec 23-69 (b) of Article IV Subdivision Design Standards and Specifications.***

6. Stormwater Pollution Prevention Plan (SW3P). SW3P Plan to be in accordance with Ch. 23 Article VIII Stormwater Compliance For Construction Activity.

7. Submit one hard or digital copy of the Final Plat to include Construction Drawings, if

applicable. The Final Plat documents shall include:

- ***i. Utilities Layout, Street Lights, Fire Hydrants, and Sidewalks;***
- ***ii. Detailed Cost Estimates of all detailed cost estimates of all required improvements within the subdivision other than gas and electric lines;***
- ***iii. Geotechnical Engineering report used as a basis for pavement design and foundation design, as applicable;***
- ***iv. Lot Grading Plan;***
- ***v. Proposed Stormwater Pollution Prevention Plan***

Section 5. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article IV, Sections 23-61(a)*** , is hereby amended as follows:

(a) Street layout. The arrangement, character, extent, width, grade and location of all streets shall conform to the "Masterplan," "[Master] Thoroughfare ***Master*** Plan," "City of Eagle Pass Public Works Specifications Construction Manual," "***City of Eagle Pass Stormwater Design Criteria Manual***," and "Comprehensive Plan" of the city and shall be considered in their relation to existing and planned streets, to topographical conditions, to public safety and convenience, and in their appropriate relation to the proposed uses of land to be served by such streets. The street layout shall be devised for the most advantageous development of the entire city development. If the right-of-way or pavement width~~. C~~ ***c***ontained herein and in City of Eagle Pass ~~Public Works "Specification Construction Manual~~ "***Thoroughfare Master Plan."***

Section 6. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article IV, Sections 23-61(m)(3)***, is hereby amended as follows:

(3) Construction standards.

a. All streets shall be constructed with respect to base, surfacing, curbs and geometric design criteria in accordance with the standards and specifications of the City of Eagle Pass Public Works Construction Specifications Manual of the city and the regulations set forth herein and shall be subject to the inspection and approval by the city manager. Samples of caliche shall be required to be laboratory tested prior to initiation of construction. All costs incurred in meeting this requirement shall be borne by the subdivider.

b. No structures shall be placed within a street right-of-way. Within key areas where beautification is desired, street trees may be permitted if approved by the public works department but must not impede driver and pedestrian sight lines.

c. All street storm drainage design shall conform with the latest revision of the City of Eagle Pass Stormwater Design Criteria Manual.

Section 7. The City of Eagle Pass Code of Ordinances, ***Chapter 23***, ***Article IV, Section 23-68(b)***, is hereby amended as follows:

(b) Drainage facilities.

(1) Drainage facilities shall be ***designed in accordance with the latest revision of the City of Eagle Pass Stormwater Design Criteria Manual and*** constructed in accordance with the design criteria and construction standards of the ***latest version of the City of Eagle Pass Construction Specifications Manual.*** [~~Master Development Plan of the City of Eagle Pass~~.]

(2) Drainage and drainage facilities shall be provided for in all instances and shall be approved by the ~~city council~~ ***City Engineer, or their designee***, and the planning and zoning commission under and subject to the requirements contained in this section, and subject also to other provisions relating to floodway, overflow and drainage areas, courses and easements in a manner such that natural watercourses shall not be so changed, ignored, filled or otherwise encroached upon as to reduce their effectiveness in carrying off surface storm water, and in a manner such that land use and development shall be effectively controlled for the purpose and to end eliminating and preventing property damage by flooding.

Section 8. This ordinance shall be cumulative of all provisions of ordinances of the City of Eagle Pass, Texas, except where the provisions of this ordinance are in direct conflict with the provisions of such ordinances, in which event the conflicting provisions of such ordinances are hereby repealed.

Section 9. It is hereby declared to be the intention of the City Council that the phrases, clauses, sentences, paragraphs and sections of this ordinance are severable, and if any phrase, clause, sentence, paragraph or section of this ordinance shall be declared unconstitutional by the valid judgment or decree of any court of competent jurisdiction, such unconstitutionality shall not affect any of the remaining phrases, clauses, sentences, paragraphs and sections of this ordinance, since the same would have been enacted by the City Council without the incorporation in this ordinance of any such unconstitutional phrase, clause, sentence, paragraph or section.

Section 10. This Ordinance shall become effective immediately upon publication.

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR ON THIS_____DAY OF_____2026.

_____

AARON VALDEZ
MAYOR

ATTESTED:

_____
ERIKA RODRIGUEZ
CITY SECRETARY

APPROVED AS TO FORM:

_____
ANA SOPHIA GARCIA
CITY ATTORNEY

ORDINANCE NO. 2026-

AN ORDINANCE APPROVING AND ADOPTING THE BUDGET OF THE CITY OF EAGLE PASS, TEXAS, FOR THE 2026-2027 FISCAL YEAR AND ESTABLISHING PROCEDURES OF FORMAL APPROVAL BY SEPTEMBER 14, 2026; FINDING THAT THE MEETING AT WHICH THIS ORDINANCE IS PASSED IS OPEN TO THE PUBLIC AS REQUIRED BY LAW; PROVIDING A SEVERABILITY CLAUSE; AND ESTABLISHING AN EFFECTIVE DATE

NOW, THEREREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EAGLE PASS, TEXAS, that:

SECTION 1. The City Manager having prepared and submitted to the City Council, a proposed budget representing a complete financial plan for the 2026-2027 fiscal year of said City to commence on the 1st day of October, 2026, and ending the 30th day of September, 2027, notice of which by publication having been timely given pursuant to applicable State Laws and this City's Home Rule Charter; and after due submission, reading, discussion and deliberation held after the posting and attached documents, as amended, in its final form and by each sub-total appearing under each heading, is hereby approved and adopted as the City Budget of the City of Eagle Pass, for the period therein and hereinafter specified.

SECTION 2. The City Manager of this City is hereby authorized and instructed to file, or cause to be filed forthwith, following the adoption of this Ordinance, a copy hereof and of the said City Budget, with the County Clerk of Maverick County, Texas and the City Secretary of the City of Eagle Pass, Texas.

SECTION 3. If any section, part, or provision of this Ordinance is declared unconstitutional or invalid by a court of competent jurisdiction, then, in that event, it is expressly provided, and it is the intention of the City Council in passing this Ordinance that its parts shall be severable, and all other parts of this Ordinance shall not be affected thereby, and they shall remain in full force and effect.

SECTION 4. This ordinance, therefore, shall be in full force and effect from and after its final passage.

READ, PASSED, AND APPROVED ON FIRST READING on this 18th Day of August, A.D., 2026.

ATTEST:

_____ _____

Aaron Valdez
Mayor

Erika Rodriguez
City Secretary

AYES:
NAYS:
ABSTAINED:
ABSENT:

READ, PASSED, AND APPROVED ON SECOND READING, this 8th Day of September, A.D., 2026.

ATTEST:

_____ _____

Aaron Valdez
Mayor

Erika Rodriguez
City Secretary

AYES:
NAYS:
ABSTAINED:
ABSENT:

READ, PASSED, AND APPROVED ON THIRD AND FINAL READING this 14th Day of September A.D., 2026.

ATTEST:

_____ _____

Aaron Valdez
Mayor

Erika Rodriguez
City Secretary

AYES:
NAYS:
ABSTAINED:
ABSENT:

APPROVED AS TO FORM AND LEGALITY:

_____

Ana S. Garcia
City Attorney

ORDINANCE NO. 2026-

AN ORDINANCE LEVYING A TAX RATE FOR THE CITY OF EAGLE PASS FOR THE TAX YEAR 2026; FINDING THAT THE MEETING AT WHICH THIS ORDINANCE IS PASSED IS OPEN TO THE PUBLIC AS REQUIRED BY LAW; PROVIDING A SEVERABILITY CLAUSE; AND ESTABLISHING AN EFFECTIVE DATE

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF EAGLE PASS, TEXAS, that:

SECTION 1. Pursuant to Section 26.05(a) of the Texas Property Tax Code and other applicable provisions of the law, the City Council of the City of Eagle Pass, does hereby levy or adopt the tax rate on $100.00 valuation for this year for tax year 2026 as follows:

$ 0.241526/$100 for the purpose of maintenance and operation

$0.238526/$100 for the payment of principal and interest on debt of this City

$0.480052/$100 total tax rate

SECTION 2. The Tax Assessor-Collector is hereby authorized to assess and collect the taxes of the City of Eagle Pass, employing the above tax rate.

SECTION 3. To provide for the funding of the 2026 - 2027 fiscal year budget, the City of Eagle Pass, Texas, must adopt a tax rate, and thereafter levy that rate, for the purpose of collecting revenues. This adoption of the tax rate and a levy must occur before October 1, 2026.

SECTION 4. This ordinance, therefore, shall be in full force and effect from and after its final passage.

READ, PASSED, AND APPROVED ON FIRST READING on this 18th Day of August, A.D., 2026.

ATTEST:

Aaron Valdez .	Erika Rodriguez
Mayor	City Secretary

AYES:
NAYS:
ABSENT:

READ, PASSED, AND APPROVED ON SECOND READING, this 8th Day of September, A.D., 2026.

ATTEST:

_____ _____

Aaron Valdez
Mayor

Erika Rodriguez
City Secretary

AYES:
NAYS:
ABSENT:

READ, PASSED, AND APPROVED ON THIRD AND FINAL READING this 14th Day of September A.D., 2026.

ATTEST:

_____ _____

Aaron Valdez .
Mayor

Erika Rodriguez
City Secretary

AYES:
NAYS:
ABSENT:

APPROVED AS TO FORM AND LEGALITY:

_____

Ana Sophia Garcia
City Attorney