BIG SPRING
TEXAS

CITY COUNCIL REGULAR AGENDA

Tuesday, March 8, 2022

Notice is hereby given that the City Council of the City of Big Spring, Texas will meet in Regular Session on Tuesday, March 8, 2022, at 5:30 pm at the City Council Chambers Located at 307 East 4th Street, Big Spring, Texas. **We welcome the public to attend the meeting via telecommunication. Citizens will be able to view the City Council Meeting on Our Local Channel 17 through Suddenlink or on Our Website http://mybigspring.com/224/Channel-17-Live.**

CITY COUNCIL MEETING ETIQUETTE

Gentlemen are requested to remove their hats inside the City Council Chambers. As a courtesy to those in attendance, please place your cell phone on "Silent" or "Vibrate." Please, no Talking during the meetings. Take all conversations outside so that others can hear.

Open Session

1.	Call to Order	Thomason
2.	Invocation	Thomason
3.	Pledge of Allegiance to the United States Flag and to the Texas State Flag	Thomason

Public Comment

Public Comment – Members of the public are entitled to speak on any topic. Additionally, members of the public may comment on any action item before or during its consideration. Speakers are Requested to Stand at the Podium and State Their Name and Address. Speakers Should Fill out the Form at the Podium and Turn it into the City Secretary. Please Do Not Exceed Five (5) Minutes.

4.	**Public Comment – If you have public comments, please call 432-264-2411.**	Thomason

Announcements, Presentations and Public Hearings

Public Hearings – The Council will take Input on Items Requiring Public Hearing Items **Prior** to any Action.

5.	**PUBLIC HEARING** – First Public Hearing to Consider the Creation of the Tax Increment Reinvestment Zone No.1 (TIRZ), Appointing the Board of the TIRZ, Establishing the Termination Date of the Zone, Making Certain Findings, Setting the Captured Tax Percentage, and Authorizing Actions in Furtherance of the Zone		Bowles
6.	Budget Review	Handout	S. Smith

City Manager's Report

7.	Large Item Pickup for District 3 – March 16, 2022		Darden
8.	Update on Rollout Container Timeline	6	Darden
9.	City Manager's Team Award Luncheon		Darden
10.	Update on Recent Aeronautical Activity at the Airport		Darden

Consent Items

11.	Approval of the City Council Minutes of the Regular Meeting of February 22, 2022	7-12	Davis
12.	Final Reading of a Resolution Adopting the Drainage Design Criteria Manual for the Design and Construction of Stormwater Drainage Systems Within the City and Its ETJ; and Providing an Effective Date	13-62	Bowles
13.	Final Reading of an Ordinance Amending Ordinance Number 039-2021 Which Adopted the Annual Budget for the City of Big Spring, Texas for the Fiscal Year Beginning October 1, 2021 and Ending September 30, 2022 by Increasing the General Fund Budget for the Purpose of Lighting Replacements at the Roy Anderson Sports Complex; Providing for Severability; Providing for Publication; and Providing an Effective Date	63-64	Lewis
14.	Final Reading of an Ordinance Amending Ordinance Number 039-2021 Which Adopted the Annual Budget for the City of Big Spring, Texas for the Fiscal Year Beginning October 1, 2021 and Ending September 30, 2022 by Increasing the General Fund Budget to Purchase Equipment for Various Departments; Providing for	65-66	S. Smith

Severability; Providing for Publication; and Providing an Effective Date

Vouchers

15.	Vouchers for 02/24/2022	$	812,296.46	Yanez
16.	Vouchers for 03/03/2022	$	194,094.41	Hughes

New Business

17.	First Reading of an Ordinance Authorizing the Creation of the Tax Increment Reinvestment Zone, No. 1, City of Big Spring Establishing the Tax Increment Fund, Appointing the Board of the Tax Increment Reinvestment Zone, Establishing the Termination Date of the Zone, Making Certain Findings, Setting the Captured Tax Percentage, and Authorizing Actions in Furtherance of the Zone	67-69	Bowles
18.	First Reading of an Ordinance Amending the Big Spring City Code Chapter 44 Entitled "Solid Waste," Article III "Illegal Dumping and Litter Control" by Adding a New Section 44-120 Entitled "Persons Against Littering and Illegal Dumping" Authorizing the City Manager to Waive Landfill Fees for Persons Picking Up and Disposing of Litter and Illegal Dumping in the City Limits of Big Spring; Establishing Criteria that Define these Projects as in the Interest of Public Health, Safety, and Welfare; Providing for Severability; and Providing an Effective Date	70-72	Thomason
19.	Discussion and Consideration Authorizing the City Manager to Execute an Interlocal Agreement Permitting Cooperation with Howard College and Other Taxing Entities for the 2022 Seal Coat Project	73-75	Bowles
20.	Consideration and Possible Action of an Agreement with Spectrum VOIP for Fax, SIP Telephone Services and Rental Equipment and Authorizing the City Manager or His Designee to Execute any Necessary Documents	Handout	Hagen
21.	BOARDS & COMMITTEES		

Convention & Visitors Bureau Board — McDonald
Jay Patel – Nominated by Councilmember McDonald (District 4)

Zoning Board of Adjustment - Alternates — Yanez
Jeremy Longoria Sanchez – Nominated by Councilmember Yanez (District 2)

Council Input

22. Input — Thomason

Executive Session

23. Adjourn into Executive Session in Accordance with the Purposes Permitted by the Open Meetings Act, Subchapter D, "Exceptions to Requirement that Meetings be Open," Chapter 551, Government Code, "Open Meetings," to Conduct a Private Consultation Under Section 551.071(1), "Consultation with Attorney; Closed Meeting," with the Attorney with Respect to Pending or Contemplated Litigation; (2) to Deliberate a Matter in Which the Duty of the Attorney to the Governmental Body under the Texas Disciplinary Rules of Professional Conduct of the State Bar of Texas Clearly Conflicts with the Open Meetings Act, see Section 551.071(2); and (3) in Accordance with the Open Meetings Act, Section 551.072, "Deliberation regarding Real Property; Closed Meeting" to Deliberate the Purchase, Exchange, Lease, or Value of Real Property when Deliberation in an Open Meeting Would have a Detrimental Effect on the Position of the Governmental Body in Negotiations with a Third Person. — Thomason

24. Reconvene in Open Session and Take Any Necessary Action on Executive Session Items — Thomason

25. **Adjourn** — Thomason

The City Council reserves the right to meet in executive session on any agenda item should the need arise pursuant to Chapter 551, Subchapter D of the Texas Government Code, or the Texas Disciplinary Rules of Professional Conduct.

Sec. 551.144. CLOSED MEETING; OFFENSE; PENALTY.
(a) A member of a governmental body commits an offense if a closed meeting is not permitted under this chapter and the member knowingly:
(1) calls or aids in calling or organizing the closed meeting, whether it is a special or called closed meeting;
(2) closes or aids in closing the meeting to the public, if it is a regular meeting; or
(3) participates in the closed meeting, whether it is a regular, special, or called meeting.

(b) An offense under Subsection (a) is a misdemeanor punishable by:
(1) a fine of not less than $100 or more than $500;
(2) confinement in the county jail for not less than one month or more than six months; or
(3) both the fine and confinement.

I hereby certify that this agenda was posted on the official bulletin board at the City of Big Spring, City Hall Building, located outside 310 Nolan Street. Given by order of the City Council and Posted on Friday, March 4, 2022 at 4:45 p.m. in accordance with Title 5, Texas Government Code and Chapter 551.

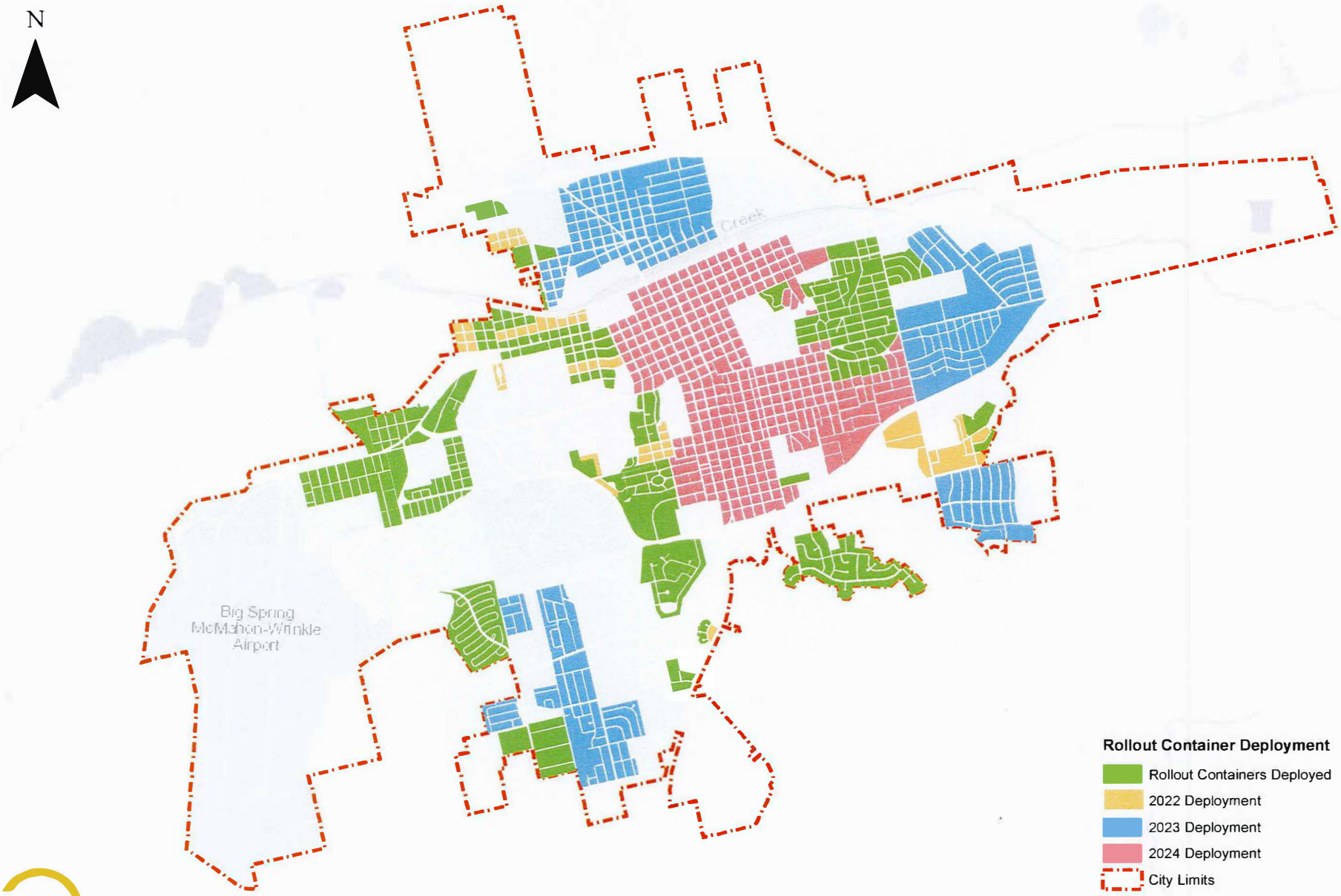
In addition, this agenda and supporting documents are posted on the City of Big Spring's Website, www.mybigspring.com, in accordance with legal requirements.

Tami L. Davis

Tami L. Davis, City Secretary

PERSONS WISHING TO HAVE AN INTERPRETER SHOULD CONTACT TAMI DAVIS AT 264-2513 or tdavis@mybigspring.com. REQUESTS FOR AN INTERPRETER SHOULD BE MADE AT LEAST 72 HOURS IN ADVANCE OF THE MEETING TIME.

Rollout Container Deployment Timeline



BIG SPRING
TEXAS

Date: 2/17/2022 Author: Konn Ulmer

STATE OF TEXAS :
COUNTY OF HOWARD :
CITY OF BIG SPRING :

The City Council of the City of Big Spring, Texas, met in a regular meeting in the City Council Chambers located at 307 E. 4th St., Big Spring, Texas, at 5:30 p.m., February 22, 2022, with the following members present in person:

SHANNON THOMASON	Mayor
NICK ORNELAS	Mayor Pro Tem
DIANE YANEZ	Councilmember
CODY HUGHES	Councilmember
GLORIA MCDONALD	Councilmember
TROY TOMPKINS	Councilmember

(Councilmember Smith was not present at this meeting.)

Same and constituting a quorum, for which four Councilmembers must be present; and the following staff in person;

TODD DARDEN	City Manager
JOHN MEDINA	Assistant City Manager
ANDREW HAGEN	City Attorney
CRAIG FERGUSON	Fire Chief
CHAD WILLIAMS	Police Chief
SHANE BOWLES	Public Works Director
MIKE FEELEY	Airpark Director
SANDY SMITH	Finance Director
HAYLEY LEWIS	Community Services Director
TAMI DAVIS	City Secretary
TIM GREEN	Municipal Judge

INVOCATION & PLEDGE OF ALLEGIANCE

Councilmember Hughes gave the invocation and Mayor Thomason led the Pledge of Allegiance to the American and Texas Flags.

PUBLIC COMMENT

No comments at this time.

ANNOUNCEMENTS, PRESENTATIONS AND PUBLIC HEARINGS

No announcements, presentations or public hearings at this time.

CITY MANAGER'S REPORT

Todd Darden, City Manager, gave an update on the following:

- Update on Large Item Pickup Reminder for District 2
- Update on Board Appointments
- Update on the ARPA (American Recue Plan Act) Funds
- Update on renovating the Westside Community Center for a new tenant
- Update on the Fire Station Bathroom renovations

CONSENT ITEMS

APPROVAL OF THE CITY COUNCIL MINUTES OF THE REGULAR MEETING OF FEBRUARY 8, 2022

FINAL READING OF AN ORDINANCE AMENDING ORDINANCE NUMBER 039-2021 WHICH ADOPTED THE ANNUAL BUDGET FOR THE CITY OF BIG SPRING, TEXAS FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2021 AND ENDING SEPTEMBER 30, 2022 BY INCREASING THE GENERAL FUND BUDGET BY ACCEPTING A DONATION TO BE USED FOR ADDITIONAL EQUIPMENT FOR THE FIRE DEPARTMENT; PROVIDING FOR REPEAL OF ORDINANCES IN CONFLICT HEREWITH; PROVIDING FOR PUBLICATION; AND PROVIDING AN EFFECTIVE DATE

FINAL READING OF AN ORDINANCE AMENDING ORDINANCE NUMBER 039-2021 WHICH ADOPTED THE ANNUAL BUDGET FOR THE CITY OF BIG SPRING, TEXAS FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2021 AND ENDING SEPTEMBER 30, 2022; TRANSFERRING FUNDS WITHIN THE SANITATION DEPARTMENT; PROVIDING FOR REPEAL OF ORDINANCES IN CONFLICT HEREWITH; PROVIDING FOR PUBLICATION; AND PROVIDING AN EFFECTIVE DATE

FINAL READING OF AN ORDINANCE AMENDING CHAPTER 40 OF THE BIG SPRING CITY CODE ENTITLED "PARKS, RECREATION, AND CULTURAL AFFAIRS," ARTICLE II, "PARKS AND RECREATIONAL FACILITIES," DIVISION 2, "PAVILION AREAS," BY ADDING A NEW SECTION 40-54 ENTITLED "STEWART PAVILION" TO RENAME "BUFFALO PAVILION," ALSO KNOWN AS "2ND PAVILION," TO "STEWART PAVILION" IN HONOR OF HOWARD AND VICKI STEWART; AMENDING SECTION 40-58 "USE OF FACILITIES; UNUSUAL NOISE, ETC." FOR CONSISTENCY; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE

Motion was made by Mayor Pro Tem Ornelas to approve the above captioned minutes and ordinances, seconded by Councilmember Yanez, with all members of the Council present voting "aye."

FINAL READING OF AN ORDINANCE AMENDING CHAPTER 2 OF THE BIG SPRING CITY CODE ENTITLED "ADMINISTRATION," ARTICLE VII "BOARDS AND COMMISSIONS," DIVISION "ZONING BOARD OF ADJUSTMENT," SECTION 2-314 "ORGANIZATION AND PROCEDURE" TO CREATE SEVEN ALTERNANTE BOARD

POSITIONS FOR THE ZONING BOARD OF ADJUSTMENT; REQUIRING THAT EACH MEMBER POSSESS THE SAME QUALIFICATIONS AS REGULAR BOARD MEMBERS; AND ESTABLISHING REQUIREMENTS UNDER WHICH ALTERNATE MEMBERS SHALL SERVE IN PLACE OF A REGULAR BOARD MEMBER; PROVIDING FOR REMOVAL OF ALTERNATE MEMBERS FOR JUST CAUSE AFTER A PUBLIC HEARING; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE

After a brief discussion motion was made by McDonald to approve the above captioned ordinance, seconded by Councilmember Hughes, with all members of the Council present voting "aye."

VOUCHERS

Councilmember Yanez reviewed the following vouchers:

VOUCHERS FOR 02/04/2022	$	389,968.68
VOUCHERS FOR 02/10/2022	$	1,282,788.54
VOUCHERS FOR 02/17/2022	$	744,130.83

Motion was made by Councilmember Yanez to approve the above captioned vouchers, seconded by Mayor Pro Tem Ornelas, with all members of the Council present voting "aye."

BIDS

CONSIDERATION AND POSSIBLE ACTION TO ACCEPT A BID AWARD FOR THE 2021 WATER LINE REPLACEMENTS AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE ANY NECESSARY DOCUMENTS

Motion was made by Mayor Pro Tem Ornelas awarding a bid for the 2021 water line replacements to Whitewater Construction, Inc. in the amount of $1,298,288.00, seconded by Councilmember McDonald, with all members of the Council present voting "aye."

CONSIDERATION AND POSSIBLE ACTION TO ACCEPT A BID AWARD FOR A BATWING MOWER FOR THE STREET DEPARTMENT AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE ANY NECESSARY DOCUMENTS

Motion was made by Councilmember McDonald awarding a bid for a Batwing Mower to South Plains Implement in the amount of $24,892.28, seconded by Councilmember Hughes, with all members of the Council present voting "aye."

CONSIDERATION AND POSSIBLE ACTION TO ACCEPT A BID AWARD FOR A ZERO TURN MOWER FOR THE PARK'S DEPARTMENT AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE ANY NECESSARY DOCUMENTS

Motion was made by Councilmember Tompkins awarding a bid for a zero turn mower to South Plains Implement in the amount of $10,952.48, seconded by Councilmember Hughes, with all members of the Council present voting "aye."

CONSIDERATION AND POSSIBLE ACTION TO ACCEPT A BID AWARD FOR A GREENS MOWER FOR THE GOLF COURSE AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE ANY NECESSARY DOCUMENTS

Motion was made by Councilmember Hughes awarding a bid for a greens mower to Austin Turf & Tractor in the amount of $42,012.68, seconded by Mayor Pro Tem Ornelas, with all members of the Council present voting "aye."

NEW BUSINESS

ACKNOWLEDGE RECEIPT OF THE BIG SPRING ECONOMIC DEVELOPMENT CORPORATION BOARD OF DIRECTOR'S MINUTES FOR THE REGULAR MEETING OF JANUARY 18, 2022 AND FOR THE SPECIAL MEETING OF JANUARY 25, 2022

Councilmembers acknowledge receipt of the above captioned minutes

REPORT OF THE RACIAL PROFILING ANALYSIS 2021

Chad Williams, Police Chief, gave a brief report on the Racial Profiling Analysis 2021.

EMERGENCY READING OF A RESOLUTION SUPPORTING EITHER OR BOTH OF THE PROPOSED PROJECTS FOR THE TEXAS DEPARTMENT OF HOUSING AND COMMUNITY AFFAIRS 2022 COMPETITIVE (9%) HOUSING TAX CREDIT ("HTC") BEALS CREEK MANOR PROJECT AND/OR THE TRAILS AT BIG SPRING PROJECT AND PLEDGING $500 IN PERMIT FEES TOWARDS THE PROJECT(S), AND PROVIDING AN EFFECTIVE DATE

Motion was made by Councilmember McDonald to approve the above captioned resolution as an emergency, seconded by Councilmember Hughes, with all members of the Council present voting "aye."

FIRST READING OF A RESOLUTION ADOPTING THE DRAINAGE DESIGN CRITERIA MANUAL FOR THE DESIGN AND CONSTRUCTION OF STORMWATER DRAINAGE SYSTEMS WITHIN THE CITY AND ITS ETJ; AND PROVIDING AN EFFECTIVE DATE

Motion was made by Councilmember Hughes to approve the above captioned resolution, seconded by Councilmember McDonald, with all members of the council present voting "aye."

FIRST READING OF AN ORDINANCE AMENDING ORDINANCE NUMBER 039-2021 WHICH ADOPTED THE ANNUAL BUDGET FOR THE CITY OF BIG SPRING, TEXAS FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2021 AND ENDING SEPTEMBER 30, 2022 BY INCREASING THE GENERAL FUND BUDGET FOR THE PURPOSE OF

LIGHTING REPLACEMENTS AT THE ROY ANDERSON SPORTS COMPLEX; PROVIDING FOR SEVERABILITY; PROVIDING FOR PUBLICATION; AND PROVIDING AN EFFECTIV DATE

Motion was made by Councilmember Hughes to approve the above captioned ordinance, seconded by Councilmember Yanez, with all members of the Council present voting "aye."

FIRST READING OF AN ORDINANCE AMENDING ORDINANCE NUMBER 039-2021 WHICH ADOPTED THE ANNUAL BUDGET FOR THE CITY OF BIG SPRING, TEXAS FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2021 AND ENDING SEPTEMBER 30, 2022 BY INCREASING THE GENERAL FUND BUDGET TO PURCHASE EQUIPMENT FOR VARIOUS DEPARTMENTS; PROVIDING FOR SEVERABILITY; PROVIDING FOR PUBLICATION; AND PROVIDING AN EFFECTIVE DATE

Motion was made by Councilmember McDonald to approve the above captioned ordinance, seconded by Councilmember Yanez, with all members of the Council present voting "aye."

CONSIDERATION AND POSSIBLE ACTION OF AN AGREEMENT WITH FINCHER ENGINEERING, LLC FOR AUDITORIUM HEATING AND UPGRADES AND AUTHORIZING THE CITY MANAGER OR HIS DESIGNEE TO EXECUTE ANY NECESSARY DOCUMENTS

Motion was made by Councilmember Hughes to approve the above captioned ordinance, seconded by Mayor Pro Tem Ornelas, with all members of the Council present voting "aye."

BOARDS AND COMMITTEES

TRAFFIC COMMISSION
One Nominee – District 2

Rhonda Paredez – Nominated by Councilmember Yanez

Councilmembers appointed Rhonda Paredez to the Traffic Commission by acclamation.

COUNCIL INPUT

All Councilmembers thanked staff.

Councilmember Tompkins would like to see more promotions towards tournaments at the Roy Anderson Sports Complex. Councilmember Tompkins also expressed his concerns regarding the loose dogs and updated the citizens and council on several things he was involved in to help the Animal Control Shelter.

Mayor Thomason gave a COVID update and read an executive order ending the emergency declaration regarding COVID-19. Mayor Thomason closed by reminded everyone to help control the pet population by having their pets spayed or neutered.

ADJOURN

Mayor Thomason adjourned the meeting at 6:38 p.m.

Shannon D. Thomason, Mayor

ATTEST:

Tami L. Davis, City Secretary

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS ADOPTING THE DRAINAGE DESIGN CRITERIA MANUAL FOR THE DESIGN AND CONSTRUCTION OF STORMWATER DRAINAGE SYSTEMS WITHIN THE CITY AND ITS ETJ; AND PROVIDING AN EFFECTIVE DATE

WHEREAS, the City's Subdivision Ordinance requires development of a Stormwater Management Plan for most types of land disturbing activities within the City and its extraterritorial jurisdiction (ETJ); and

WHEREAS, basic requirements and design principles are needed to properly evaluate conditions for the systematic design of a stormwater drainage system;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, AS FOLLOWS, THAT:

SECTION 1. The City Council hereby adopts the regulations known as the "Drainage Design Criteria Manual of Big Spring," attached hereto as Exhibit "A," as an appendix to the Big Spring Subdivision Ordinance.

PASSED AND APPROVED on first reading at a regular meeting of the City Council on the **22nd** day of **February**, **2022** with all members of the Council voting "aye" for the passage of same.

PASSED AND APPROVED on second and final reading at a regular meeting of the City Council on the **8th** day of **March**, **2022** with all members of the Council voting "aye" for the passage of same.

_____
Shannon D. Thomason, Mayor

ATTEST:

_____
Tami L. Davis, City Secretary

Drainage Design Criteria Manual

The City of Big Spring, Texas

CITY OF
Big Spring

Prepared by:
West Company of Midland, LLC.
110 W. Louisiana Ave., Ste. 110
Midland, Texas 79701
Firm#: 2184
Larry H. Walker, P.E.

Effective June 2016

DRAINAGE DESIGN CRITERIA MANUAL

Of

The City of Big Spring, Texas

310 Nolan Street, Big Spring, TX 79720

These drainage standards have been developed pursuant to the Subdivision Ordinance and were adopted by the City of Big Spring with an effective date of June 2016. These were reviewed and approved by Johnny Womack, Public Works Director and support staff.

With permission from the City of Abilene, this document is a modification of the "Drainage Standards for the City of Abilene" and the online version of the "Austin, Texas – Drainage Criteria Manual" updated on November 26, 2014 that has been prepared for the City of Big Spring by West Company of Midland, LLC. The principal authors and compilers of this Manual include Matthew L. Evans, P.E., C.F.M., Engineering Project Manager; and Larry H. Walker, P.E., P.M.P., Vice President Engineering. Johnny R. Poindexter, Assistant Project Manager, is acknowledged for his skillful CADD drafting in preparing the figures.

Drainage Design Criteria Manual
Of the City of Big Spring

Table of Contents

1.0 DRAINAGE POLICY

1.1 Purpose

The purpose of this Drainage Design Criteria Manual (Manual) is to establish standard principles and practices for the design and construction of stormwater drainage systems within the City of Big Spring, Texas (City) and its Extraterritorial jurisdiction (ETJ). The intent of this Manual is to effectively guide and assist persons with the development of a Stormwater Management Plan. The City's Subdivision Ordinance requires the development of a Stormwater Management Plan for most types of land disturbing activities within the City and its ETJ. The Manual is intended to provide standards and criteria which provide unity in analysis and system design and is complementary to basic information obtainable from industry standard references on hydrology, hydraulics and water resources. Adherence with this Manual will promote consistency with the identification of the requirements, the analysis of the rainfall, determination of the runoff, methods of collection and conveyance of stormwater.

1.2 Scope

This Manual is intended to provide the designer of a proposed development project with the basic requirements and design principles to properly evaluate conditions for the systematic design of a stormwater drainage system. The design factors, formulae, graphs and procedures in this Manual are intended for use only as engineering guides in the solution of drainage problems involving determination of the quantity, rate of flow, method of collection, storage, conveyance and disposal of stormwater. The selection of material included in the Manual was based upon the assumption that the design engineer and reviewer have a basic knowledge and understanding of open channel hydraulics, storm sewer hydraulics, and urban hydrological techniques. Responsibility for the actual design remains primarily with the design engineer. Users of this Manual should be knowledgeable and experienced in the theory and application of drainage engineering.

Methods of design other than those indicated herein may be considered in specific cases where experience indicates the appropriateness of such a deviation.

However, any variations from the practices established herein must have the expressed written approval of the City's Public Works Director or his designee.[1]

1.3 Drainage Systems

A. Major Drainage Systems

Major drainage systems are those intended to convey larger flows and evaluated with respect to the 100 year frequency storm. A 100 year storm is a storm that has a one percent (1%) chance of being exceeded in any one year period. These major systems are considered to provide flood protection.

1. Natural Streams
   a. Unimproved drainage ways scheduled to remain in the natural state shall be dedicated to the City of Big Spring either by title or easement, and platted to the 100-year flood way limit.
   b. Procedure for design discharge flows, erosion protection, and water surface elevations shall be in accordance with Sections 2, 3 and 5.5, respectively.
   c. Where the proposed improvement encroaches into a natural stream area the floodway shall be dedicated in a similar manner as Section 1.3, Item A.1.a. to the City of Big Spring. The floodway limits shall be determined in accordance with National Flood Insurance standards.
2. Improved Channels
   a. Conveyance for at least the 10-year flood shall be conveyed within the channel banks.
   b. The 100-year runoff shall be conveyed within the channel right-of-way and/or dedicated easement.
   c. Channel right-of-way and/or dedicated easement shall provide for maintenance access.
   d. Unlined channels shall have side slopes no greater than 3:1 and bottom widths not less than eight (8) feet unless prohibited by existing facilities.

[1] The designee of the Public Works Director shall be considered the only valid substitute who is responsible for the required decision-making and/or approvals listed in this Manual for the Public Works Director.

e. Lined channels may have side slopes as steep as 2:1 provided no slope maintenance is required.

f. Procedure for design discharge flows, erosion protection, and water surface elevations shall be in accordance with Sections 2, 3 and 5.5, respectively.

3. Detention Storage

a. Detention storage is used principally to reduce the increased runoff caused by urbanization.

b. Detention storage areas shall have the capacity and outlet system to reduce flows for the 2, 10, 25 and 100-year frequency storms to a level not exceeding pre-development rates. Design criteria shall be in accordance with Section 7.

c. Maintenance of detention areas shall normally be the responsibility of the landowner except for certain public areas as determined by the Public Works Director. In such cases a filed maintenance agreement in the Public Records of Howard County shall be required.

d. Detention sites receiving City of Big Spring maintenance shall be dedicated to the City of Big Spring either by title, easement or plat. The dedicated area shall include all land inundated by the 100-year flood plus additional area as necessary to provide for appropriate maintenance and adequate ingress and egress.

e. Discharge from detention storage areas shall not cause downstream erosion as per Sections 5, 6.5 and 6.6.

f. An emergency spillway shall be provided and sized to convey the excess 100-year flow which is not stored or conveyed by the principle spillway.

g. Detention ponds shall comply with the following site standards unless a written variance from the Public Works Director is obtained:

i. Concrete paved or rock lined flow line in accordance with the City's Design and Construction Standards shall be provided in flow line of basin designed to handle flows more frequent than natural rainfall.

ii. The pond outfall shall not concentrate the stormwater flow from a site in such a manner as to create a point source of stormwater exiting the site where a non-point source condition currently exists. However, if the point source disposal of the stormwater is unavoidable then the stormwater must be conveyed to an appropriate outfall site (i.e. existing storm sewer or drainage channel.)

iii. Concrete pavement or rock lined flow line is not required where design storage will not receive flows more frequent than natural rainfall.

iv. Erosion protection as per Section 3 shall be provided at the inflow and outflow of each structure.

v. Basins which have disturbed areas from the natural state shall be seeded for erosion control as per Natural Resources Conservation Service (NRCS)/Texas Department of Transportation (TxDOT) standards. Prior to acceptance the grass shall be fully established, or a financial guarantee for the same shall be deposited with the City.

vi. Basins shall be designed for complete drainage resulting in a dry pond unless otherwise approved by the Public Works Director.

vii. Hydrologic routing through the detention pond of discharges from the 2, 10, 25 and 100-year storms shall be performed to ensure that post development runoff is equal to or less than pre-development runoff under a range of storm frequencies. The Public Works Director may request validation and/or verification of design software computations.

h. Where applicable, dam design and safety requirements as set forth by the State of Texas shall be met.

4. Emergency Overflows

a. Emergency overflows or overland swales shall be provided at all mid-block low points or other low points.

b. Overflow routes shall convey within the right-of-way of the 100-year storm.

c. A flood limit easement equal to the spread of water from the 100-year storm shall be dedicated to the City of Big Spring. The minimum width shall be twenty (20) feet.

d. Overland flow routes shall be seeded for erosion control in accordance with standards of NRCS/TxDOT or other methods acceptable to the Public Works Director.

5. Street Right-of-Way

All new streets designed to convey storm water runoff shall convey the 100-year flow within the right-of-way limits and/or specifically dedicated easements.

6. Bridges and Culverts

a. Where bridges and/or culverts are installed on major drainage systems, they shall be designed for the 25-year storm event and to meet FEMA standards of zero rise during the 100-year event.

b. The 100-year flow will not be permitted to overflow specified street bridges in accordance with the approved Comprehensive City Plan.

c. Design criteria shall be in accordance with Section 6 of this Manual.

d. Headwalls, rip rap or other approved erosion protection shall be provided at the upstream and downstream ends of the culvert barrel(s) which conform to the City's Design and Construction Standards.

e. Culvert length plus headwalls shall conform to the City's Design and Construction Standards.

B. Minor Drainage Systems

Minor drainage systems consist of street gutters, inlets and pipes and function to provide relief from nuisance type floods, such as those occurring from a five (5)-year frequency storm. A five (5)-year storm is a storm that has a 20% chance of occurring every year. A major system will protect from loss of property and life, and a minor system provides for convenience and ease of travel.

1. Streets
    a. Street design and layout should function to provide the initial conveyance system for stormwater runoff for most if not all developments. Street layout should follow existing topography and drainage patterns as closely as practicable. The hydraulic design of a street should be such that reasonable access by emergency vehicles and personnel is ensured during rainstorm events up to and including the 100-year storm.
    b. All streets designed to convey stormwater runoff shall convey the 100-year flow within the right-of-way limits and/or specifically dedicated easements.
    c. For the purposes of maintaining reasonable traffic flow and safety at all times, and for controlling nuisance flooding during all storm events up to and including a five (5)-year storm, all streets that will convey stormwater runoff shall be designed in accordance with the following standards:
        i. Residential and Collector Streets - For all flows up to the five (5)-year storm, flowing water shall not exceed six inches (6") in depth at any point within the traffic lanes, including intersections, with traffic lanes being defined as the central twenty-two feet (22') of pavement. For streets with an inverted crown, the traffic lanes are defined as the eleven feet (11') adjacent to each curb or edge of pavement.
        ii. Arterial Streets - For all flows up to the five (5)-year storm, one twelve foot (12') wide lane in the central portion of the street shall not be inundated. For streets with an inverted crown, the traffic lanes are defined as the twelve feet (12') adjacent to each curb or edge of pavement.
        iii. Divided Arterial Streets and Freeways - For all flows up to the five (5)-year storm, one twelve foot (12') wide lane in each direction shall not be inundated. For streets with an inverted crown, the

traffic lanes are defined as the twelve feet (12') adjacent to each curb or edge of pavement.

NOTE: The five (5)-year frequency storm with six inches of water on the street will equate to about nine inches of water on the street for a 100-year frequency storm.

d. The surface of an arterial street shall not be crossed with stormwater runoff from rainfall events at or below the five (5)-year frequency. Flows from events greater than the five (5)-year storm may overtop the roadway surface so long as the flow direction continues along the same line as that for lesser storm event flows as approved by the Public Works Director.

e. All existing naturally occurring channels which carry stormwater at a rate greater than 10 cubic feet per second (cfs) during a five (5)-year storm event shall be maintained as such through any new development, and the developer shall not be allowed to close such a channel. In the event a channel as just described intersects a street, the stormwater shall be carried underneath the street in a culvert structure and will not be discharged into the street.

2. Storm Drain Inlets and Pipes

a. When the five (5)-year frequency flood exceeds the standard street section spread limits, the following could be implemented:

i. A storm drainage system consisting of inlets, pipes, manholes and associated appurtenances.

ii. Removal of all or part of the storm flow from the street into an alternative conveyance.

iii. Street widening as approved by the Public Works Director.

iv. Design and installation of non-standard gutter sections.

NOTE: These are only suggestions and are not meant to be requirements. The design engineer may implement other methods, if approved by the Public Works Director.

b. City of Big Spring standards or other standards approved by the Public Works Director may be utilized for each component part of the drainage system.
c. Design criteria shall be in accordance with the applicable sections of this Manual.
d. The storm drain system shall conform to the following criteria unless otherwise approved by the Public Works Director:
   i. Minimum velocity with the pipe flowing full shall be 2.5 feet per second (fps). The maximum velocity of storm drain (collectors) shall be limited to 15 feet per second. The maximum velocity of storm drain (mains) shall be limited to 12 fps.
   ii. Minimum storm drain pipe diameter shall be 18 inches for a circular pipe or Design Size #3 for an arched pipe.
   iii. Pipe diameters shall not decrease downstream, except when outlet control for detention may be applicable.
   iv. Pipe crowns at change in sizes should be set at the same elevation.
   v. Vertical curves in the conduit will not be permitted except where siphons are approved.
   vi. Maximum manhole spacing:

Table 1-1. Maximum manhole spacing

Pipe Diameter (inches)	Maximum Spacing (feet)
18-36	600
42-60	1,000
Larger than 60	No limit

Manholes and inlets shall be placed at horizontal P.I. alignment changes.

   vii. Minimum pipe cover over the top of the pipe shall not be less than 1.5 ft. unless approved by the Public Works Director, based upon manufacturer's recommendations.

viii. The calculated hydraulic grade line of a closed drainage system shall not be more than the maximum control elevation over the street surface (Sections 1.3.B.1 & 2).

ix. Short radius bends may be used only on 24" and larger pipes at a junction or bend. A manhole shall always be located at the end of such short radius bends.

3. Roadways without Curb and Gutter
   a. Culverts placed in roadside ditches shall pass the five (5)-year frequency flow, or pass the hydraulic capacity of the ditch without overtopping the road, driveway, etc., more than six (6) inches.
   b. Headwalls and endwalls, as per Section 6.3, and meeting City of Big Spring Minimum Design and Construction Standards or other approved details shall be provided at the upstream and downstream ends of ditch culverts.
   c. Culverts perpendicular to the roadway shall have sufficient length to permit a 4:1 slope extending from the shoulder limit to flow line of the pipe where a vertical headwall is not used. Place five foot (5') minimum rip rap around the pipe with an 18" deep toewall along the downstream edge.
   d. Minimum culvert diameter shall be 18 inches for a circular pipe or Design Size #3 for an arched pipe.
   e. Design criteria shall be in accordance with the applicable sections of this Manual.
   f. Culverts parallel to roadway shall have sufficient length to permit a maximum of 4:1 slope extending from the top back at curb or outside edge of shoulder or nearest roadway edge and five foot (5') minimum rip rap around the pipe with an 18" deep toewall along the downstream edge.
4. Roadside Ditches
   a. Roadside ditches shall convey the 10-year flow without overflowing the banks (edge of pavement to right-of-way).

b. Maximum ditch velocities shall not exceed those identified in Section 5 without providing erosion protection.

5. Erosion and Sedimentation Control
   a. All improved ditches with erodible materials shall be provided with erosion protection for design velocities exceeding those in Section 5 of this Manual.
   b. Sediment control shall be provided for all developments as prescribed by the Texas Commission on Environmental Quality's (TCEQ) "General Permit to Discharge Under the Texas Pollutant Discharge Elimination System" (Construction General Permit.)
   c. Sediment shall not be conveyed into improved drainage facilities, public rights-of-way, or onto adjacent property. Recommendations for sediment control are presented in Section 3 of this Manual, or as otherwise approved by the Public Works Director.
   d. Entrapped sediment shall periodically be removed and redistributed within the development site or otherwise properly disposed. Detention basins, until accepted by the City for maintenance, shall be continuously monitored and maintained as necessary to maintain design storage and flow conditions.

1.4 Developer Responsibilities

A. Stormwater Management Plan

1. All Stormwater Management Plans shall be formulated and implemented under the direct supervision of a registered professional engineer, licensed by the State of Texas. Plans submitted for final approval shall bear the signature of the submitting engineer along with the following statement:

> "I hereby certify that I am familiar with the adopted ordinances and regulations of the City of Big Spring governing detention and drainage facilities; that these plans have been prepared under my supervision; and that the foregoing Stormwater Management Plan complies with the intent and general requirements of the City of Big Spring."

2. Stormwater Management Plan Contents. A Stormwater Management Plan shall consist of engineering drawings, contour maps, and all supporting engineering calculations, as applicable to the land area covered by the plan. This is required to demonstrate full compliance with the requirements of the Big Spring Subdivision Ordinance and Big Spring's adopted Drainage Standards. A plan shall include all pertinent information required by the Public Works Director and may include, but is not limited to, any of all of the following elements:
   a. An engineering report dealing with the applicable provisions of the adopted Big Spring Drainage Standards, clearly setting forth the scope of the engineering problems and the proposed solutions.
   b. An engineering hydrologic analysis of stormwater runoff from a 100-yr storm under existing site conditions and under proposed developed site conditions in accordance with City's land use plans and consultation with the Public Works Director.
   c. An engineering hydraulic analysis for the control and conveyance of stormwater runoff from a 100-yr storm under the proposed developed conditions.
   d. The location of all existing drainage channels, subsurface drainage facilities and other public and private utilities.
   e. The on-site 100-year flood boundaries of any major drainage systems.
   f. The proposed method of handling all runoff from the development and a demonstrated capability to handle upstream drainage assuming fully developed condition.
   g. Proposed fill or other structure elevating techniques, levees, channel modifications, and detention facilities.
   h. Detention facility computations comparing inflow and outflow rates to establish maximum storage volume and peak discharge rate requirements and to demonstrate maintenance of pre-development runoff condition.

i. The location and size of all existing and proposed drainage easements and areas.

j. The location, size and character of all temporary and permanent erosion and sedimentation control facilities, with description detailing all on-site erosion control measures which will be established and maintained during all periods of development and construction.

k. The pre-development cross sectional conveyance shall be preserved under all circumstances involving fill in the floodplain.

l. In addition to the requirements of detentions and pre-development conveyance preservation, the loss of pre-development floodplain storage provided by a natural creek shall be compensated to the greatest extent possible.

3. To the maximum extent possible, Stormwater Management Plans shall be fully documented on a topographic map that accurately delineates all existing and proposed drainage facilities such as streets, storm sewers, natural and manmade channels, swales, etc. All existing and proposed floodplain and floodway boundaries and drainage and/or detention easements shall be shown on this map. Where a significant portion of the drainage area exists outside the specific development tract, a second, larger scale map may be used to delineate contour and the offsite tributary drainage area(s). The exact boundaries of all proposed drainage sub-areas shall be delineated on this map and the pertinent discharge rates from each sub- area shall be listed at the point of discharge. Where physical improvements are proposed to be made as part of this Stormwater Management Plan implementation, the design characteristics and hydraulic capacities of the proposed facilities and the pertinent hydraulic loadings shall also be delineated on this map.

4. Insure that all dead-end streets have a Stormwater Management Plan for water flow away from the end of the street. Where the extension of a dead-end street is anticipated, the flow away from the point shall be provided on the current project.

B. Design Check List For Construction Plans

To assist in the preparation of a complete and standardized set of drainage and construction plans, a check list of data to be included on the plans is presented:

1. Drainage Area Maps for both the existing and proposed conditions will be appropriate to the drainage area.
2. Drawing numbers, date, north arrow, signature blocks, match lines.
3. Subdivision name.
4. Names and widths of streets.
5. Easements and rights-of-way.
6. Survey Data: Bench marks for horizontal and vertical control.
7. Street profiles with gutter flow line grades and typical street cross sections.
8. Pipe size, grade, type, class, length, flow required, flow provided, and hydraulic grade line.
9. Manhole size with invert elevation shown.
10. Inlet size with invert elevations shown.
11. Channel size, slope, and plotted water surface of the 100-year flow, cross section, and discharge velocities (See Table 5-1).
12. Location, horizontally and vertically, of all utility lines.
13. Soil boring logs when available.
14. Structural details.
15. Detention facility location, storage volume, principle spillway design and associated appurtenance details.
16. Erosion and sediment control device(s) location(s) and details as necessary.
17. The engineer will insure that other drainage is not trapped because of this development.

C. Submittal of Computations

A complete set of design calculations on the appropriate calculation sheets shall be submitted and approved in writing by the Public Works Director for all drainage related projects.

D. Applicability

These standards will apply to any and all development projects that have not begun construction (whether previously approved or a new submittal.)

1.5 Regional Stormwater Management

The City of Big Spring may choose to implement a regional stormwater management system in order to limit the impacts of development runoff and provide flood mitigation in the Beals Creek, Big Spring Draw, Big Sandy Draw, Little Sandy Draw, and Reads Draw watersheds. This would be a coordinated effort with other governmental entities within each watershed. The design engineer shall verify with the City of Big Spring prior to the design of individual detention basins in these watersheds.

2.0 DETERMINATION OF STORMWATER RUNOFF

2.1 Methods of Analysis

The methods of stormwater runoff calculations are dependent upon the design engineer's technical familiarity and the size of the area to be analyzed. For the method chosen the engineer will be responsible for making reasonable assumptions as to the development characteristics of the proposed project area. However, rainfall runoff rates shall be estimated in accordance with standard technical documents that have been researched, validated and published in cooperation with appropriate agencies or organizations, such as the National Oceanographic and Atmospheric Administration, U.S. Geological Survey, and/or TxDOT. The engineer may be asked to provide justification of any assumptions necessary for the calculation of stormwater runoff.

Numerous methods of rainfall-runoff computation are available for the design of storm drainage and flood control systems. The Rational Method is accepted as adequate for drainage areas totaling 100 acres or less. The NRCS (formerly the Soil Conservation Service (SCS)) hydrologic methods (available in the NRCS TR-20, and the US Army Corps of Engineers' Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) program) should be used for drainage areas larger than 100 acres but may also be used for drainage areas of any size. The method of analysis must remain consistent when drainage areas are combined and the method which applies to the largest combined drainage area should be used unless the situation requires the use of NRCS hydrologic methods (i.e., a detention facility connected to a downstream storm drainage system). The engineer can use other methods but must have their acceptability approved in writing by the Public Works Director.

2.2 Rational Method

The Rational Method is based on the direct relationship between rainfall and runoff, and is expressed by the following equation:

Q_p = CiA (Eq. 2-1)

Where:

"Q_p" is defined as the peak runoff in cubic feet per second. Actually, Q_p is in units of acre-inches per hour. Since this rate of acre-in/hr differs from cubic feet per second by less than one (1) percent (1 acre-in/hr = 1.008 cfs), the more common units of cfs are used.

"C" is the composite coefficient of runoff representing the ratio of peak runoff rate "Q_p" to average rainfall intensity rate.

"i" for the soil types and land uses characteristic of the contributing drainage area. "i" is the average intensity of rainfall in inches per hour for a period of time equal to the time of concentration for the drainage area to the design point under consideration.

"A" is the area in acres contributing runoff to the point of design.

The following basic assumptions are associated with the Rational Method:

1. The storm duration is equal to the time of concentration.
2. The computed peak rate of runoff at the design point is a function of the average rainfall rate over a duration equal to the time of concentration at that point.
3. The return period or frequency of the computed peak flow is the same as that for the design storm.
4. The necessary basin characteristics can be identified and the runoff coefficient does not vary during a storm.
5. Rainfall intensity is constant during the storm duration and spatially uniform for the area under analysis.
6. The maximum rate of discharge at the point of design will occur when the entire area above the point of design is contributing runoff.

A. Runoff Coefficient (C)

The proportion of the total rainfall that will reach the drainage system depends on the surface vegetation condition, soil type, imperviousness of the surface, land slope and ponding characteristics of the area. Impervious surfaces, such as asphalt pavements and roofs of buildings, will be subject to

approximately 100 percent runoff (regardless of the slope). On-site inspections and aerial photographs may prove valuable in estimating the nature of the surfaces within the drainage area.

It should be noted that the runoff coefficient "C" is the Rational Method variable which is least amenable to precise determination. A reasonable coefficient must be chosen to represent the integrated effects of infiltration, surface ponding, evaporation, flow routing and interception, all of which affect the time distribution and peak rate of runoff.

It is often desirable to develop a composite runoff coefficient based upon the percentages of different types of surfaces in the drainage area. This procedure is often applied to typical "sample blocks" as a guide to selection of reasonable values of the coefficient for an entire area. Suggested coefficients with respect to specific surface types are given in Table 2-1. "C" values for developed conditions should be based on maximum allowable impervious cover as listed in the City's zoning ordinance.

Table 2-1. Rational Method Runoff Coefficients (C)

Character of Surface	Return Period						
	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years	500 Years
Developed							
Compacted Crushed Limestone/Caliche	0.53	0.57	0.61	0.66	0.70	0.75	0.85
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95	1.00
Concrete	0.75	0.80	0.83	0.88	0.92	0.97	1.00
Grass Areas (Lawns, Parks, etc.)							
*Poor Condition**							
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47	0.58
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53	0.61
Steep, over 7%	0.40	0.43	0.45	0.49	0.52	0.55	0.62
*Fair Condition***							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58

Table 2-1. Rational Method Runoff Coefficients (C)

Character of Surface	Return Period						
	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years	500 Years
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
*Good Condition****							
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36	0.49
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46	0.56
Steep, over 7%	0.34	0.37	0.40	0.44	0.47	0.51	0.58
Undeveloped							
Cultivated							
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47	0.57
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51	0.60
Steep, over 7%	0.39	0.42	0.44	0.48	0.51	0.54	0.61
Pasture/Range							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Forest/Woodlands							
Flat, 0-7%	0.22	0.25	0.28	0.31	0.35	0.39	0.48
Average, 2-7%	0.31	0.34	0.36	0.40	0.43	0.47	0.56
Steep, over 7%	0.35	0.39	0.41	0.45	0.48	0.52	0.58

Assumptions:

The Composite "C" value for developed conditions (C_{DEV}) is : $C_{DEV} = IC_1 + (1-I)C_2$

Where:
I = Impervious cover, percent
C_1 = "C" value for impervious cover
C_2 = "C" value for pervious area (grass, lawns, parks, etc.)

* Grass cover less than 50 percent of the area.

** Grass cover on 50 to 75 percent of the area.

*** Grass cover greater than 75 percent of the area.

Source: 1. Rossmiller (1980)
2. City of Austin (2014)

B. Time of Concentration

The time of concentration is the time for surface runoff to flow from the most remote point in the watershed to the point of interest. This applies to the most remote point in time, not necessarily the most remote point in distance. Runoff from a drainage area usually reaches a peak at the time when the entire area is contributing. However, runoff may reach a peak prior to the time the entire drainage area is contributing if the area is irregularly shaped or if land use characteristics differ significantly within the area. Sound engineering judgment should be used to determine a flow path representative of the drainage area and in the subsequent calculation of the time of concentration. The time of concentration to any point in a storm drainage system is a combination of the sheet flow (overland), the shallow concentrated flow and the channel flow, which may include storm drains. The minimum time of concentration for any drainage area shall be ten (10) minutes. Additionally, the minimum slope used for calculation of sheet and shallow flow travel time components should be 0.005 feet per foot (0.5%). The preferred procedure for estimating time of concentration is the NRCS method as described in NRCS's Technical Release 55 (TR-55). This method is outlined below. The overall time of concentration is calculated as the sum of the sheet, shallow concentrated and channel flow travel times. Note that there may be multiple shallow concentrated and channel segments depending on the nature of the flow path.

$$T_C = T_{t(sheet)} + T_{t(shallow\ concentrated)} + T_{t(channel)} \quad \text{(Eq. 2-2)}$$

1. Sheet Flow. Sheet flow is shallow flow over land surfaces, which usually occurs in the headwaters of a drainage system. The engineer should realize that sheet flow occurs for only very short distances, especially in urbanized conditions. Sheet flow for both natural (undeveloped) and developed conditions should be limited to a maximum of 100 feet. Sheet flow for developed conditions should be based on the actual pavement or grass conditions for areas that are already developed and should be representative of the anticipated land use within the headwater area in the case of currently undeveloped areas. In a typical residential subdivision, sheet flow may be the

distance from one end of the lot to the other or from the house to the edge of the lot. In some heavily urbanized drainage areas, sheet flow may not exist in the headwater area. The NRCS method employs Equation 2-3, which is a modified form kinematic wave equation, for the calculation of the sheet flow travel time.

$T_t = 0.42(nL)^{0.8}/((P_2)^{0.5}s^{0.4})$ (Eq. 2-3)

Where,

T_t = Sheet flow travel time (minutes)

n = Manning's n (see Table 2-2)

L = Length of the reach (ft)

P_2 = 2-year, 24-hour rainfall (inches)

s = Slope of the ground (ft/ft)

2. Shallow Concentrated Flow. After a maximum of approximately 100 feet, sheet flow usually becomes shallow concentrated flow collecting in swales, small rills, and gullies. Shallow concentrated flows are assumed not to have well-defined channels and have flow depths of 0.1 to 0.5 feet. The travel time for shallow concentrated flows can be computed by Equations 2-4 and 2-5. These two equations are based on the solution of Manning's equation with different assumptions for n (Manning's roughness coefficient) and r (hydraulic radius, ft). For unpaved areas, n is 0.05 and r is 0.4; for paved areas, n is 0.025 and r is 0.2.

   Unpaved $T_t = L/(60(16.1345)(s)^{0.5})$ (Eq. 2-4)

   Paved $T_t = L/(60(20.3282)(s)^{0.5})$ (Eq. 2-5)

   Where,

   T_t = Travel time for shallow concentrated flows (minutes)

   L = Length of the reach (ft)

   s = Slope of the ground (ft/ft)

3. Channel or Storm Drain Flow. The velocity in an open channel or a storm drain not flowing full can be determined by using Manning's Equation. Channel velocities can also be determined by using backwater profiles. For open channel flow, average flow velocity is usually determined by assuming a

bank-full condition. Note that the channel flow component of the time of concentration may need to be divided into multiple segments in order to represent significant changes in channel characteristics.

For storm drain flow under pressure conditions (hydraulic grade line is higher than the lowest crown of a storm drain) the following equation should be applied:

$V = Q/A$ (Eq. 2-6)

Where:

V = Average velocity (ft/s)

Q = Design discharge (cfs)

A = Cross-sectional area (ft^2)

Flow travel time through a channel can be calculated by the equation:

$T_t = \Sigma(L_i/60\ V_i)$ (Eq. 2-7)

Where:

T_t = Total flow travel time through the channel (minutes)

L_i = The i-th channel segment length (ft)

V_i = The average flow velocity within the ith channel segment (ft/s)

Table 2-2. Manning's "n" for overland flow

Manning's "n"[1]	Surface Description
0.015	Concrete (rough or smoothed finish)
0.016	Asphalt
0.05	Fallow (no residue)
Cultivated Soils:	
0.06	Residue Cover ≤ 20%
0.17	Residue cover > 20%
Grass:	
0.15	Short-grass prairie
0.24	Dense grasses[2]
0.13	Range (natural)

Table 2-2. Manning's "n" for overland flow

Manning's "n"[1]	Surface Description
Woods:[3]	
0.40	Light underbrush
0.80	Dense underbrush
[1] The Manning's n values are a composite of information compiled by Engman (1986).	
[2] Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.	
[3] When selecting n, consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.	
Source: City of Austin (2014)	

C. Rainfall Intensity

The rainfall intensity (i), is the average rainfall rate in inches per hour for the period of maximum rainfall of a given frequency having a duration equal to the time of concentration. After the design storm frequency has been selected, the rainfall intensity can be obtained from the intensity-duration-frequency (IDF) curves based on the selected design frequency and design duration as established by design standards or chosen by the engineer as a design parameter. The design engineer can also calculate the value of rainfall intensity from the best-fit IDF equation (2-8) with known t_c value for the entire drainage area of interest.

$$i = b/(t_c+d)^e \quad \text{(Eq. 2-8)}$$

where: i = Average Rainfall Intensity (inches/hour)

t_c = storm duration (minutes) (equals time of concentration)

b, d, e = Coefficients for different storm frequencies listed in Table 2-3

Table 2-3. Intensity-Duration-Frequency curve coefficients for Howard County

Constants	Storm Year					
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
e (in) =	0.805	0.800	0.802	0.796	0.791	0.788
b =	42	56	65	76	86	95
d (min)=	9.2	10.1	10.1	10.1	10.1	9.2
Source: Smith (1998)						

Using Equation 2-8 and the coefficients in Table 2-3, the following storm intensities for Howard County are provided in Table 2-4 and can be utilized to create an IDF curve.

Table 2-4. Intensity Curve Data for Howard County

Time of Concentration (minutes)	Runoff Values for the given Storm Intensities[1] (in/hr)					
	2 Year Storm	5 Year Storm	10 Year Storm	25 Year Storm	50 Year Storm	100 Year Storm
10	3.89	5.08	5.86	6.97	8.01	9.26
20	2.78	3.68	4.24	5.06	5.82	6.65
30	2.19	2.92	3.37	4.02	4.64	5.27
40	1.82	2.45	2.82	3.37	3.89	4.41
50	1.57	2.11	2.43	2.92	3.37	3.81
60	1.39	1.87	2.15	2.58	2.98	3.37
70	1.24	1.68	1.93	2.32	2.68	3.03
80	1.13	1.53	1.76	2.11	2.45	2.76
90	1.04	1.41	1.62	1.94	2.25	2.54
100	0.96	1.30	1.50	1.80	2.09	2.35
110	0.90	1.21	1.40	1.68	1.95	2.20
120	0.84	1.14	1.31	1.58	1.83	2.06
130	0.79	1.07	1.23	1.49	1.72	1.94
140	0.75	1.02	1.17	1.41	1.63	1.84
150	0.71	0.97	1.11	1.34	1.55	1.75
160	0.68	0.92	1.06	1.27	1.48	1.67
170	0.64	0.88	1.01	1.22	1.41	1.59
180	0.62	0.84	0.97	1.17	1.35	1.53
190	0.59	0.81	0.93	1.12	1.30	1.47
200	0.57	0.78	0.89	1.08	1.25	1.41
210	0.55	0.75	0.86	1.04	1.21	1.36
220	0.53	0.72	0.83	1.00	1.16	1.31
230	0.51	0.70	0.80	0.97	1.13	1.27
240	0.49	0.68	0.78	0.94	1.09	1.23

[1] Calculated with Equation 2-8 ($i= b/(t_c+d)^e$) and e, b, and d values from Table 2-3

Source: Adapted from City of Midland (1992, p. 4-14)

In 1998, William Asquith at the USGS Texas Office analyzed virtually all rainfall data available in the State of Texas using L-moment methodology and

published the results in a USGS Water Resources Investigations Report (WRIR 98-4044). In June 2004, Dr. Asquith, in cooperation with TxDOT, published the depth-duration-frequency (DDF) maps of several precipitation events for Texas. The values listed in Table 2.5 were interpolated from the maps of that atlas. The design engineer may utilize this information or other suitable publications to generate the IDF and the DDF values that are suitable for use in the City of Big Spring. The IDF curves and the IDF equations are required for use in determining peak flows by the Rational Method or other appropriate methods.

Table 2-5. Depth-Duration-Frequency Table for Howard County

Recurrence Interval (yr)	Depth of Precipitation (inches)											
	15-min	30-min	1-hr	2-hr	3-hr	6-hr	12-hr	1-day	2-day	3-day	5-day	7-day
2	0.69	0.98	1.23	1.52	1.57	1.81	2.16	2.54	2.62	3.15	3.43	3.74
5	0.94	1.25	1.72	2.16	2.20	2.61	2.83	3.62	4.24	4.57	4.88	5.39
10	1.11	1.50	2.06	2.58	2.69	3.24	3.47	4.45	4.94	5.32	5.71	6.26
25	1.31	1.80	2.48	3.16	3.32	3.77	4.23	5.34	6.15	6.82	7.03	7.64
50	1.51	2.09	2.86	3.74	3.92	4.50	4.88	6.47	7.03	8.11	8.38	8.75
100	1.76	2.39	3.31	4.34	4.52	5.46	5.83	7.38	8.00	9.12	9.85	10.23
250	1.87	2.71	3.84	5.37	5.48	6.52	6.96	8.73	9.54	10.85	11.62	11.99
500	2.23	2.99	4.38	5.87	6.21	7.86	8.14	9.92	10.83	12.17	12.71	13.20
Source: Interpolated values from the maps in Asquith and Roussel, (2004)												

Using the values in Table 2-5, the engineer may obtain the precipitation depth for a given frequency and convert this precipitation depth to precipitation intensity by dividing the depth by the storm duration. The storm duration is measured in inches/hour.

D. Drainage Area (A)

The size (acres) of the watershed needs to be determined for application of the Rational Method. The area may be determined through the use of topographic maps, supplemented by field surveys where topographic data has changed or where the contour interval is too great to distinguish the direction of flow. The drainage divide lines are determined based on topography, street layout, lot grading, building structure configuration and orientation, drainage

system layout and other features that are created by the urbanization process.

2.3 Soil Conservation Service Method for Calculation of Peak Flows

The Soil Conservation Service (SCS) hydrologic method can be applied to urban drainage areas of any size. The major parameters required to calculate a runoff hydrograph with the method include the rainfall distribution, runoff curve numbers, time of concentration and drainage area. For detailed information regarding the SCS method and the TR-20 computer program, the user is referred to the following NRCS publications. These can be obtained from the NRCS website. They are:

NEH-4: "Hydrology," Section 4, National Engineering Handbook

TR-20: Computer Program for Project Formulation, Hydrology

TR-55: Urban Hydrology for Small Watersheds

TP-149: A Method for Estimating Volume and Rate of Runoff in Small Watersheds

A. The City of Big Spring has adopted the use of an SCS 24-hour storm duration with a Type II distribution for use with the SCS method. For use in spreadsheet calculations, Type II distribution ordinates can be derived from the HEC-HMS program. When using the HEC-HMS model, the computational time interval should be selected based on criteria for the minimum lag time. The maximum computational time interval used in a HEC-HMS model should be six (6) minutes. The HEC-HMS programs can be downloaded from the US Army Corps of Engineers website. These models may be requested by the public and used as the basis for drainage analysis where applicable. Any results based on models must be certified by a Texas Licensed Professional Engineer.

B. Soil Conservation Service Runoff Curve Numbers

The NRCS has developed an index, the runoff curve number, to represent the combined hydrologic effect of soil type, land use, agricultural land treatment class, hydrologic condition, and antecedent soil moisture. These watershed factors have the most significant impact in estimating the volume of runoff, and can be assessed from soil surveys, site investigations and land use maps.

The curve number is an indication of the potential runoff for a given antecedent soil moisture condition, and it ranges in value from zero to 100. The NRCS runoff curve numbers are grouped into three (3) antecedent soil moisture conditions — Antecedent Runoff Condition (ARC) I, ARC Il and ARC III. Values of runoff curve numbers for all three (3) conditions may be computed following guidelines in Part 630, Chapter 10 of the National Engineering Handbook. ARC I is the dry soil condition and ARC III is the wet soil condition. ARC II is normally considered to be the average condition. The Antecedent Runoff Condition (ARC) was previously referred to as the Antecedent Moisture Condition (AMC) in older NRCS publications.

The NRCS curve number values provided in Tables 2-6 and 2-7 are for an ARC II. If it is desired to change to an ARC I or Ill condition, the adjustments given in Part 630, Chapter 10 of the National Engineering Handbook should be used. Justification must be provided for the selection of an ARC other than condition II.

The National Resources Conservation Service has classified more than 4,000 soils into four (4) hydrologic groups, identified by the letters A, B, C, and D, to represent watershed characteristics.

Group A: (Low runoff potential). Soils having a high infiltration rate even when thoroughly wetted and consisting chiefly of deep, well-drained to excessively drained sands or gravels.

Group B: Soils having a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well-drained soils with moderately fine to moderately coarse texture.

Group C: Soils having a slow infiltration rate when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water or soil with moderately fine to fine texture.

Group D: (High runoff potential). Soils having a very slow infiltration rate when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan

or clay layer at or near the surface and shallow soils over nearly impervious material.

Table 2-6 lists the curve numbers for the four (4) soil groups under various land uses, land treatment and hydrologic conditions. Curve numbers for fully developed conditions should be based on maximum allowable impervious cover listed in Big Spring Zoning Ordinances. When calculating fully developed peak runoff rates it is recommended that the undeveloped curve number and the maximum allowable impervious cover be used as input parameters. In order to determine the soil classifications in the Big Spring area, the NRCS Soil Survey of Howard County, Texas should be used. Digital versions of these soil datasets are available online.

Table 2-6. NRCS Runoff Curve Numbers for Urban Areas (assuming ARC-II condition)

Cover Description		Curve Numbers for Hydrologic Soil Group			
Cover Type and Hydrologic Condition	Average % Impervious Area[1]	A	B	C	D
Fully Developed Urban Areas (Vegetation Established)					
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, etc. (excluding right of way)		98	98	98	98
Streets and Roads:					
Paved; curbs and storms drains (excluding right of way)		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
Western desert urban areas:					

Table 2-6. NRCS Runoff Curve Numbers for Urban Areas (assuming ARC-II condition)

Cover Description		Curve Numbers for Hydrologic Soil Group			
Cover Type and Hydrologic Condition	Average % Impervious Area[1]	A	B	C	D
Natural desert landscaping (pervious areas only)[3]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1-2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Developing Urban Areas					
Newly graded areas (pervious areas only, no vegetation)		77	86	91	94
Idle lands (CN's are determined using cover types similar to those listed under "Agricultural Lands."					

[1] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using Figure 2-1 or 2-2.

[2] Composite CN's for natural desert landscaping should be computed using Figures 2-1 and 2-2 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[3] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[4] **Poor**: less than 30 percent ground cover (litter, grass and brush overstory).
Fair: 30 to 70 percent ground cover.
Good: greater than 70 percent ground cover

Source: NRCS (1986, pp. 2-5)

Table 2-7. NRCS Runoff Curve Numbers for Agricultural Lands[1] (assuming ARC-II condition)

Cover Description			Curve Numbers for Hydrologic Soil Group			
Cover Type	Treatment[2]	Hydrologic condition	A	B	C	D
Cultivated Agricultural Lands						
Fallow	Bare Soil	--	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row Crops	Straight Row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
	C&T+CR	Poor	65	73	79	81
		Good	61	70	77	80
Arid and Semiarid Rangelands[3]						
Herbaceous—mixture of grass, weeds and low-growing brush with brush the minor element		Poor		80	87	93
		Fair		71	81	89
		Good		62	74	85
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, mesquite and cactus.		Poor	63	77	85	88
		Fair	55	72	81	86
		Good	49	68	79	84

[1] Average runoff condition, and $I_a = 0.2S$

[2] Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

[3] **Poor**: less than 30 percent ground cover (litter, grass and brush overstory).
Fair: 30 to 70 percent ground cover.
Good: greater than 70 percent ground cover

Source: NRCS (1986, pp. 2-6 and 2-8)

C. Time of Concentration

The procedures for estimating time of concentration for the NRCS method are described in the NRCS Technical Release 55 (TR-55) and in Section 2.2.B of this Manual. Three (3) types of flow (sheet flow, shallow concentrated flow and channel flow) are considered. Note that Table 2-2 shall be used for determination of sheet flow Manning's roughness coefficients rather than the table included in TR-55.

In hydrograph analysis, the time of concentration can be defined as the time from the end of excess rainfall to the point of inflection on the falling limb of the hydrograph. The time of concentration determines the shape of the runoff hydrograph. Times of concentration are required for the existing and developed conditions to adequately model the impact of the development on stormwater runoff. The methodology presented in TR-55 provides a reasonable approach for the estimation of time of concentration. The lag time, defined as the time between the center of mass of excess rainfall to the runoff peak, is typically used in the HEC-HMS implementation of the SCS methodology. The lag time can be estimated with this equation.

$T_{lag} = 0.6\ T_c$ (Eq. 2-9)

In general, times of concentration for the developed condition should be calculated based on conservative assumptions that consider the increased hydraulic efficiency expected with an ultimate developed condition. Times of concentration should be representative of the overall drainage area, not simply based on the longest (in either distance or time) flow path. Sheet flow for both existing and proposed conditions should be limited to 100 feet. This length should be considered a maximum; sheet flow lengths should be measured and justified for all conditions. Additionally, the minimum slope used for calculation of sheet and shall flow travel time components should be 0.005 feet per foot (0.5%).

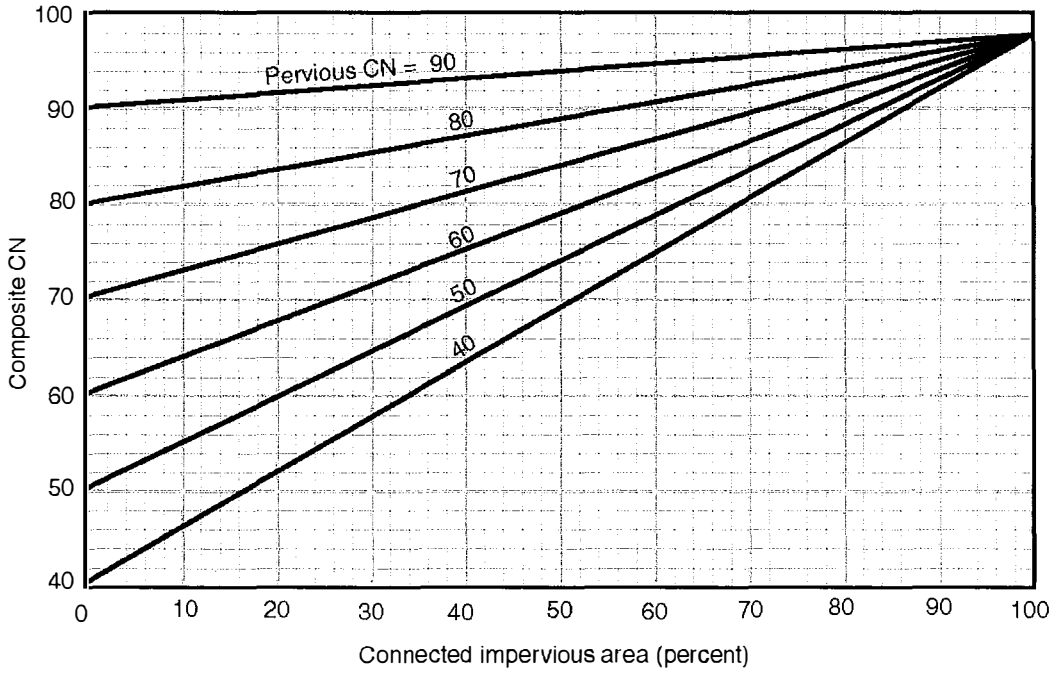


Figure 2-1. Composite CN with connected impervious area.
Source: NRCS (1986, p. 2-10)

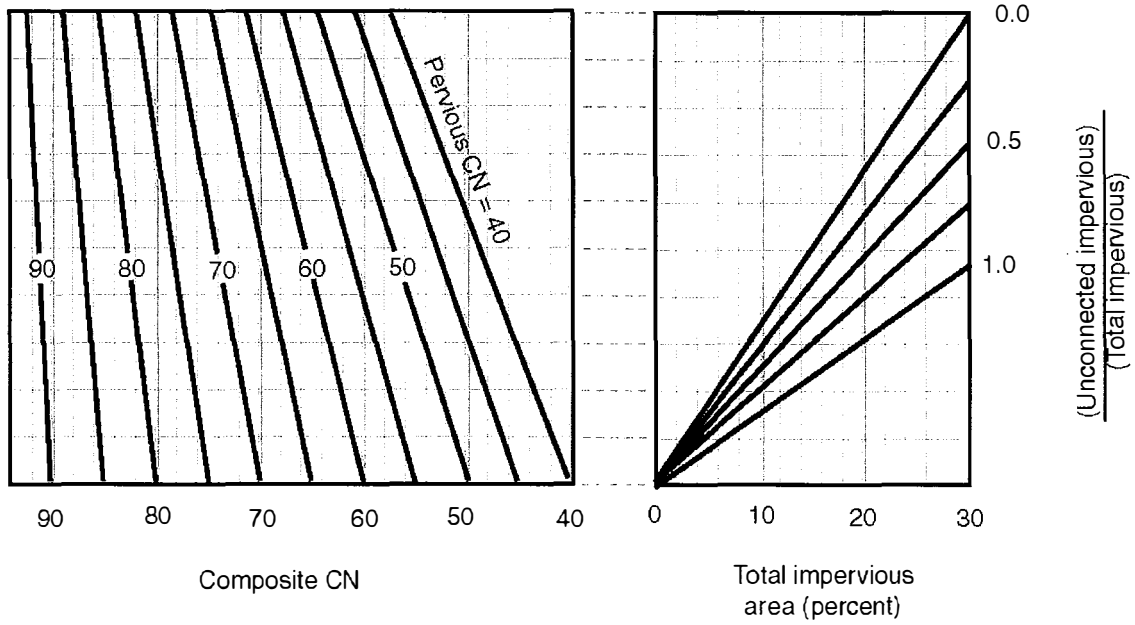


Figure 2-2. Composite CN with unconnected impervious areas and total impervious area less than 30%.
Source: NRCS (1986, p. 2-10)

3.0 EROSION AND SEDIMENTATION CONTROL PLAN

3.1 General

Increased natural erosion and sedimentation processes are frequent results of land development activities. Therefore, TCEQ requires compliance with the Construction General Permit. Compliance with TCEQ may require a Stormwater Pollution Prevention Plan (SWPPP). For this reason, an erosion and sediment control program must be instituted during the construction phase. Prior to the completion of a subdivision and acceptance of public improvements, rights-of-way, and easements combined on each lot shall have a sediment barrier constructed, designed for a 2-year storm (such construction to be covered by a Maintenance Bond) and maintained until the lot is stabilized, or one (1) year after acceptance of the subdivision by the City as per the aforementioned maintenance bond. An erosion and sediment control program shall be utilized to prevent sedimentation damage to areas and streams below the development site until the site is stabilized. The following practices are recommended for erosion and sedimentation control.

3.2 Sediment Barriers

Sediment barriers intercept runoff and capture sediments prior to the discharge of runoff into a water course or onto adjacent downstream properties. Properly constructed and maintained, these structures remove the bulk of coarser sediment from runoff leaving a construction site and effectively reduce the velocity and hence erosive capacity of runoff.

Five structures recommended as temporary sediment barriers below a construction site are the straw bale barrier, silt fence, erosion-control logs, sand bags and rock filter dams. The straw bale barrier consists of standard rectangular straw bales placed end to end (tied together with nylon binder twine or wire) and adequately staked to the ground. The silt fence consists of a filter fabric attached to a wire mesh fence of suitable height. Erosion-control logs are mesh tubes filled with compost or straw which function similar to straw bales. Sand bags are polypropylene, polyethylene or polyamide woven fabric bags filled with natural coarse sand or manufactured sand. Rock filter dams are small berms placed

perpendicular to the flow path across swales or ditches. These dams are constructed of aggregate ranging in size from three (3) to eight (8) inches in diameter depending upon the anticipated runoff flow volumes and/or velocities.

These methods are applicable for small drainage areas and may be used in a minor swale or ditch line with a runoff contributing area less than two acres. Care should be taken in determining the number and spacing of these structures for larger drainage areas.

3.3 Storm Drain Inlet Protection

Storm drain inlets intercepting flow from a disturbed drainage area should be provided to ensure adequate protection against sediment entering the storm drain line. Recommended practices for a standard grate drop inlet include a straw bale barrier, silt fence, erosion-control logs, sand bags, and a block and gravel filter.

The straw bale barrier, silt fence, erosion-control logs, and sand bags are described in Section 3.2. These structures are constructed along the outside perimeter of the inlet. Good judgment should be used in determining the adequacy of these filters for larger concentrated flows which may reduce their structural stability.

The block and gravel filter is used where heavy concentrated flows are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure. It consists of cinder blocks placed lengthwise around the perimeter of the inlet and wrapped with wire mesh. A suitable coarse aggregate is then piled against the wire mesh to the top of the block barrier. The wire mesh should have ½ inch openings and the aggregate should be of suitable size and gradation to effectively filter sediment.

Recommended practices for a standard depressed curb inlet include a straw bale, silt fence, erosion-control logs, sand bags and a block and gravel sediment filter. These structures are similar in purpose and design as mentioned for a grate drop inlet. The design and placement of barriers will be as approved by the Public Works Director.

All previously mentioned structures should be periodically checked and maintained to provide optimum protection against sediment entering the storm drain line.

3.4 Detention Basin

Small detention basins are an alternative measure to sediment barriers for preventing sediment to be carried off-site to downstream areas. Basins should be sized with proper outlet works to detain stormwater runoff for a length of time suitable for the settling of most sediment carried off with the stormwater. Runoff from a construction site must be effectively diverted to the basin for implementation of this method. Periodic cleaning of the detention basin is necessary to prevent loss of storage volume capacity.

3.5 Erosion Control

Erosion control prevents sediment from inundating areas down-slope from a construction site by preventing displacement of soil located within the construction zones due to runoff. Various methods such as the diversion of upland stormwater runoff, temporary seeding and mulching of the site, and surface roughening to reduce runoff velocity and increase infiltration will reduce the erosion of denuded land before stabilization is established. For development of land greater than 1.0 acre an SWPPP will be considered as fulfillment of this section. An erosion prevention plan is required to be approved by the Public Works Director for development of land less than 1.0 acre.

4.0 FLOW IN STREETS AND STORM DRAIN INLET DESIGN

4.1 Gutter Flow

Drainage of stormwater flow in gutters is based upon the hydraulics of open channels. Permissible use of gutters for stormwater conveyance will be based upon limitations set forth in Section 1.3.B.1.

4.2 Inlet Use

The following conditions exist for the various uses of inlets.

A. Combination curb inlets should be only where space behind curb prohibits other inlet types.

B. Grate inlets should be used only where space restrictions prohibit other inlets or at locations with no curb.

C. No depressed inlets shall be used on arterials and freeways unless they are clearly outside all traffic lanes.

D. Inlets shall be placed preferably at the upstream side of street intersections, at low points, or where the gutter flow exceeds its limits. Inlets shall be located on off streets or alleys when possible.

E. Water flowing in gutters of arterials and expressways should be collected prior to super-elevated sections to prevent water flowing across the street for up to a 5-year storm as per Section 1.3.B.1.

4.3 Inlet Types

Inlets must be utilized at the point at which street flow conditions begin to approach or exceed the storm runoff limitations set forth in Section 1.3.B.1. The final selection of inlet types will be based upon hydraulic performance, safety requirements and economics.

Inlets in sumps, curb inlets on grade, depressed curb inlets on grade, recessed curb inlets and combinations thereof are acceptable means of intercepting excess surface runoff.

The following guidelines shall be used in the design of inlets to be located on streets.

A. Maximum permissible depression for depressed curb inlets (depression measured from gutter line) in residential and collector streets shall be five (5) inches.
B. Maximum permissible depression for depressed curb inlets (depression measured from gutter line) in divided and undivided arterials and freeways shall be two and one-half inches (2.5 in) unless specifically approved by the Public Works Director.
C. Inlets shall have a six (6) inches minimum throat opening.
D. Recessed inlets shall not interfere with the intended use of a sidewalk.
E. Inlets should be designed and located with pedestrian and bicycle traffic in mind.
F. Table 4-1 lists the reductions in calculated inlet capacities that shall be utilized to account for blockage of the inlets by trash and debris:

Table 4-1. Inlet Capacity Reduction Values

Inlet Type	Capacity Reduction (%)
5" depressed curb inlet	10
Drop inlets in sumps	10
Combination grate and curb inlet in a sump	20
Grate inlets	25

G. The capacity of a combination curb and grate inlet on grade shall be considered to be ninety percent (90%) of the sum of their individual capacities (allowing for reduction due to clogging). This will also apply to a combination depressed curb and grate inlet on grade.
H. The capacity of a combination curb and grate inlet in a sump shall be considered the sum of their individual capacities (allowing for clogging).

5.0 CHANNELS

5.1 General

Channels exist in nature as creeks and streams and provide the natural conveyance for storm runoff. Likewise in urban storm drainage, constructed channels may improve the natural system by providing the conveyance needed for large quantities of storm runoff. Utilization of open channels for urban storm drainage, in addition to the requirements in Section1 and 2, and Figure 5-1, requires additional considerations. Channels may be advantageous because of greater capacity and normally lower cost, however, consideration must be given to the extended right-of-way requirement, safety hazards in residential areas, and maintenance costs.

Hydraulically, open channels are characterized by a concentrated flow having a free water surface. The design of open channels should provide a channel cross section of sufficient size to adequately convey the design flow of water and prevent flooding. Section 1.3, A and Figure 5-1 set forth basic criteria defining utilization, capacities, shape, and lining requirements for channels.

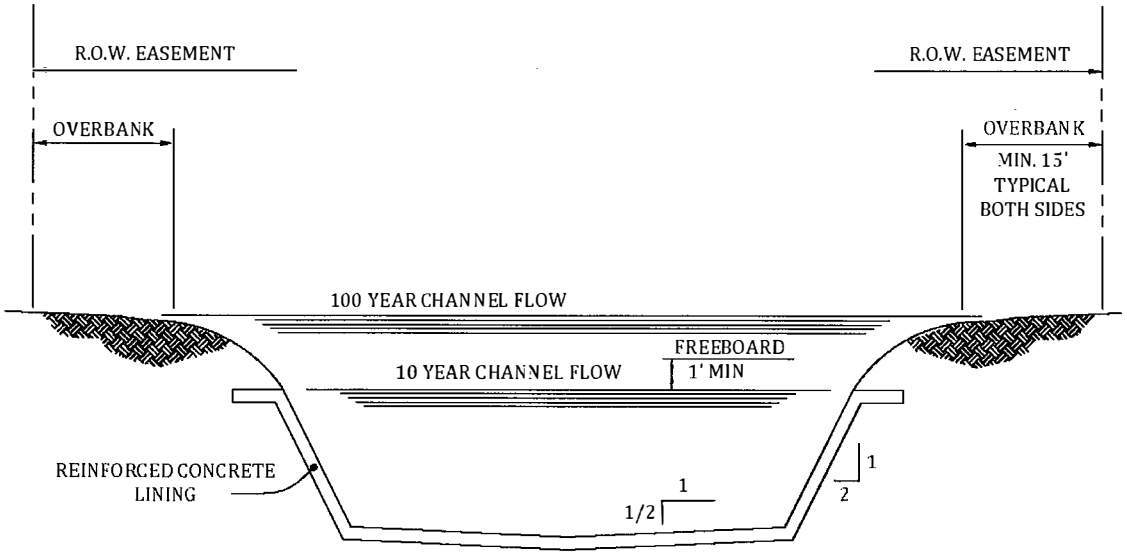
5.2 Discharge Criteria

Design flows in natural and improved channels and through bridges or culverts and other structures associated with a particular channel shall be based on the higher of the following:

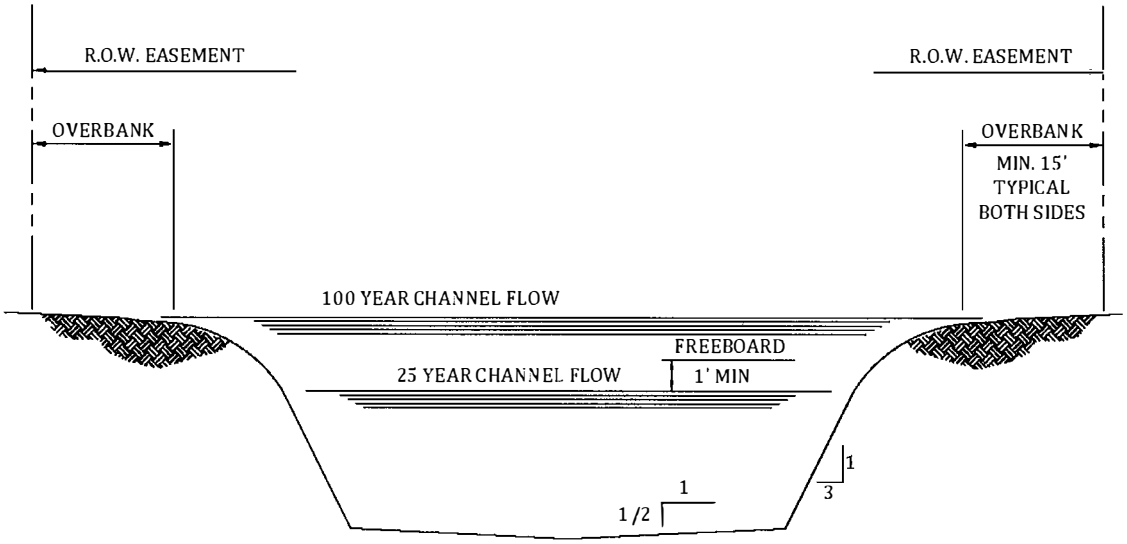
1. The Big Spring Flood Insurance Study.
2. Design flows frequency as calculated by design criteria given in Section 2.

5.3 Velocity

With higher velocities it will become necessary to provide channel lining to prevent erosion, therefore, maximum velocities of flow for various channel linings are established in Table 5-1 to give the engineer a guide for providing channel protection. Table 5-1 is only a guide, and linings other than those listed may be used if approved by the Public Works Director. Where practical, channel stepping, flow retarding structures, or other suitable methods may be utilized to control high velocities and thereby prevent erosion.



MINIMUM CONCRETE-LINED CHANNEL SECTION



MINIMUM IMPROVED CHANNEL SECTION

Figure 5-1. Channel Sections

Conversely, consideration should be given to minimum velocities and grades to prevent silting. Recommended velocities for unlined channels are as given in Table 5-1.

5.4 Freeboard

Major channels with built-up levees should be provided with three (3) feet of freeboard. All other improved channels with built-up levees should be provided with one (1) foot of freeboard. Consideration for additional freeboard should be given when a channel flows through an area where extensive damage would occur as a result of overflow.

5.5 Water Surface Profiles

A water surface profile must be computed for all channels and shown on all final drawings. Standard acceptable backwater methods or computer programs may be utilized. All losses due to changes in velocity, drops, bridge openings and other obstructions must be considered.

5.6 Maintaining the Natural Storage Volume

Maintaining the natural storage volume provided in the floodplain will be required in channel calculations.

Table 5-1. Recommended Maximum Channel Velocities

Channel Material	Maximum Channel Velocity (ft/s)
Fine Sand	2.5
Coarse Sand	4.0
Fine Gravel	6.0
Earth:	
• Sandy Silt	2.5
• Silty Clay	3.5
• Clay	6.0
Bermuda Grass-Lined Earth:	
• Sandy Silt	6.0
• Silty Clay	8.0
Sedimentary Rock:	
• Soft Shale	3.5
• Soft Sandstone	8.0
Igneous or Hard Metamorphic Rock	12.0
Reinforced Concrete Lining	15.0

6.0 CULVERTS

6.1 General

Culverts are an integral part of any storm drainage system. The function of a drainage culvert is to pass stormwater flow from the upstream side of an embankment to the downstream side without creating excessive downstream velocities, submerging embankment or causing excessive backwater.

6.2 Quantity of Flow

The quantity of design flow shall be determined in accordance with Section 2 of this Manual.

6.3 Headwalls and Endwalls

Headwalls will be either straight parallel headwalls, flared headwalls, paved sloped entrances, warped headwalls or pre-formed headwalls, or as approved by the Public Works Director with or without aprons depending on site conditions. Suggested guidelines for the selection of headwall and endwall types are provided in Table 6-1.

Table 6-1. Guidelines for the Selection of Headwall and Endwall Types

Conditions	Headwall and Endwall Types
Approach velocities below 6 fps. Approach channel undefined. Formation of backwater pool is acceptable. No downstream channel protection required.	Straight parallel
Approach velocities between 6-10 fps. Approach channel well defined	Flared (wings of flared walls located with respect to axis of the approach channel velocity)
Approach velocities of 8 fps or greater. Approach channel well defined.	Warped (suggested for use only for large drainage installations with limited right-of-way.)

6.4 Culvert Hydraulics

The hydraulic design of culverts will be based upon design aids found in the TxDOT specifications and standard plans, or other suitable material as approved by the Public Works Director.

6.5 Discharge Velocities

The velocity of discharge from culverts should be limited as shown in Table 6-2. Consideration must be given to the effect of high velocities and turbulence on the channel, adjoining property and embankment.

Table 6-2. Culvert Discharge Velocities

Culvert Discharging onto:	Maximum Allowable Velocity (fps)
Earth (sandy)	6
Earth (calcareous clay)	8
Earth (sodded, vegetated)	8
Hard Shale	10
Rock or Concrete	15

6.6 Erosion Control

In certain instances, rip rap protection and energy dissipaters downstream of culverts may prove to be more economical solutions to high outlet velocities than resizing of a culvert. Engineering judgment will dictate the design of energy dissipaters and sizing and placing of rip rap. The Technical Report. No. FHWA/R0-82/011, "Scour at Culvert Outlets in Mixed Bed Materials" U.S. Department of Transportation dated September 1982, is one source of information available regarding the effects of scour downstream of culvert outlets.

6.7 Culvert Type

The selection of the type of culvert utilized and its shape is left open to individual judgment based on local conditions but shall meet with the approval of the Public Works Director.

7.0 DETENTION STORAGE

7.1 General

Detention is a means of reducing the increased runoff associated with the development of drainage basins. Detention storage ponds should have the capacity and outlet works capable of reducing increased peak flows for each of the 2, 10, 25 and 100-year frequency storms. The net flow rate from a detention storage pond shall not exceed pre-development runoff rates from the drainage basin. Retention storage may be considered for approval by the Public Works Director.

Because an area used for detention of runoff may have other uses, the size, shape, and slope(s) of the detention facility should be compatible with such auxiliary uses of the facility. In addition, the allowable depth of water for the design recurrence interval and the length of time that stored water remains in the facility should also be compatible with the other uses of the facility.

7.2 Design

A flow routing analysis using detailed hydrographs must be applied for all detention pond designs. The NRCS hydrologic methods (TR-20) and the HEC hydrologic methods (HEC-HMS) may be used. The engineer may use other methods but must have their acceptability approved by the Public Works Director.

7.6 The following detention facility computations shall be submitted and reviewed for approval by the Public Works Director.

1. Existing pre-development runoff hydrographs for the 2, 5, 10, 25 and 100-year storms.
2. 2, 5, 10, 25 and 100-year hydrographs representing developed conditions.
3. A depth/elevation versus storage graph for the detention basin.
4. A depth/elevation versus discharge graph for the detention basin outlet works.
5. Reservoir routing computations of the developed conditions 2, 5, 10, 25 and 100-year hydrographs through the detention facility and associated outflow hydrographs.

B. Runoff Hydrographs

The runoff hydrographs for areas of 200 acres or greater will be developed using Snyder's Synthetic Unit Hydrograph procedure, or other methods approved by the Public Works Director.

For drainage areas less than 200 acres, the Rational Method, Modified Rational Method (MRM) or other methods approved by the Public Works Director shall be utilized to construct the runoff hydrograph.

C. Depth/Elevation - Storage Relationship

A depth/elevation storage relationship is a graph of depth/elevation of stored water vs. storage volume for the detention basin. The depth/elevation is usually placed on the ordinate, and the storage volume on the abscissa. The units for depth can be inches or feet. The units for elevation would be feet. The units for volume can be cubic feet, acre-inches, and acre-feet. The storage volume at a particular depth is always the total volume of storage below that depth.

D. Depth/Elevation -Discharge Relationship

A depth/elevation discharge relationship is expressed by a graph of depth/elevation vs. discharge rate. The depth/elevation is usually placed on the ordinate, and the discharge rate on the abscissa. The units for depth can be inches or feet. The units for elevation would be feet. The units for outflow rate can be cubic feet per second. The outflow rate at a particular depth is the summation of the outflow rates from all outlet structures which are discharging water at that particular depth.

7.3 Basin Design vs. Storm Frequency and Duration

Detention basins designed for use in the Big Spring area should be designed to limit post development runoff to predevelopment rates for each of the 2, 5, 10, 25 and 100-year storms. Analysis of these storms with various durations should be carried out to ascertain that the storage space and outlet works of a detention basin are indeed capable of alternating all design storms of varying durations in accordance with Big Spring standards.

7.4 Berms

Berms will not be permitted where the "toe" of the outside berm will be closer than 5 feet from the ROW line. There must be room for sidewalks near the ROW line of all streets.

7.5 Regional Detention Ponds

The City of Big Spring encourages the use of larger Regional Ponds over a large number of smaller ponds in the same areas if owner or owners can work together to create one pond for general use.

8.0 REFERENCES

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City of Midland. (1992). *Storm Drainage Design Manual*.

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ORDINANCE NO. _____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, AMENDING ORDINANCE NUMBER 039-2021 WHICH ADOPTED THE ANNUAL BUDGET FOR THE CITY OF BIG SPRING, TEXAS FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2021 AND ENDING SEPTEMBER 30, 2022 BY INCREASING THE GENERAL FUND BUDGET FOR THE PURPOSE OF LIGHTING REPLACEMENTS AT THE ROY ANDERSON SPORTS COMPLEX; PROVIDING FOR SEVERABILITY; PROVIDING FOR PUBLICATION; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS the City Council adopted the annual 2021-22 budget for the City of Big Spring, Texas on September 28, 2021 ("Budget"); and

WHEREAS replacing some lighting fixtures at the Roy Anderson Sports Complex was not included in such Budget; and

WHEREAS the City Manager and the Finance Director recommend that the City Council increase the General Fund budgeted expenditures and amend the Budget previously approved;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, AS FOLLOWS THAT:

SECTION 1. The General Fund Budget of the Annual Budget for the City of Big Spring, Texas for the Fiscal Year beginning October 1, 2021 and ending September 30, 2022 is hereby increased by the amount of $16,500.00 to the expense account number 002-027-375-6229 for the purpose of lighting replacements at the Roy Anderson Sports Complex.

SECTION 2. The remaining portions of Ordinance Number 039-2021 shall remain in full force and effect.

SECTION 3. Should any section, paragraph, sentence, clause, phrase or word of this ordinance be declared unconstitutional or invalid for any purpose, the reminder of this ordinance shall not be affected thereby.

SECTION 4. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of the conflict.

SECTION 5. The City Secretary is hereby authorized and directed to cause the publication of this ordinance in accordance with law.

SECTION 6. This ordinance shall be in full force and effective from and after its publication as required by law.

PASSED AND APPROVED on first reading at a regular meeting of the City Council on the **22nd** day of **February, 2022** with all members of the Council voting "aye" for the passage of same.

PASSED AND APPROVED on second reading at a regular meeting of the City Council on the **8th** day of **March, 2022** with all members of the Council voting "aye" for the passage of same.

_____
Shannon D. Thomason, Mayor

ATTEST:

_____
Tami L. Davis, City Secretary

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, AMENDING ORDINANCE NUMBER 039-2021 WHICH ADOPTED THE ANNUAL BUDGET FOR THE CITY OF BIG SPRING, TEXAS FOR THE FISCAL YEAR BEGINNING OCTOBER 1, 2021 AND ENDING SEPTEMBER 30, 2022 BY INCREASING THE GENERAL FUND BUDGET TO PURCHASE EQUIPMENT FOR VARIOUS DEPARTMENTS; PROVIDING FOR SEVERABILITY; PROVIDING FOR PUBLICATION; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS the City Council adopted the annual 2021-22 budget for the City of Big Spring, Texas on September 28, 2021 ("Budget"); and

WHEREAS all bids were rejected for the Lease Purchasing Agreement due to the decrease in the amount to be financed and the various equipment needed for various departments were not included in such Budget; and

WHEREAS the City Manager and the Finance Director recommend that the City Council increase the General Fund budgeted expenditures and amend the Budget previously approved;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, AS FOLLOWS THAT:

SECTION 1. The General Fund Budget of the Annual Budget for the City of Big Spring, Texas for the Fiscal Year beginning October 1, 2021 and ending September 30, 2022 is hereby increased by the amount of $77,857.44 to the following expense account numbers:

002-022-320-6404 - Batwing Mower for the Street Department in the amount of $24,892.28;

002-027-370-6314 – Zero Turn Mower for the Parks Department in the amount of $10,952.48; and

002-027-390-6314 – Greens Mower for the Golf Course in the amount of $42,012.68.

This equipment will be funded through the General Fund Balance.

SECTION 2. The remaining portions of Ordinance Number 039-2021 shall remain in full force and effect.

SECTION 3. Should any section, paragraph, sentence, clause, phrase or word of this ordinance be declared unconstitutional or invalid for any purpose, the reminder of this ordinance shall not be affected thereby.

SECTION 4. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of the conflict.

SECTION 5. The City Secretary is hereby authorized and directed to cause the publication of this ordinance in accordance with law.

SECTION 6. This ordinance shall be in full force and effective from and after its publication as required by law.

PASSED AND APPROVED on first reading at a regular meeting of the City Council on the **22nd** day of **February, 2022** with all members of the Council voting "aye" for the passage of same.

PASSED AND APPROVED on second reading at a regular meeting of the City Council on the **8th** day of **March, 2022** with all members of the Council voting "aye" for the passage of same.

_____
Shannon D. Thomason, Mayor

ATTEST:

_____
Tami L. Davis, City Secretary

ORDINANCE NO. _____

AN ORDINANCE AUTHORIZING THE CREATION OF THE TAX INCREMENT REINVESTMENT ZONE, NO. 1, CITY OF BIG SPRING ESTABLISHING THE TAX INCREMENT FUND, APPOINTING THE BOARD OF THE TAX INCREMENT REINVESTMENT ZONE, ESTABLISHING THE TERMINATION DATE OF THE ZONE, MAKING CERTAIN FINDINGS, SETTING THE CAPTURED TAX PERCENTAGE, AND AUTHORIZING ACTIONS IN FURTHERANCE OF THE ZONE.

WHEREAS, City Council finds it advisable to take the following action; and

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, AS FOLLOWS, THAT:

SECTION 1. The City Council finds:

A. The City of Big Spring (City) has prepared a preliminary Financing Plan for Tax Increment Reinvestment Zone No. 1.

B. The City has properly noticed and held a hearing regarding the establishment of the TIRZ No. 1.

C. The proposed Zone is to be located within the Area known as Original Town at central coordinates 32.252457, -101.475483 bounded by S. Gregg St. to Goliad St. from W. 1st St. to E. 6th St. in the City of Big Spring, Howard County, Texas.

D. At the hearing on the proposed Zone, any interested person, and any property owner with property located in the proposed Zone was allowed by council to speak for or against the creation of the Zone, its boundaries, the concept of tax increment financing, or to protest the inclusion of the property within the Zone.

E. Improvements within the TIRZ No. 1 will significantly enhance the value of all the taxable real property in the Zone and will be of general benefit to the City of Big Spring.

F. The area within the TIRZ No. 1 meets the requirements of Texas Tax Code Section 311.005 because the dilapidated condition of its property impairs the sound growth of the City and is not, in present condition, the highest and best use to foster public health, safety, morals, or welfare of the community.

G. Development or redevelopment in the Zone would not occur solely through private investment in the reasonably foreseeable future.

H. The privately owned property within the Zone has less than 30% used for residential purposes as defined by Texas Tax Code 311.006(a)(1).

I. The total appraised value of property within tax increment reinvestment zones within the City of Big Spring is under the limit established by Texas Tax Code 311.006(a)(2)(B).

SECTION 2. In accordance with Texas Tax Code Section 311.005(a), Council establishes and names the TIRZ No. 1 with boundaries as described.

SECTION 3. Council establishes the Board of Directors of the TIRZ No. 1 to consist of each of the members of the City Council, [County and College to be added if applicable] sitting as Board members. Each Board member serves for a two-year term as authorized by Texas Tax Code Section 311.009(e).

SECTION 4. Council adopts the Preliminary Financing Plan for TIRZ No. 1 and authorizes the City Manager to return with the Final Project Plan and Financing Plan for Council approval.

SECTION 5. Council establishes the TIRZ No. 1 Tax Increment Fund.

SECTION 6. The TIRZ No. 1 will terminate upon the later of all debt service issued by the City and paid in part of entirely by the Zone has been fully satisfied, or December 31, 2052, unless otherwise terminated.

SECTION 7. Council establishes the tax increment of the captured increment of City property taxes to be placed in the TIRZ No. 1 Tax Increment Fund and to be used for all purposes of the TIRZ as set forth in the Project Plan and Financing Plan at __%.

SECTION 8. Council authorizes the City Manager, the City Finance Director, and the City Attorney to take all such actions as are necessary to implement this ordinance and the establishment of this TIRZ No. 1.

SECTION 9. Should any section, paragraph, sentence, clause, phrase or word of this ordinance be declared unconstitutional or invalid for any purpose, the reminder of this ordinance shall not be affected thereby.

SECTION 10. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of the conflict.

PASSED AND APPROVED on first reading at a regular meeting of the City Council on the **8th** day of **March**, **2022** with all members of the Council voting "aye" for the passage of same.

PASSED AND APPROVED on second and final reading at a regular meeting of the City Council on the **22nd** day of **March**, **2022** with all members of the Council voting "aye" for the passage of same.

Shannon D. Thomason, Mayor

ATTEST:

Tami L. Davis, City Secretary

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS AMENDING BIG SPRING CITY CODE CHAPTER 44 ENTITLED "SOLID WASTE," ARTICLE III "ILLEGAL DUMPING AND LITTER CONTROL" BY ADDING A NEW SECTION 44-120 ENTITLED "PERSONS AGAINST LITTERING AND ILLEGAL DUMPING" AUTHORIZING THE CITY MANAGER TO WAIVE LANDFILL FEES FOR PERSONS PICKING UP AND DISPOSING OF LITTER AND ILLEGAL DUMPING IN THE CITY LIMITS OF BIG SPRING; ESTABLISHING CRITERIA THAT DEFINE THESE PROJECTS AS IN THE INTEREST OF PUBLIC HEALTH, SAFETY, AND WELFARE; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE

WHEREAS, Persons residing in our community have expressed an interest in volunteering their time to pick up litter and illegal dumping; and

WHEREAS, The landfill fees of the City are partially imposed on the City of Big Spring by state law under Section 30 Texas Administrative Code Subchapter P, Fees and Reporting, yet imposing a fee on a citizen for taking action of their own free will to clean up their community places an undue burden and penalizes responsible action of disposing of waste; and

WHEREAS, the City Council finds that litter and illegal dumping are harmful and threatening to the public health, safety, and welfare of the City of Big Spring; and

WHEREAS, City Council declares that disposing of litter and illegal dumping serves the public interest and is a valid public purpose;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BIG SPRING, TEXAS, THAT:

SECTION 1. Big Spring City Code, Chapter 44 entitled "Solid Waste," Article III entitled "Illegal Dumping and Liter Control" is hereby amended to add a new Sections 44-120 to 44-122 to read in their entirety as follows:

Sec. 44-120. – Persons against litter and illegal dumping.

The City Manager is authorized to waive landfill disposal fees upon application of a person or disposal of matter collected from public rights-of-way, easements, and property.

Sec. 44.121 – Application of Person/City Manager consideration.

A person may request waiver of landfill disposal fees in writing to the City Manager. An applicant shall provide the location and general description of the matter to be removed and disposed of. The person shall provide written proof to the City that the landowner consents to the removal of the litter or illegal dumping. The City Manager shall verify the location and general description of the matter and determine whether the matter is a danger to the public health safety and welfare of the public. If the City Manager determines that the matter poses a threat or danger of to the public health, safety, and welfare as defined by the City Council the City Manager shall waive the disposal fee associated with disposing of the matter. The City Manager shall provide authorization or denial to the applicant in writing. Copies of the document shall be forwarded to each Member of City Council

Sec. 44-122. Determination of danger to public health, safety, and welfare.

The City Council hereby determines that any matter defined as bulky waste, commercial waste, dead animal, garbage, liter, miscellaneous non-vegetative yard waste, rubbish, solid waste, or yard waste on public property presents a danger to the public health, safety, and welfare as these items draw vermin, rodents, and other pests as well as incite continued liter and illegal dumping.

Sec. 44-123. Person access to City landfill.

A Person shall be permitted to dispose of waste as authorized by the City Manager upon presentation of the written authorization in this Article.

SECTION 2. Should any section, paragraph, sentence, clause, phrase, or word of this ordinance be declared unconstitutional or invalid for any purpose, the reminder of this ordinance shall not be affected thereby.

SECTION 3. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of the conflict.

SECTION 4. This Ordinance shall take effect immediately after passage in accordance with the provisions of the Charter of the City of Big Spring, and it is accordingly so ordained.

PASSED AND APPROVED on first reading at a regular meeting of the City Council on the **8th** day of **March**, **2022** with all members of the Council voting "aye" for the passage of same.

PASSED AND APPROVED on second and final reading at a regular meeting of the City Council on the **22nd** day of **March**, **2022** with all members of the Council voting "aye" for the passage of same.

_____
Shannon D. Thomason, Mayor

ATTEST:

_____
Tami L. Davis, City Secretary

INTERLOCAL AGREEMENT

This Agreement for the joint bidding and engineering management of street improvement projects is entered into between each of the signatories to this Agreement (hereinafter "Participant(s)") and between each additional participant who may hereafter consent to be bound by the terms of this Agreement by appropriate resolution or minute order executed or ordered by its governing body. This Agreement is executed pursuant to TEXAS GOVERNMENT CODE CHAPTER 791, the Texas Interlocal Cooperation Act.

The Agreement of the parties is as follows:

1. Term.

This Agreement shall extend through the 2022 seal coating season and for so long thereafter as may be necessary to complete the 2022 seal coating program in a manner satisfactory to the individual participants.

2. Consideration.

Each participant agrees to jointly bid their individual seal coating programs and to coordinate the bidding process in order to take advantage of economies of scale and to eliminate repetitive efforts by each of the participants. The bid packet is available upon request from the City Secretary, document title: "City of Big Spring Contract Documents and Specifications for 2022 Seal Coat."

3. Joint Bid Process.

It is hereby agreed by the parties that the firm of Jacob & Martin, LLC, 3465 Curry Lane, Abilene, Texas 79606 ("hereinafter "engineers") will be the agent for each of the participants in all matters relating to the bidding of the seal coat program and the management of the program once the bidding has been completed. Each participant agrees to be bound by the fee schedule submitted by engineers.

4. Communication.

Engineers shall keep the individual participants informed as to the progress of the bidding process and following the awarding of the bids shall coordinate the seal coat program.

5. Payment.

Each participant agrees to pay the cost of its portion of the seal coat program and be solely responsible for its liabilities.

6. Force Majeure.

In the event any party shall be rendered unable to carry out its obligation under this Agreement in whole or in part as a result of "Force Majeure", and if the party shall give notice and describe in detail the nature of the occurrence, then the obligation of the party giving such notice, so far as it is affected by such "Force Majeure" shall be suspended during the continuance of the inability then claimed, but for no longer period. The affected party shall use its best efforts to endeavor to overcome such inability with all reasonable dispatch. The term "Force Majeure" as employed herein shall mean acts of God, strikes, lockouts, or other industrial disturbance, acts of public enemy, orders of any kind of the Government of the United States or the State of Texas, or any civil or military authority, earthquake, fires, hurricanes, storms, floods, washouts, civil disturbances, explosions, breakage, or accidents to machinery.

7. Modification.

This Agreement may be amended only with the consent of the governing bodies of each of the parties through appropriate written resolutions or minute orders, executed or ordered and delivered to the parties.

8. Construction.

This Agreement is intended to express the mutual intent of the participants and, irrespective of the identity of the participant preparing this Agreement or any document or instrument referred to herein, no rule of strict construction against the party preparing the document shall be applied.

9. Severability.

In the event any portion of this Agreement shall be declared to be invalid or unenforceable for any reason, such finding shall not affect the validity of the balance of this agreement.

10. Entire Agreement.

This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes any and all prior or contemporaneous agreements or understandings, whether written or oral with respect to the subject matter hereof. No verbal agreement or conversation with any officer, agent, or employee of a participant either before or after execution of the Agreement shall affect or modify any of the terms or obligations contained in the contract. Any such verbal agreement or conversation shall be considered as unofficial information and in no way binding upon the participants.

11. Additional parties.

Each of the original signatories to this Agreement consents to the ratification of this Agreement by

additional governmental participants so long as each additional participant agrees to be bound by the terms and conditions of this Agreement to the same extent as the original signatories.

12. Venue

Venue and jurisdiction of any suit, or cause of action arising or in connection with this Agreement shall lie exclusively in Howard County, Texas.

13. Effective Date.

This Agreement shall be effective as to each of the signatories on the date of the final execution of their respective resolutions or minute orders adopting this Agreement.

This Agreement contemplates that all payments shall be made from current funds budgeted for the year 2022. In the event the governing body of the City of Big Spring shall fail to appropriate funds to participate in the seal coat program in the 2022 budget, then this Agreement shall terminate on the last day of the fiscal year preceding the year for which appropriation is not made.

_____

Todd Darden, City Manager

ATTEST:

_____

Tami L. Davis, City Secretary

APPROVED AS TO FORM:

_____

Andrew W. Hagen, City Attorney