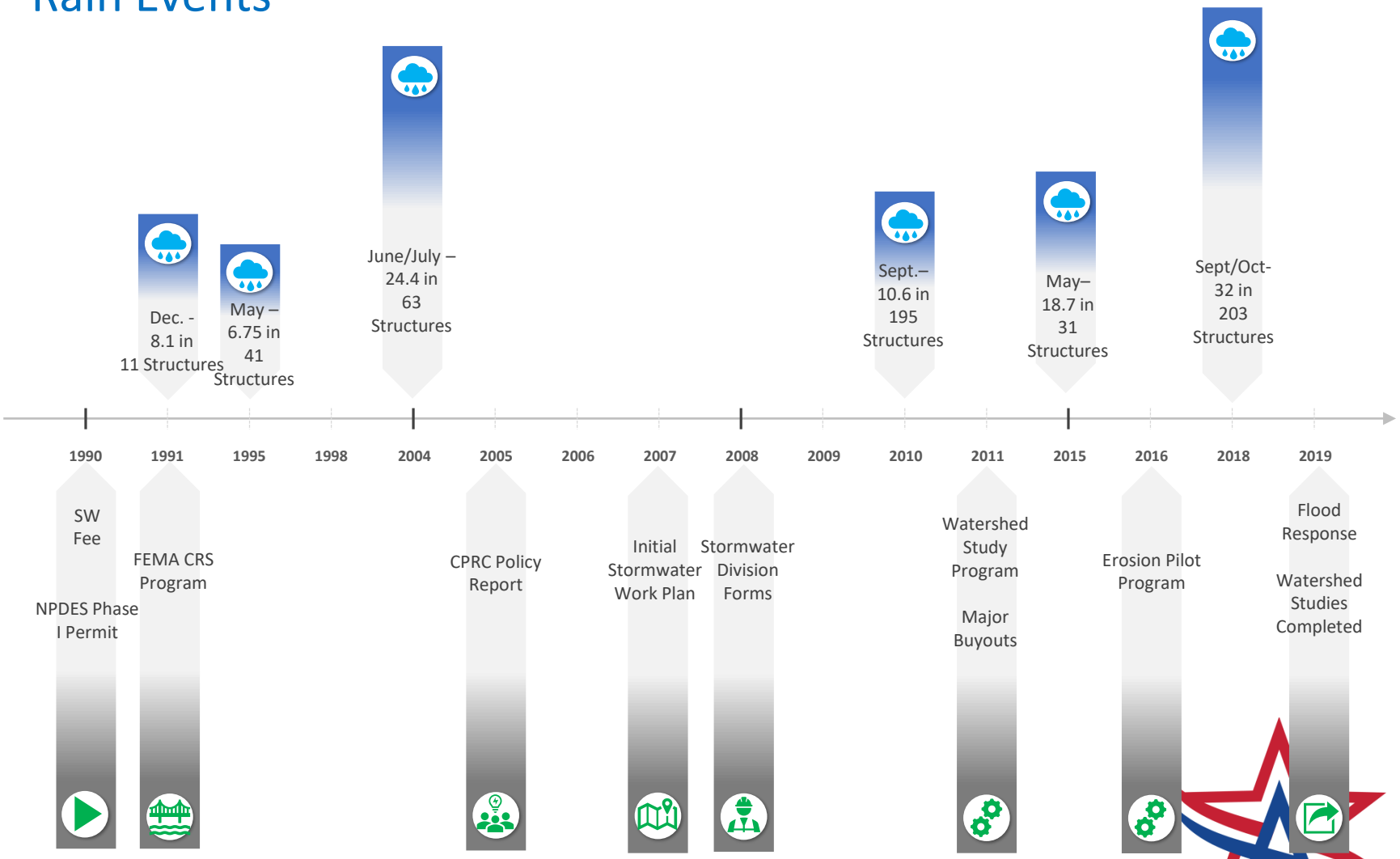
STORMWATER PROGRAM FLOODING AND EROSION UPDATE

Mindy Carmichael, PE

Director, Public Works & Transportation

November 8, 2019

Rain Events



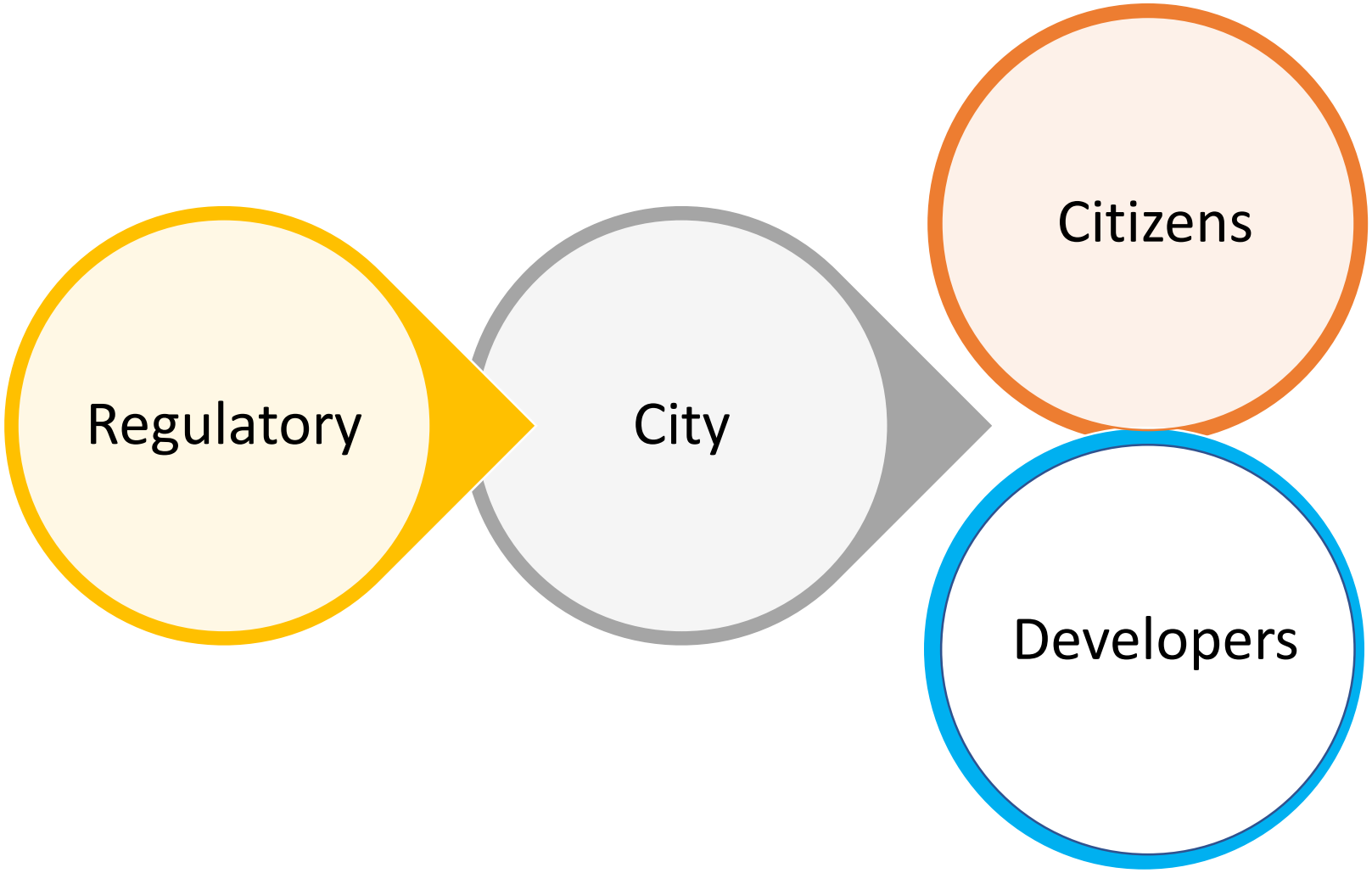
City Actions

ARLINGTON℠
THE AMERICAN DREAM CITY

Stormwater Infrastructure

ASSET	COUNT
Inlets	19,307
Manholes	1224
Pipes	3,191,094 LF
Outfalls	3597
Channels	483, 074 LF
Culverts	715
Bridges	107
Streams	129 Miles

Stormwater Responsibilities



- **FEMA**

Regulates preventing, mitigating and responding to flooding disasters

National Flood Insurance Program

- **CORPS**

Regulates environmental and ecosystem restoration in creeks and streams

Section 404 Clean Water Act

- **EPA/TCEQ**

Regulates discharge from pipes, ditches, or channels to waters of the United States

Municipal Separate Storm Sewer System

PREVENT

- Flood Damage Ordinance
- Construction SWPPP
- Design Criteria Manual

MITIGATE

- Adequate Design and Construction
- Voluntary Buyout Program

CITY

MAINTAIN

- Infrastructure Maintenance
- Debris Removal

EDUCATE

- Flood Hazards and Insurance Advice
- Turn Around Don’t Drown
- Stormwater Quality

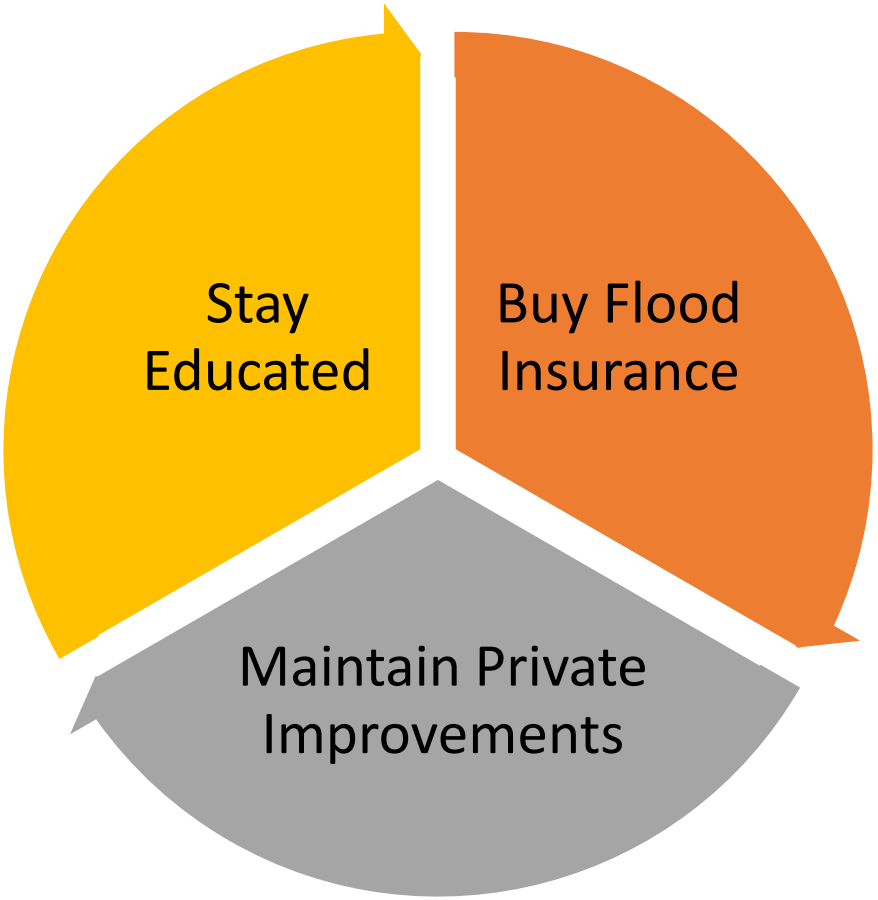
Developer Responsibilities

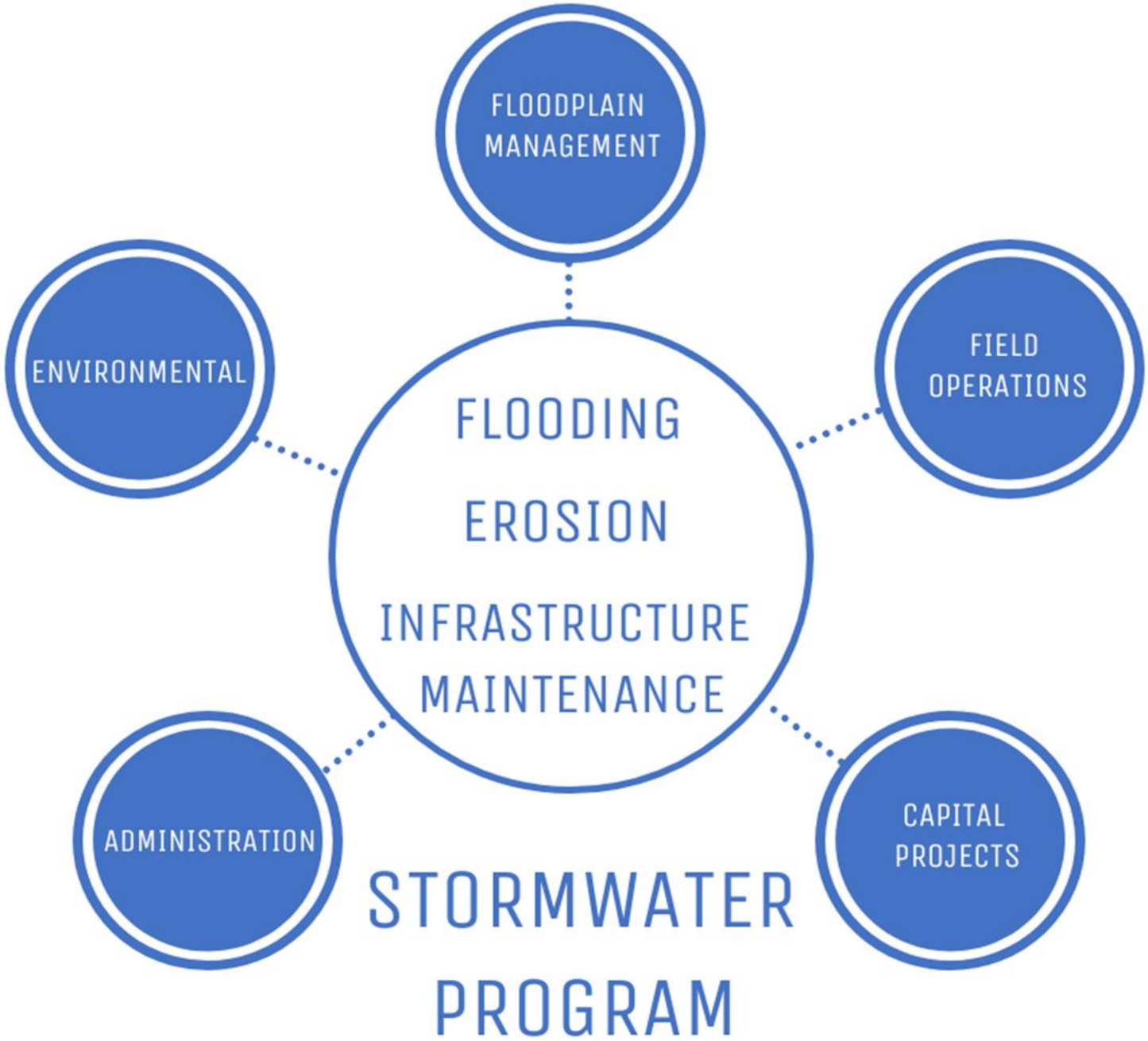
Ensure viability with existing land uses and adjacent properties

Comply with current plans, codes, criteria and development standards

Provide for quality engineering and construction

Citizen Responsibilities




FLOODPLAIN MANAGEMENT
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FIELD OPERATIONS
FLOODING
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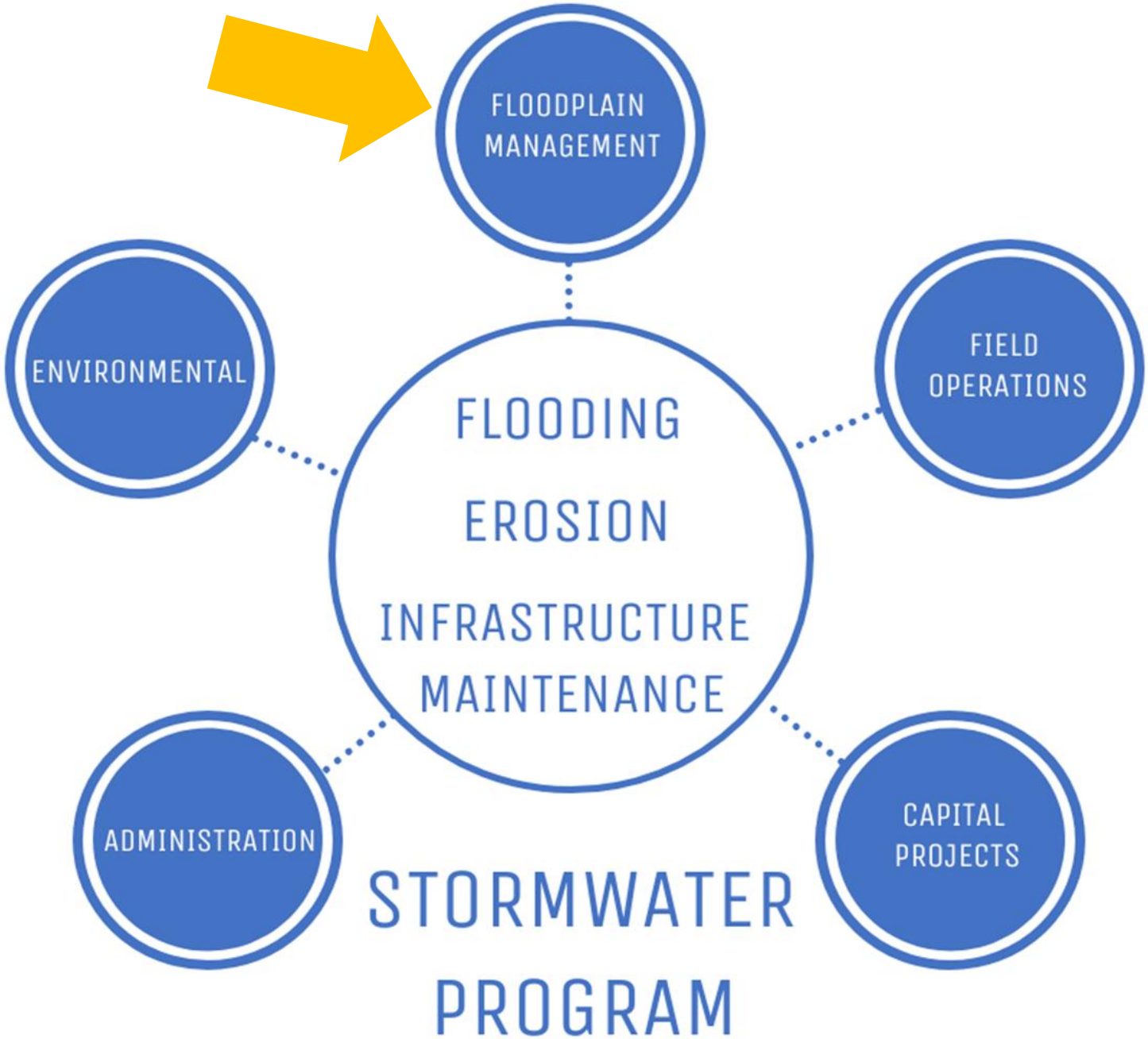
INFRASTRUCTURE MAINTENANCE
ADMINISTRATION
CAPITAL PROJECTS
STORMWATER PROGRAM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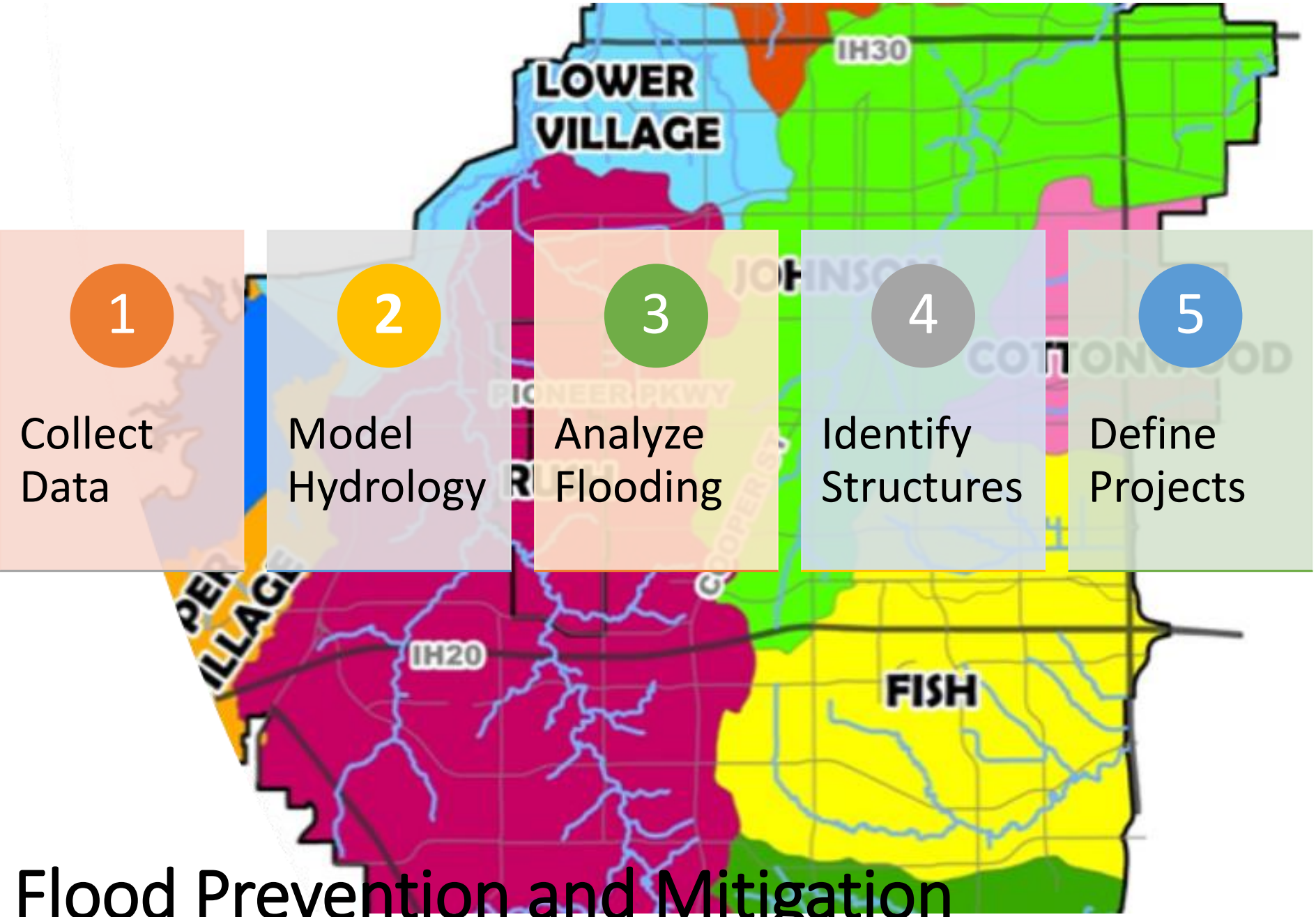
Education and Outreach

- HOA and Civic Groups
- Stormtalker ISD Program
- Adult Classes
- Focus Campaigns
- Partnerships
- Newsletter/Social Media

Flood Prevention

Floodplain Preservation

- Dedication of Floodplain
- Dedication of Erosion Clear Zone
- Tree Preservation Ordinance
- Acquisition and creation of Linear Park System



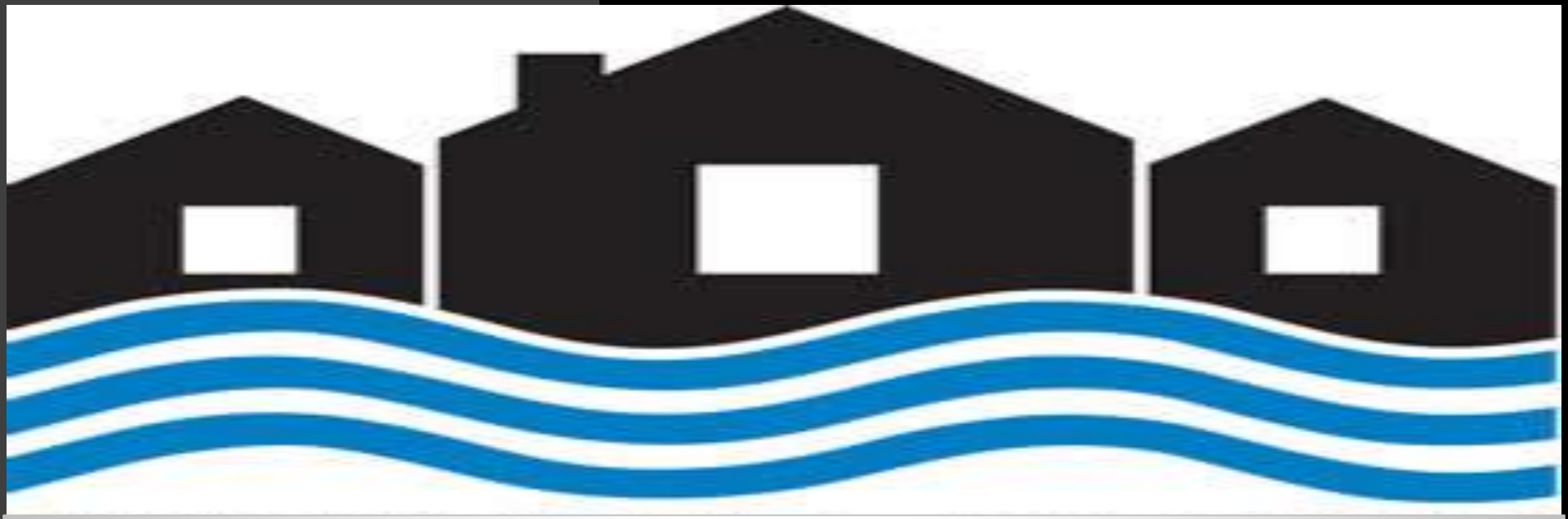
Flood Prevention and Mitigation

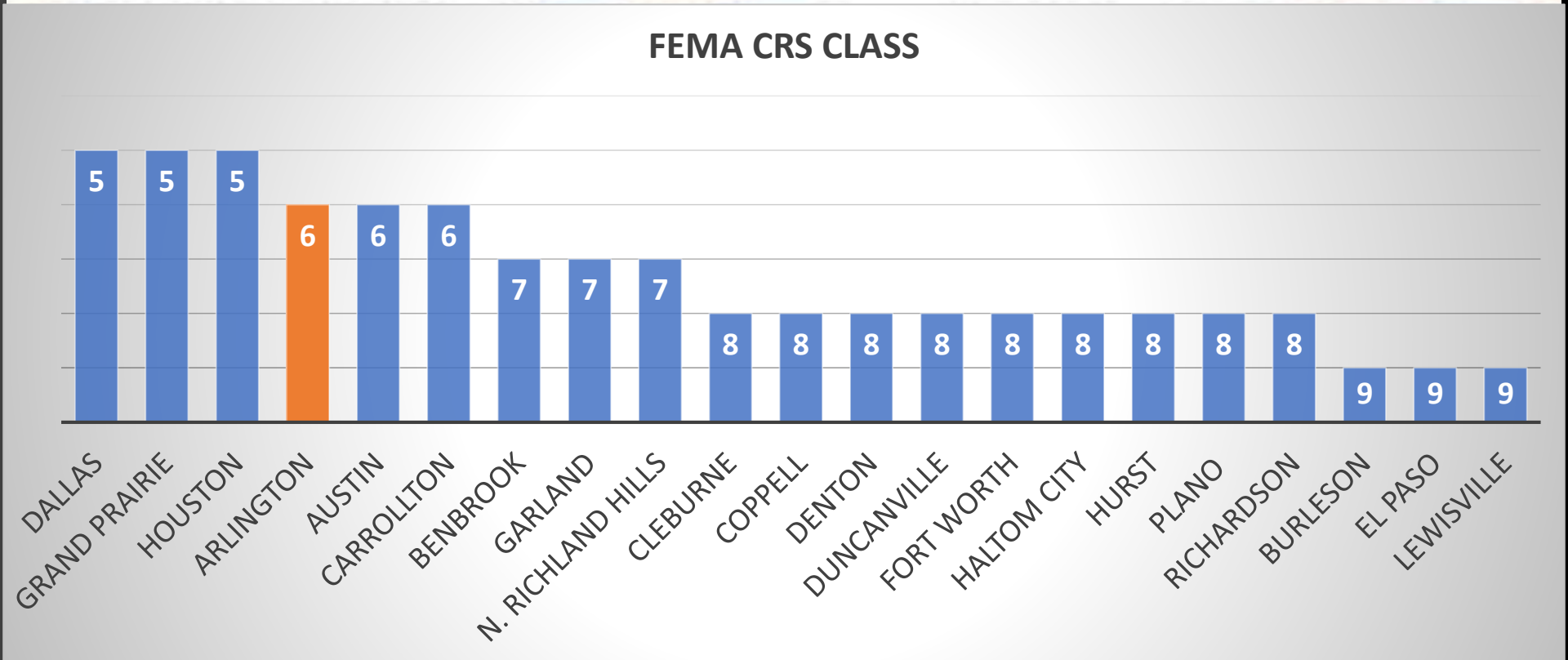
Watershed and Localized Analyses Progress

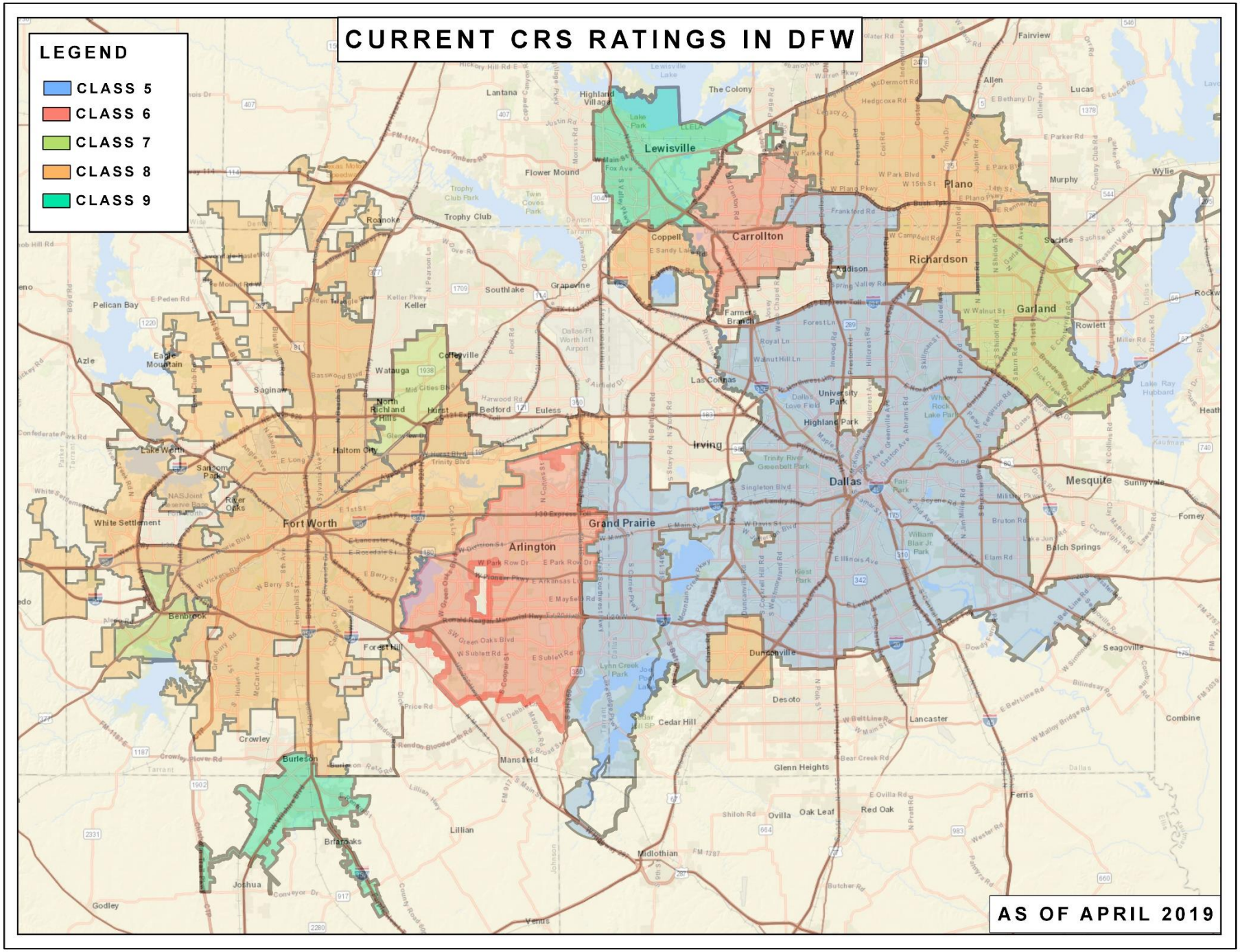
SYSTEM COMPONENT	Data Collection	H&H Modeling	Hazard Assessment	Potential Project Modeling	Conceptual Project ID	PWT Review	Scoring and Prioritization	Council Adoption	FEMA Acceptance	FEMA Map Issued
RUSH CREEK	✓	✓	✓	✓	✓	✓		✓	✓	
JOHNSON CREEK	✓	✓	✓	✓	✓	✓		✓	✓	✓
FISH AND COTTONWOOD CREEKS	✓	✓	✓	✓	✓	✓		✓	✓	✓
DITTO AND CRYSTAL CANYON CREEKS	✓	✓	✓	✓	✓	✓		✓	✓	
WF(A)2 Cooper/Green Oaks/ Lamar	✓	✓	✓	✓	✓	✓		✓	✓	✓
WF(A)1 Green Oaks/ Forestwood	✓	✓	✓	✓	✓	✓		✓	✓	✓
VC(A)1 Randol Mill Park	✓	✓	✓	✓	✓	✓				
LYNN CREEK AND BOWMAN BRANCH	✓	✓	✓	✓	✓					
UPPER VILLAGE CREEK AND TRINITY	✓	✓	✓	✓	✓					
LOCALIZED ANALYSES	✓	✓	✓	✓	✓					

Flood Zone Mapping Updates

- Flood zone mapping is an effective tool used to clearly communicate flood risk to the public.
- Results from the various watershed studies will be used to update the FEMA flood maps.
- Maps are used as part of the stormwater policy and ordinances as the first line of defense for floodplain management.
- FEMA views updated flood maps as the foundation for an effective stormwater program.




FEMA CRS CLASS
5
5
5
6
6
6
7
7
7
8
8
8
8
8
8
8
8
8
9
9
9
DALLAS
GRAND PRAIRIE
HOUSTON
ARLINGTON
AUSTIN
CARROLLTON
BENBROOK
GARLAND
N. RICHLAND HILLS
CLEBURNE
COPPELL
DENTON
DUNCANVILLE
FORT WORTH
HALTOM CITY
HURST
PLANO
RICHARDSON
BURLESON
EL PASO
LEWISVILLE


CURRENT CRS RATINGS IN DFW
LEGEND
CLASS 5
CLASS 6
CLASS 7
CLASS 8
CLASS 9
AS OF APRIL 2019
Lewisville
Carrollton
Plano
Richardson
Garland
Irving
Dallas
Fort Worth
Arlington
Grand Prairie
Mesquite
Duncanville
Desoto
Lancaster
Cedar Hill
Mansfield
Burleson
Crowley
Keller
Southlake
Grapevine
Euless
Bedford
Hurst
Haltom City
Watauga
Colleyville
Saginaw
Azle
Benbrook
Forest Hill
White Settlement
Lake Worth
River Oaks
Roanoke
Trophy Club
Flower Mound
Highland Village
Lantana
The Colony
Coppell
Farmers Branch
Addison
University Park
Highland Park
Las Colinas
Rowlett
Sachse
Murphy
Allen
Lucas
Wylie
Balch Springs
Seagoville
Combine
Glenn Heights
Ovilla
Oak Leaf
Red Oak
Ferris
Midlothian
Lillian
Briaroaks
Joshua
Godley
Venus
Pelican Bay
Eagle Mountain
Sanctuary Park
Lake Ray Hubbard

GOAL 2020: CRS CLASS 5

PROGRAM FOR PUBLIC INFORMATION

REPETITIVE LOSS AREA ANALYSIS PLAN

FLOOD INSURANCE COVERAGE IMPROVEMENT PLAN

Floodplain Management Excellence

- City Floodplain Management Excellence Award
  - *Texas Floodplain Manager's Association*
- Floodplain Manager of the Year – 2019
  - *Texas Floodplain Manager's Association*
- CRS Class 6

FEMA

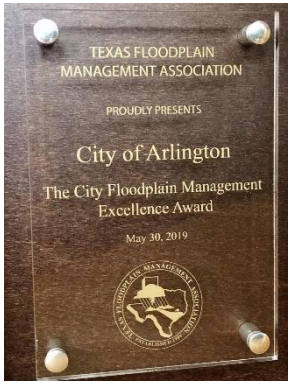
City of Arlington

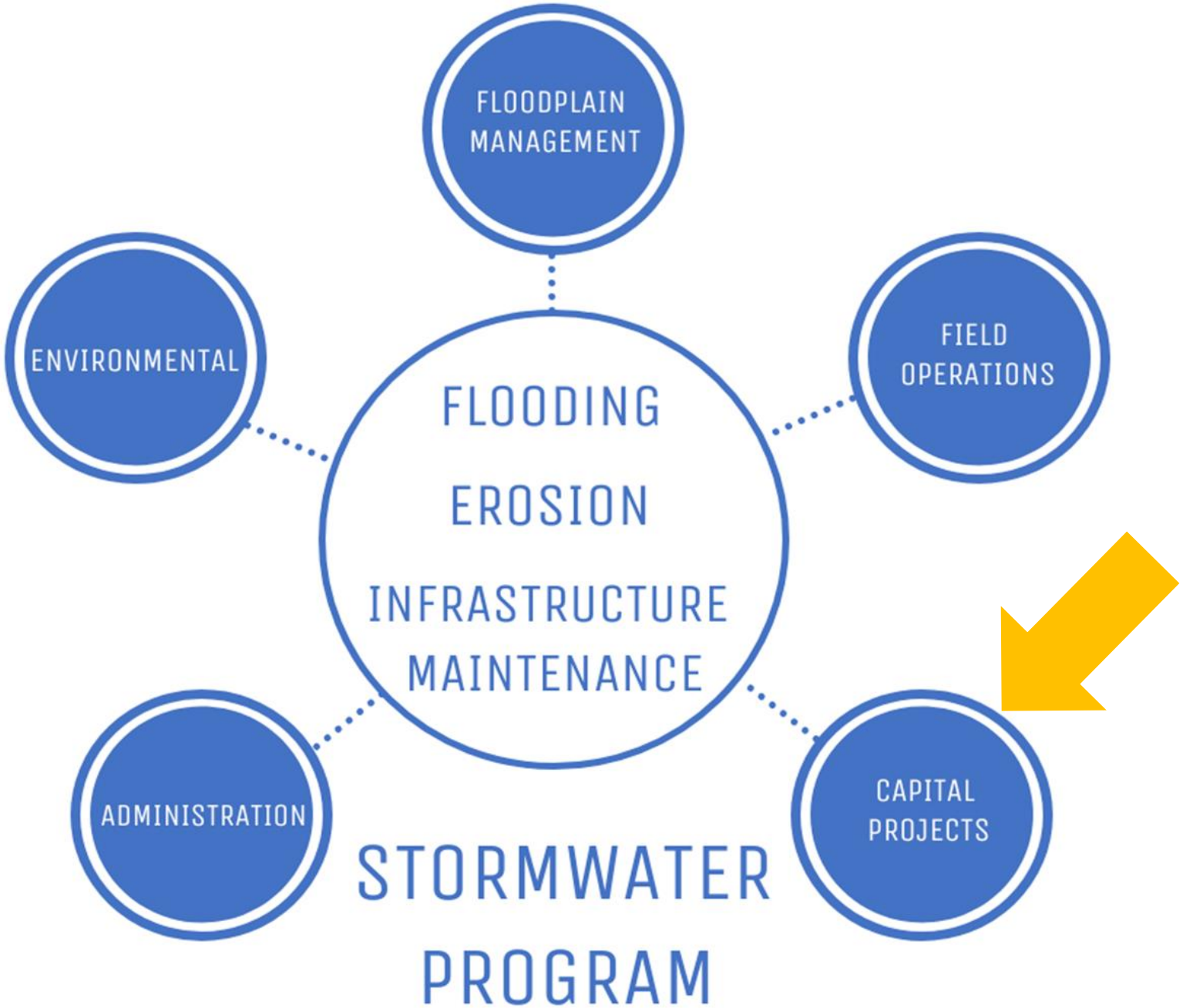
successfully participates in the

National Flood Insurance Program
Community Rating System

The community has undertaken a series of meaningful activities to protect its citizens from losses caused by flooding and has significantly exceeded the requirements for NFIP participation and effective floodplain management.

May 1, 2018

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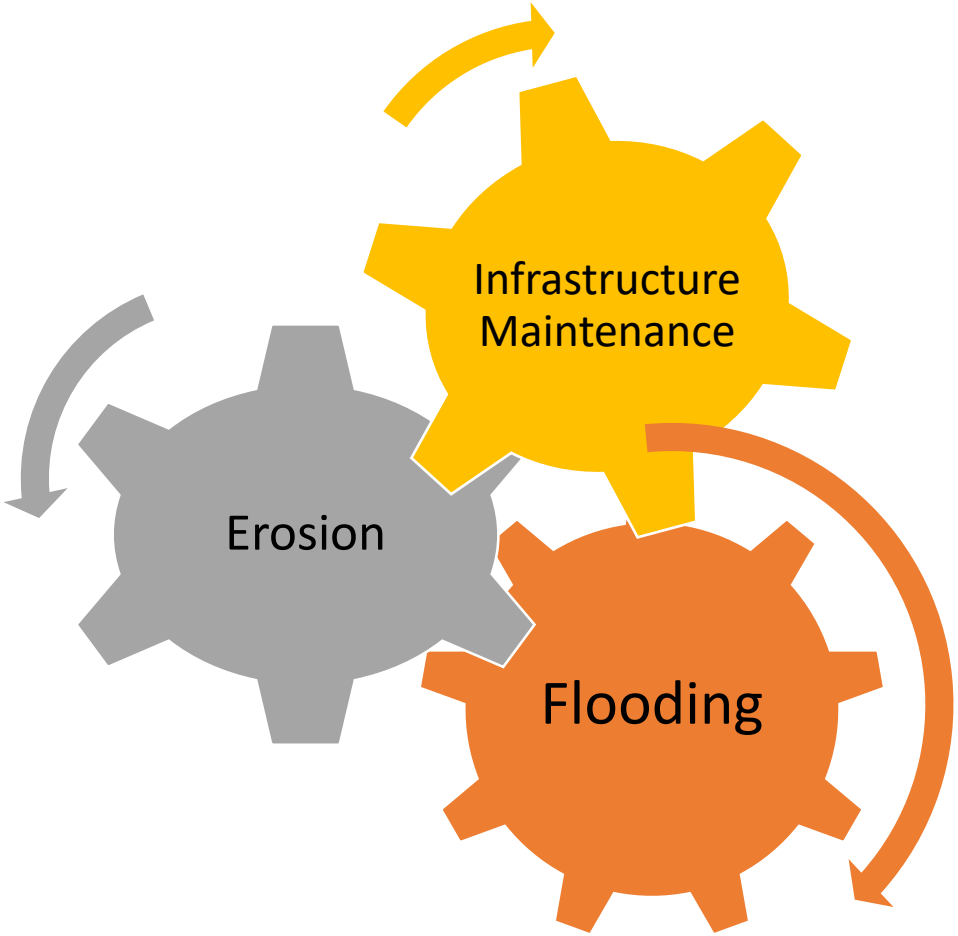
CAPITAL PROJECTS
STORMWATER PROGRAM

12734
12861
12941
13035
13139
13187
13268
13401
530
540
550
PROPOSED
12 bldgs. potentially removed from the 100-yr floodplain.
Install 10'x6' rectangular channel.
Modular block walls
Natural bottom
EXISTING
100-yr Q = 157 cfs
100-yr velocity = 5 to 8 fps
PROPOSED
100-yr Q = 245 cfs
100-yr velocity = 7 to 11 fps
Construct earthen berm
EXISTING
100-yr lateral overflow = 80 cfs
PROPOSED
100-yr lateral overflow = 0 cfs
Wayland Dr
McCartney Ct
Scarlett Ct
Cleburn Dr
EX 72" RCP DIVERSION
107
220
343
552
625
755
859
885
903
971
1003
1023
1143
1161
719

Capital Improvement Projects

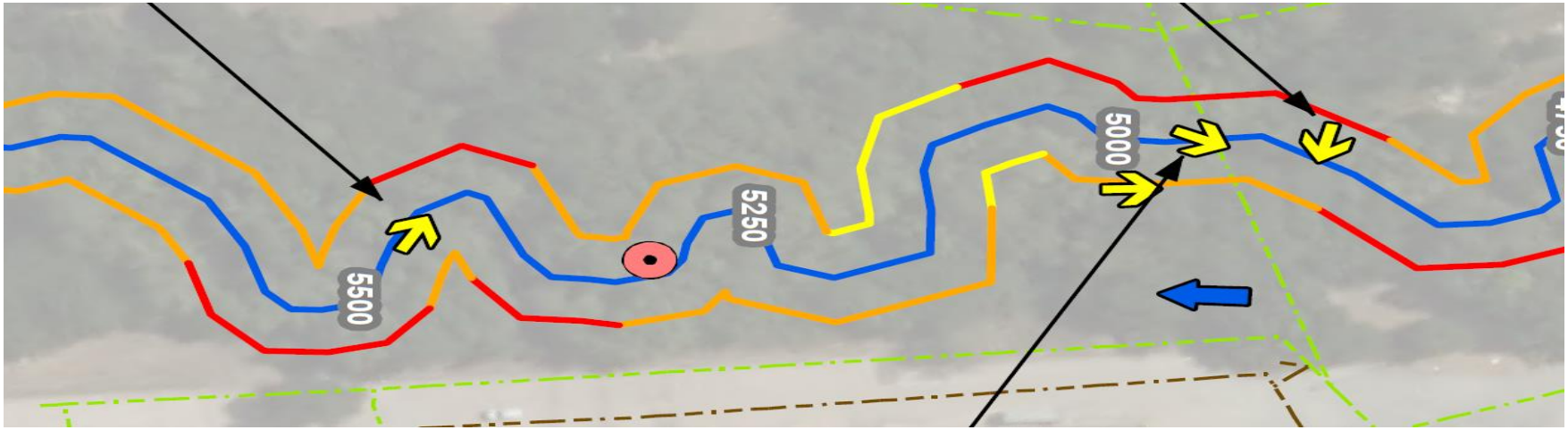
Data Driven Prioritization



Data Driven Prioritization

- Flooding Risk
  - Frequency of flooding
  - Number of impacted structures
  - Critical structures

Data Driven Prioritization



Erosion Risk

- Green - Stable
- Yellow – Moderately Unstable
- Orange – Highly Unstable
- Red – Severely Unstable
- Purple – Emergency Repair

8.6% of streams considered highly or severely unstable or require emergency repair

Data Driven Prioritization

- Utilize condition assessments
- Failure may cause flooding and erosion

Data Driven Prioritization

Additional Weighting Considerations

- Regulatory or risk of noncompliance
- Critical Infrastructure
- Cost Efficiency (RWD coordination)
- Roadway Flooding
- Citizen Support

Flood Mitigation

Erosion Mitigation

Flood Mitigation

2018/2019 COMPLETED PROJECTS

Quarters are based on calendar year.

	2017				2018				2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2015 Misc. Drainage (Landover Hills/Ticino Valley/Del Rio)					■	■	■	■				
2017 Misc. Stormwater Maintenance Project, Phase A (Running Brook Apt)									■	■	■	
2017 Bridge Maintenance (Hardisty Bridge Repair)							■	■	■			
2017 Misc. Erosion Improvements(Airport, Debbie/Collins & Macgregor/Collins)								■	■	■		
Greencove Drainage Improvements						■	■	■	■	■	■	
JC-9/Sanford Erosion Repair							■	■	■			
Laguna Vista Drainage Improvements	■	■	■	■	■							
Major Channel Rebuild (Park Row Location)				■	■	■	■	■				
Mayfield Road Drainage Improvements		■	■	■	■							
Meadow Park Estates Drainage Improvements		■	■	■	■	■	■					
North Fork Cottonwood Creek Channel Repair, Phase 1(Park Row - Carter)		■	■	■	■	■						
Rush Creek at Bowen/Green Oaks Erosion Improvements		■	■	■	■							
Wimbledon Drainage Improvements						■	■	■				

CURRENTLY UNDER CONSTRUCTION

Quarters are based on calendar year.

	2018				2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2015 Bridge Repair (Center Street)			■	■	■	■	■	■	■			
2017 Bridge Maintenance (Dugan, Beady & Ballpark Way Bridge Repairs)							■	■				
2017 Misc. Stormwater Maintenance Projects (Green Hill Channel)							■	■				
Country Club Road Local Drainage & Channel Improvements & Park Row Bridge Repair							■	■	■	■	■	
Randol Mill Park Pond Dredging							■	■	■			
Sublett Creek Neighborhood Drainage (Hollow Creek, Doty, Redstone & Surfolk)				■	■	■	■	■				
Upper Johnson Creek Pond Dredging (Gateway Park & Lakes of Matlock Ponds)			■	■	■	■	■	■				

PROPOSED 2019/2020 CONSTRUCTION

Quarters are based on calendar year.

Design Phase
Right-of-way Phase
Construction Phase (includes franchised utility relocation)

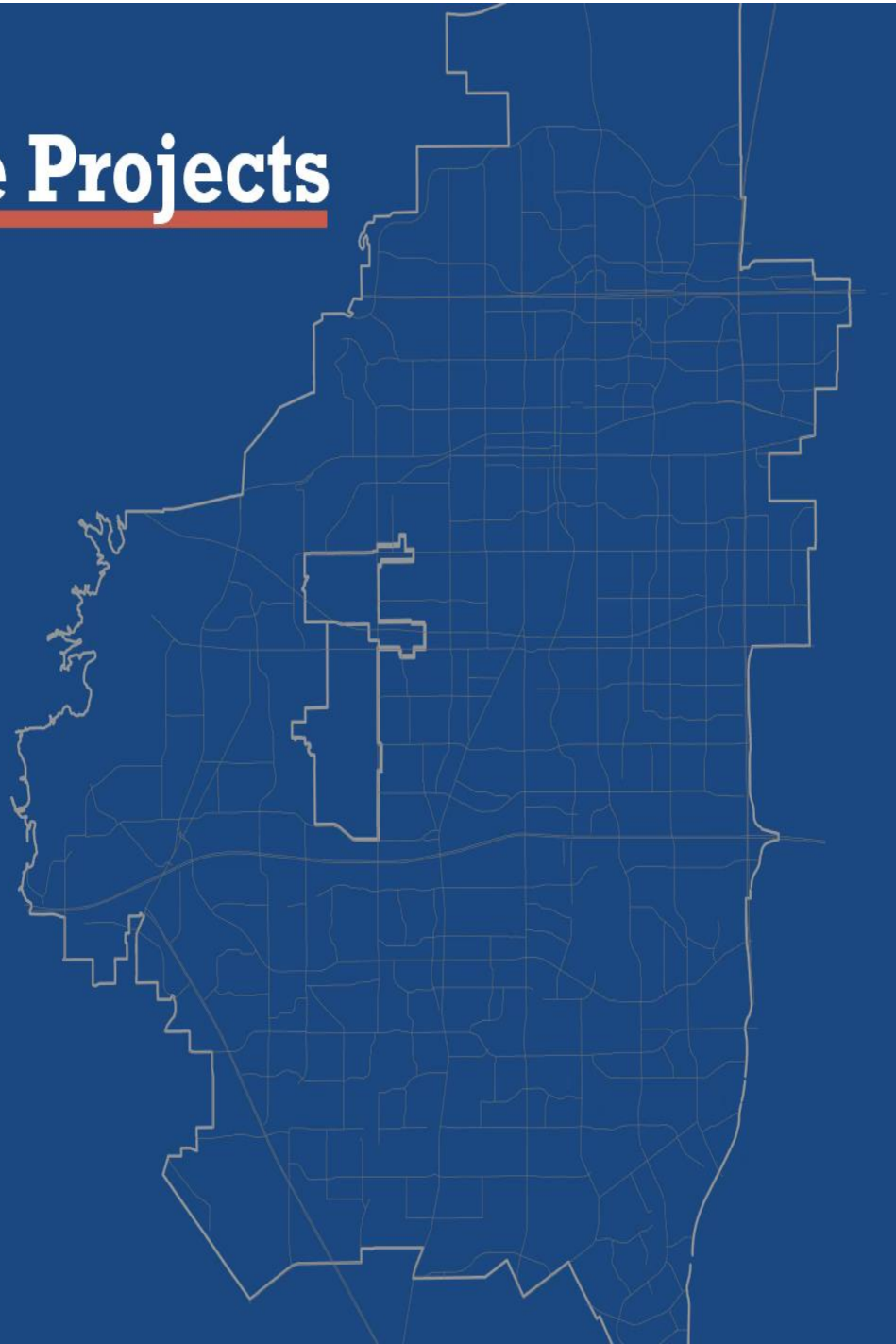
	2019				2020				2021			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2017 Misc. Stormwater Maintenance Projects (Green Hill Channel)												
2017 Misc. Drainage Improvements (Maywood Drive & Ivycrest Trail)												
2017 Misc. Erosion Improvements (Derby Hill, Trail Lake & Green Acres)												
2019 Drainage Ditch Improvements (10 locations)												
2019 Misc. Maintenance (Collins, Brittany, Powder Horn, Perryland, Thames & Silkcrest												
2019 Infrastructure Erosion Repair (Whistler, Willow Bend & Twin Elms)												
Bonneville / Greenbrook Drainage												
California Lane Drainage												
Harvest Hills Channel Rebuild, Phase I												
Kee Branch Tributary 1 Erosion Improvements (Green Oaks - Oak Springs)												
Kee Branch Tributary 4 Erosion Improvements (Andalusia - Deaver Park)												
Lower Johnson Creek Dredging												
Matthews Court Drainage Improvements, Phase1 & 2												
Rush Creek at Indian Trail Erosion Improvements												
Washington Drive Erosion Improvements												

CAPITAL PROGRAM PROGRESS– October 2019

Since 2009

Project Type	Structures Protected	Cost (spent or encumbered)	Percentage of Program
Flood Mitigation (Complete or Under Construction)	389	$73,274,396	70%
Flood Mitigation (Currently in Design)	141	$1,860,871	2%
Streambank Stabilization/Erosion Mitigation	1	$11,930,521	11%
Maintenance (includes participation projects)	28	$9,446,240	9%
Miscellaneous (Street Sweeping, Stream Gauges, etc.)	N/A	$2,121,345	2%
Watershed Studies	N/A	$6,720,647	6%
Total	**559**	**$105,354,020**	100%

Drainage Projects



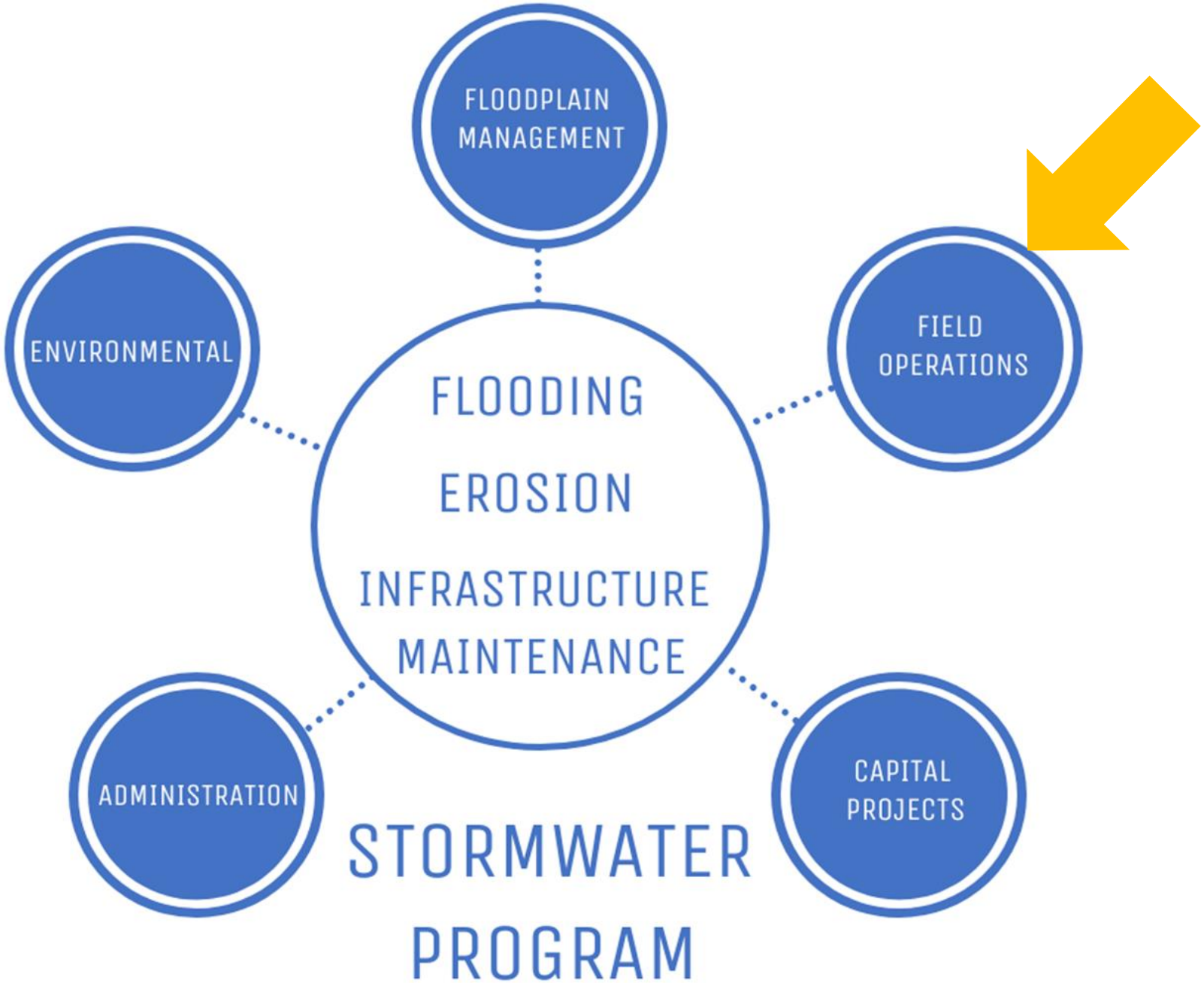
Erosion Pilot Program

Erosion Pilot Projects

- $9M Authorized
- 3 projects initially selected
  - Washington Drive
  - Kee Branch Trib 1
  - Kee Branch Trib 4
- Washington Drive and Kee Branch Trib 4 are beneficial and moving forward to construction
- Kee Branch Trib 1 will be scaled back

Erosion Pilot Program Project Considerations

- Funding for public purpose, reach by reach basis
- Streams continue to erode during design
- Where do improvements stop?
- Not one size fits all
- Corps permit limits options
- No increase in downstream water surface elevation
- Neighborhood buy-In challenging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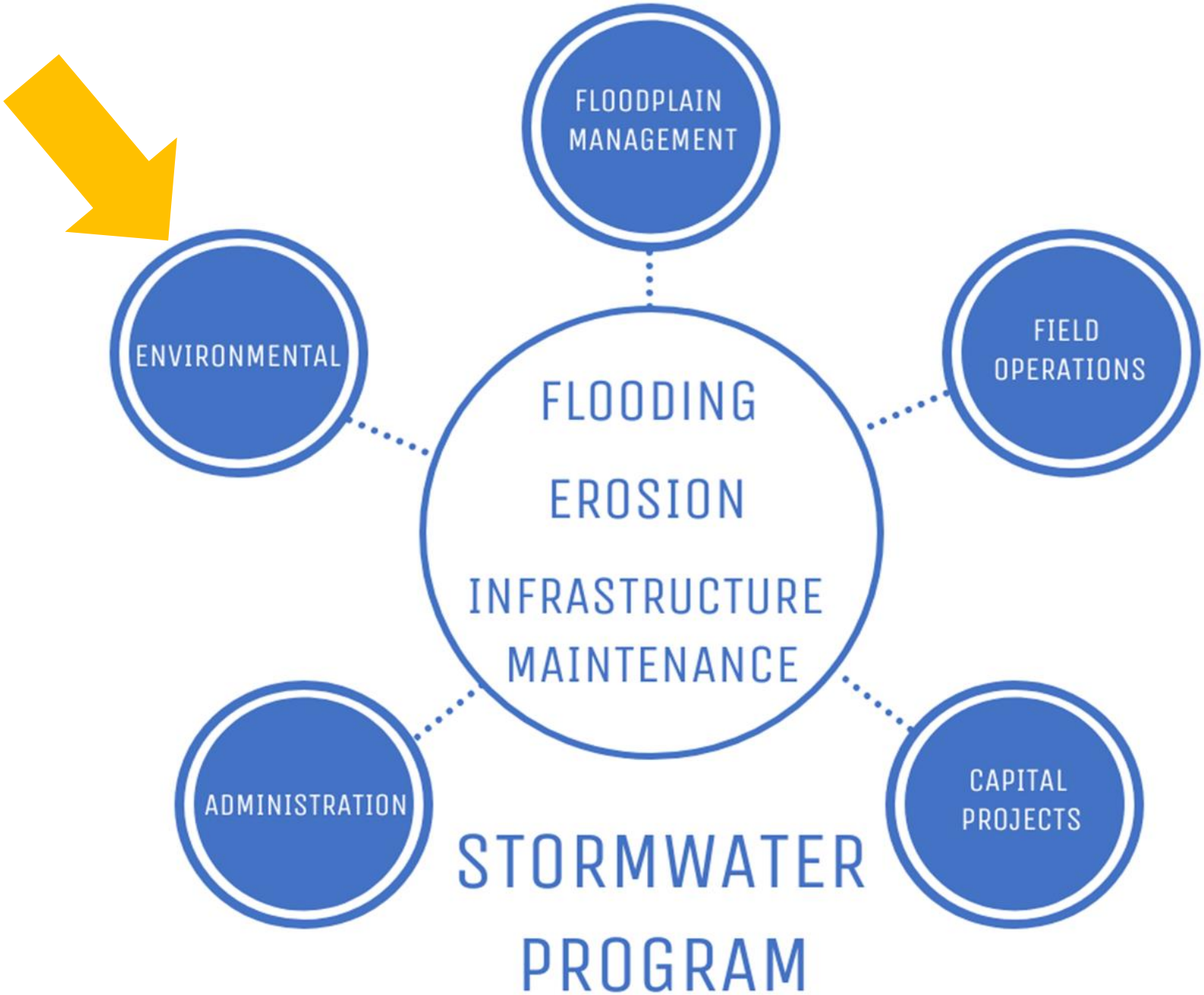
STORMWATER PROGRAM

Field Operations

- Respond to citizen concerns
- Perform scheduled maintenance activities.
- Remove blockage from streams and channels
- Construct small drainage mitigation projects
- Perform annual inspections of drainage infrastructure

Emergency Operations

- Remove Debris from culverts and bridges
- Barricade flooded roadways
- Respond to storm damage
- Fill and distribute sandbags
- North Texas Emergency Response Team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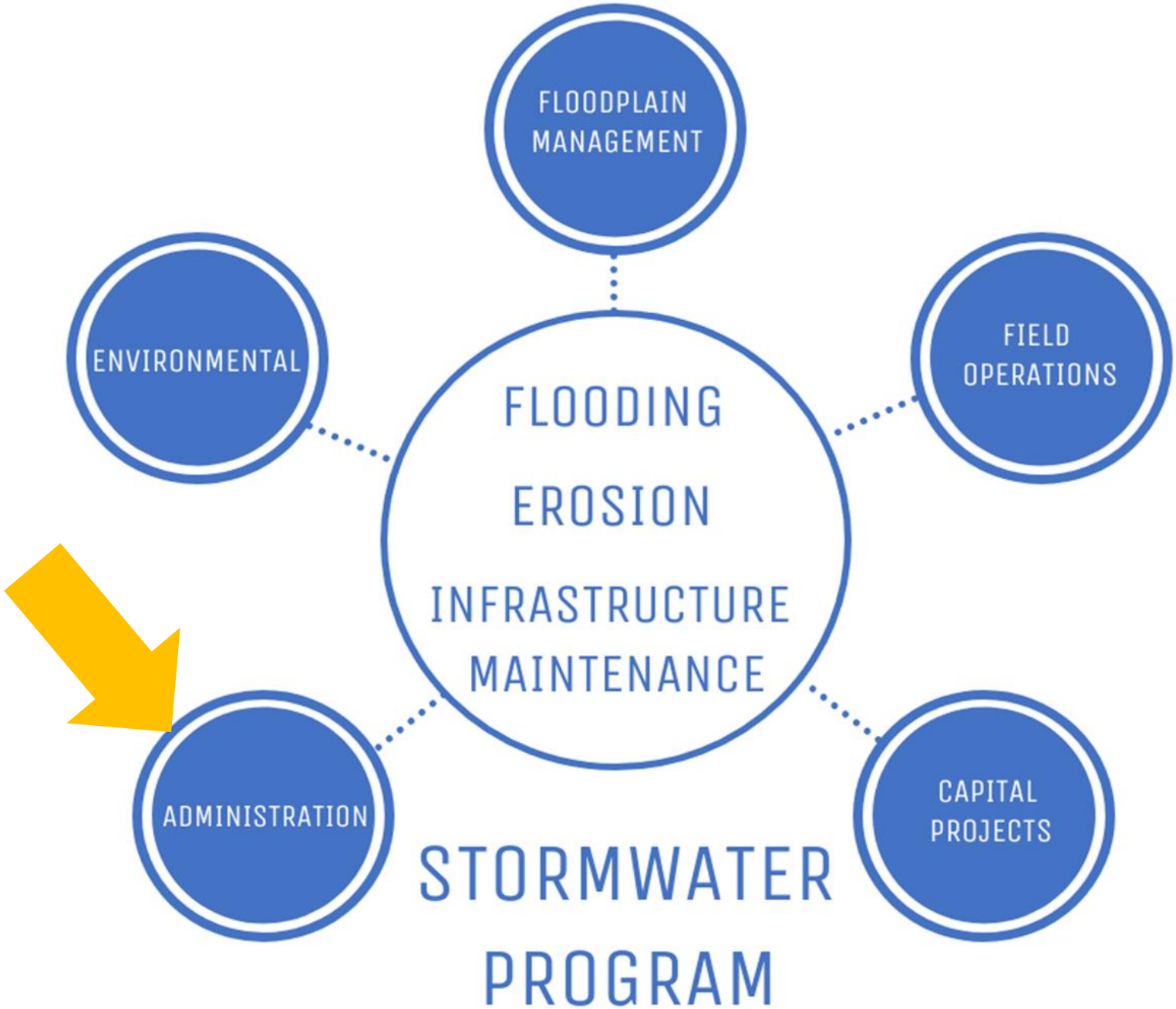
Environmental Compliance Assurance

Environmental Initiatives

- Construction Inspections
- Automotive Related Business Inspections
- Good Housekeeping Program
- New Post Construction Inspections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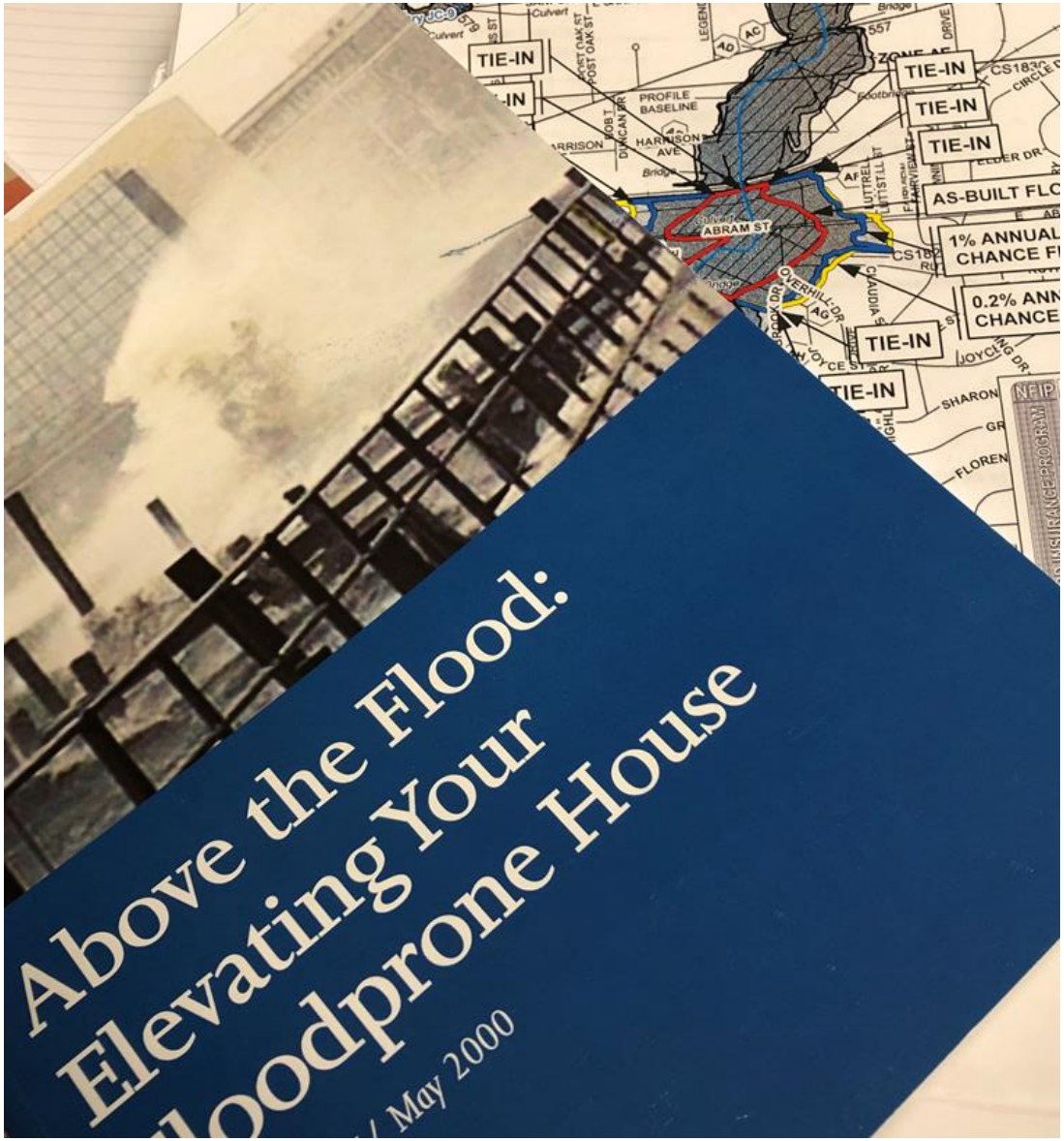
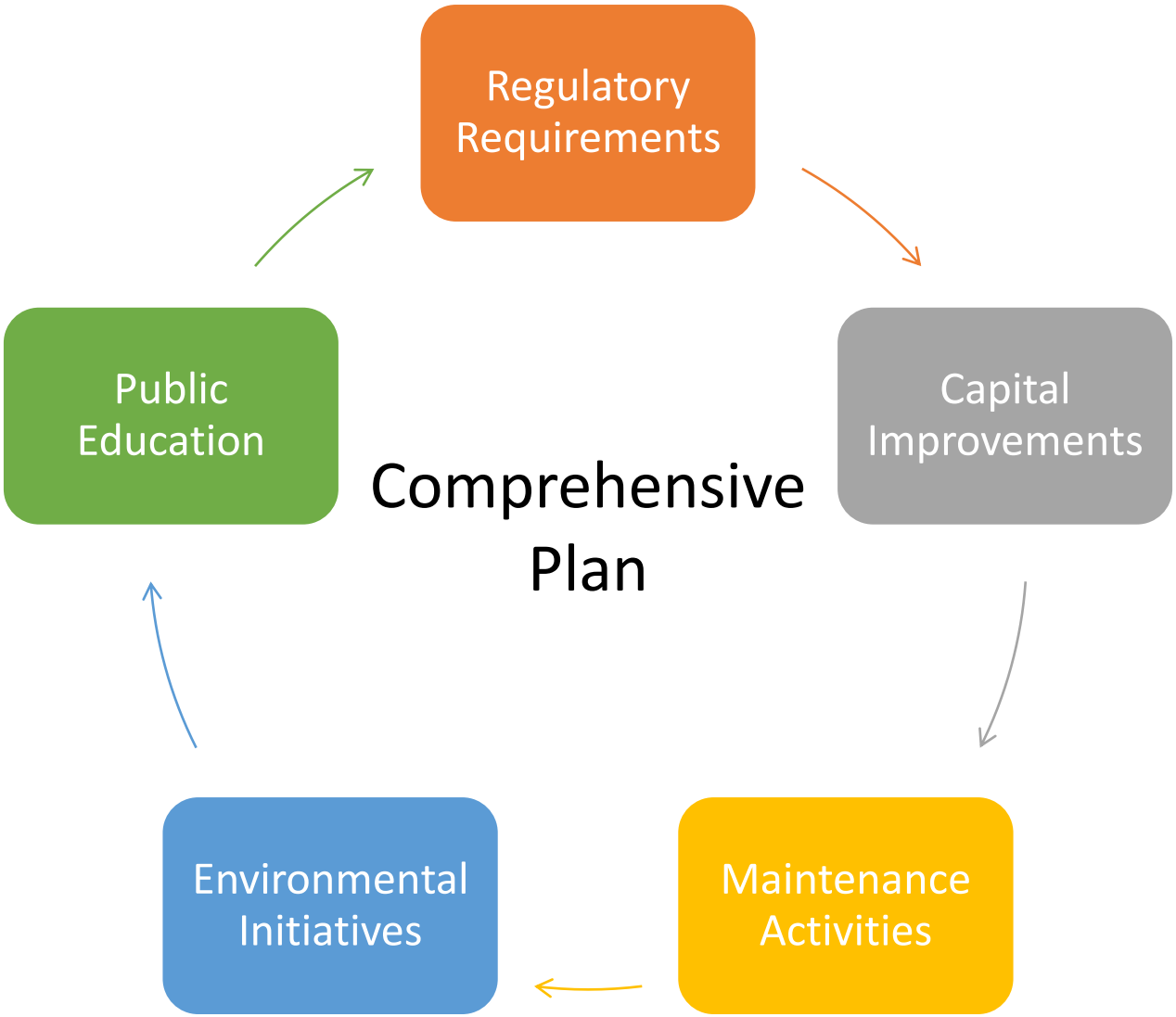
SWUF Administration

- SWUF billing and revenue projections
- Performs Impervious Area Audit
- Interprets floodplain maps for citizens
- Explains need of flood insurance
- Intake and routing of customer drainage and flooding concerns



Shaping the Future



Comprehensive Stormwater Plan Timeline

Technical Assessments

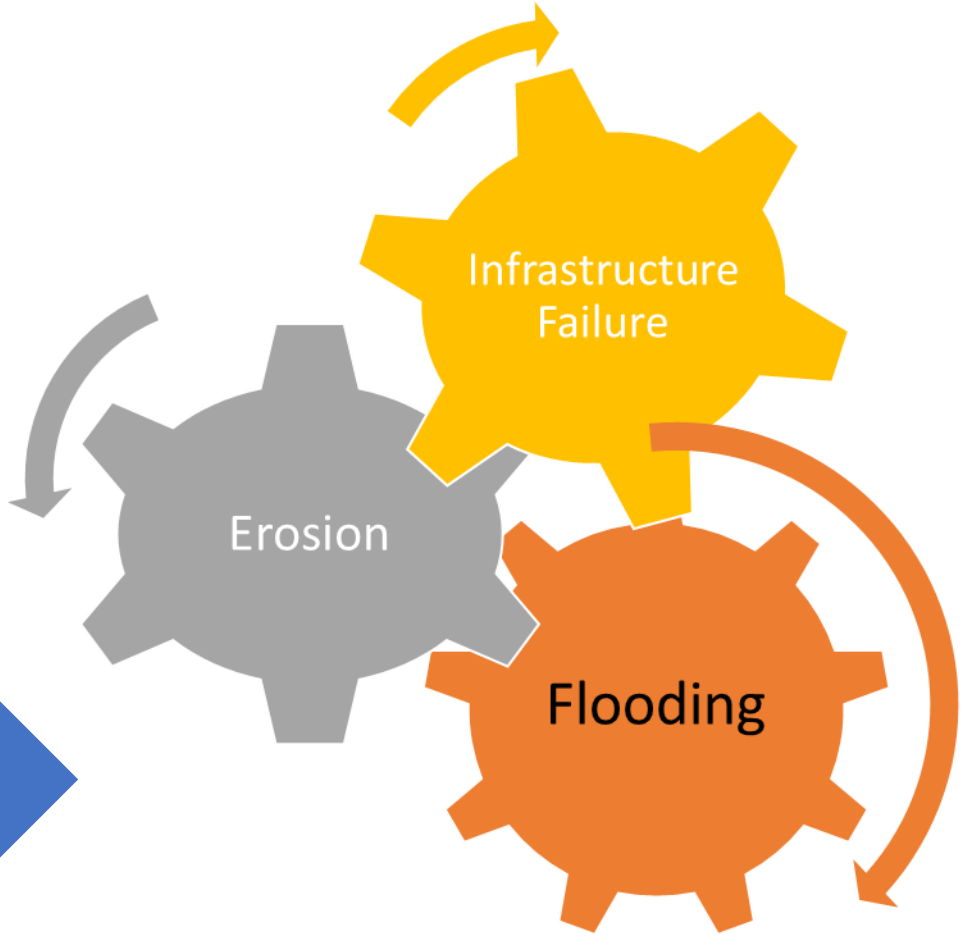
2019

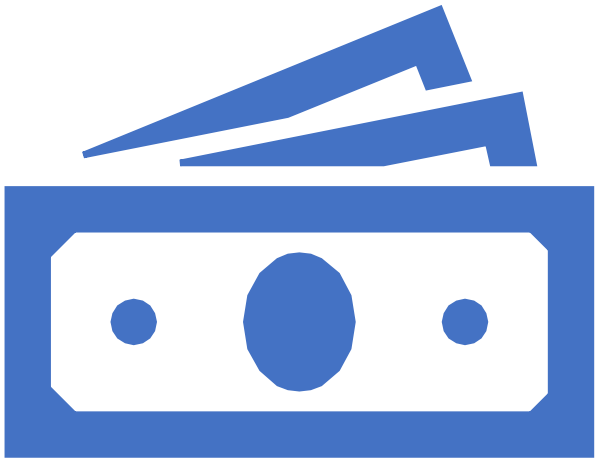
Prioritize Projects and Activities

2020

Comprehensive Plan

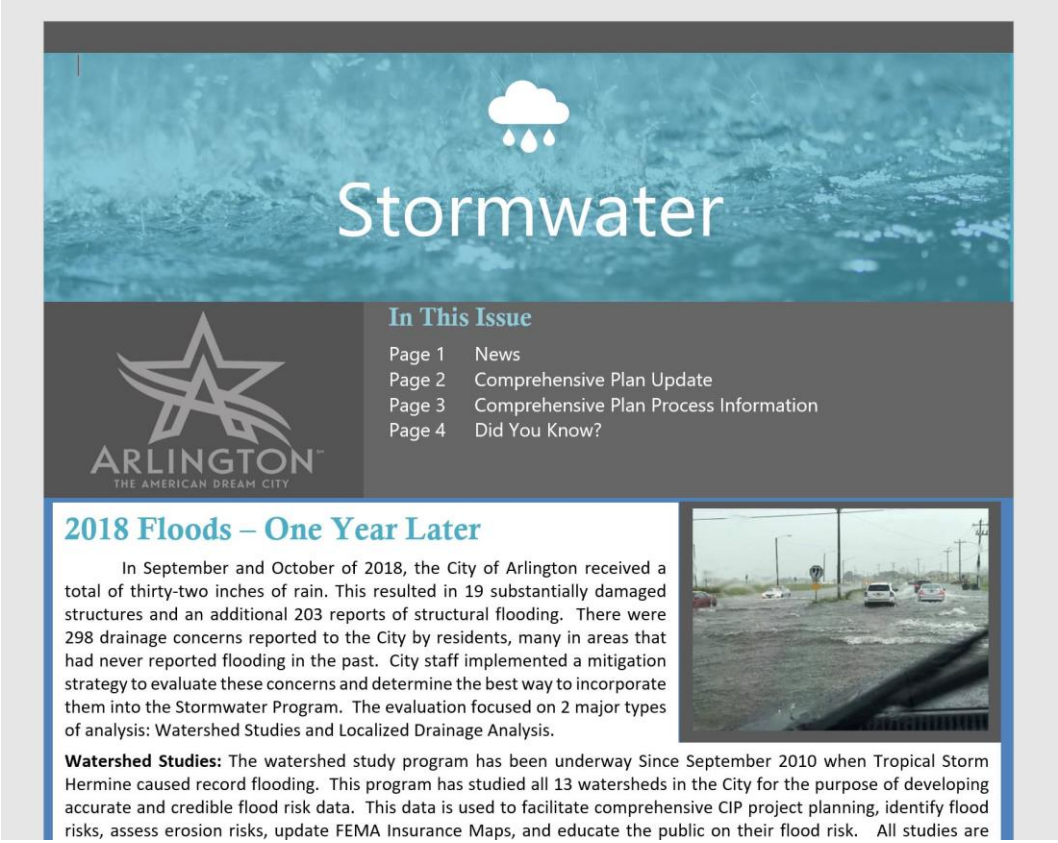
2021





Investment

- Current project funding from the Stormwater Utility Fee assessed on developed impervious area.
- Maximum fee in 2021 of $7.50/ERU will provide approximately $10M annually for project implementation.
- Continue to use all resources to fund significant infrastructure gap.
- Comprehensive plan positions us to acquire federal funding



Stormwater

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THE AMERICAN DREAM CITY

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2018 Floods – One Year Later

In September and October of 2018, the City of Arlington received a total of thirty-two inches of rain. This resulted in 19 substantially damaged structures and an additional 203 reports of structural flooding. There were 298 drainage concerns reported to the City by residents, many in areas that had never reported flooding in the past. City staff implemented a mitigation strategy to evaluate these concerns and determine the best way to incorporate them into the Stormwater Program. The evaluation focused on 2 major types of analysis: Watershed Studies and Localized Drainage Analysis.

Watershed Studies: The watershed study program has been underway Since September 2010 when Tropical Storm Hermine caused record flooding. This program has studied all 13 watersheds in the City for the purpose of developing accurate and credible flood risk data. This data is used to facilitate comprehensive CIP project planning, identify flood risks, assess erosion risks, update FEMA Insurance Maps, and educate the public on their flood risk. All studies are

Stormwater Newsletter

Questions and Discussion

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