ENGINEERING DEPARTMENT

Presentation Overview:

- September 15th rain event
- Recent rain events
- Why does Harlingen flood?
- Updates to ordinance
- On-going drainage projects
- Future drainage projects

September 15th rain event

- Over 6” in 2 hours
- National Weather Service issued a flash flood warning
- Classified as a 50-year storm
- It took 2 to 3 hours for water to recede
- City’s stormwater systems kept draining runoff during this time, no blockages were found
- Clean stormwater inlets and underground pipes played a crucial role to drain the water faster

Picture of Washington Ave and 3rd St intersection, facing South. Taken approximately at 6PM

Same intersection, facing East. Picture taken approximately at 8PM

Previous rain events

June 24 to June 25, 2018

- **16-17” in 72 hours**
- **Floodwaters up to 4 feet on roadways**
- **Classified as a 100 to 500-year storm**

June 18 to June 21, 2019

- **12-15” in 3.5 hours**
- **Floodwaters up to 4 feet on roadways**
- **Historic rainfall, 500-year plus storm**

It should be noted:

- **The September 15th rain event was less intense than the previous 2018 and 2019 events**
- **A 500-year event represents an extreme rainfall that exceeds typical design criteria**
- **Existing street infrastructure and ROW limits make a 500-year design option extremely costly**
- **No stormwater underground system in the RGV can handle the rain intensity of a 500-year event**

Why does Harlingen Flood?

UNDERSIZED DRAINAGE SYSTEMS

- Many underground stormwater pipes throughout the city are very small (12”, 15”, 18” pipes)

RAPID URBANIZATION

- Large impervious areas with little pervious areas and no mitigation measures
- Developing a city with undersized drainage systems

BLOCKAGES IN DRAINAGE SYSTEMS

- Debris and sediment can obstruct water flow
- Maintenance to our drainage systems is crucial

TOPOGRAPHY

- The city’s topography does not lend itself for easy solutions
- On average, ground elevations throughout the city vary from the high 30’s to the low 40’s.

HEAVY RAINFALL

- Intense storms produce more rain than the ground and drainage systems can handle

CLIMATE CHANGE

- Altered weather patterns cause prolonged droughts followed by heavy rains
- According to the National Oceanic and Atmospheric Administration (NOAA), rain intensities are increasing and becoming more frequent

Updates to Ordinance

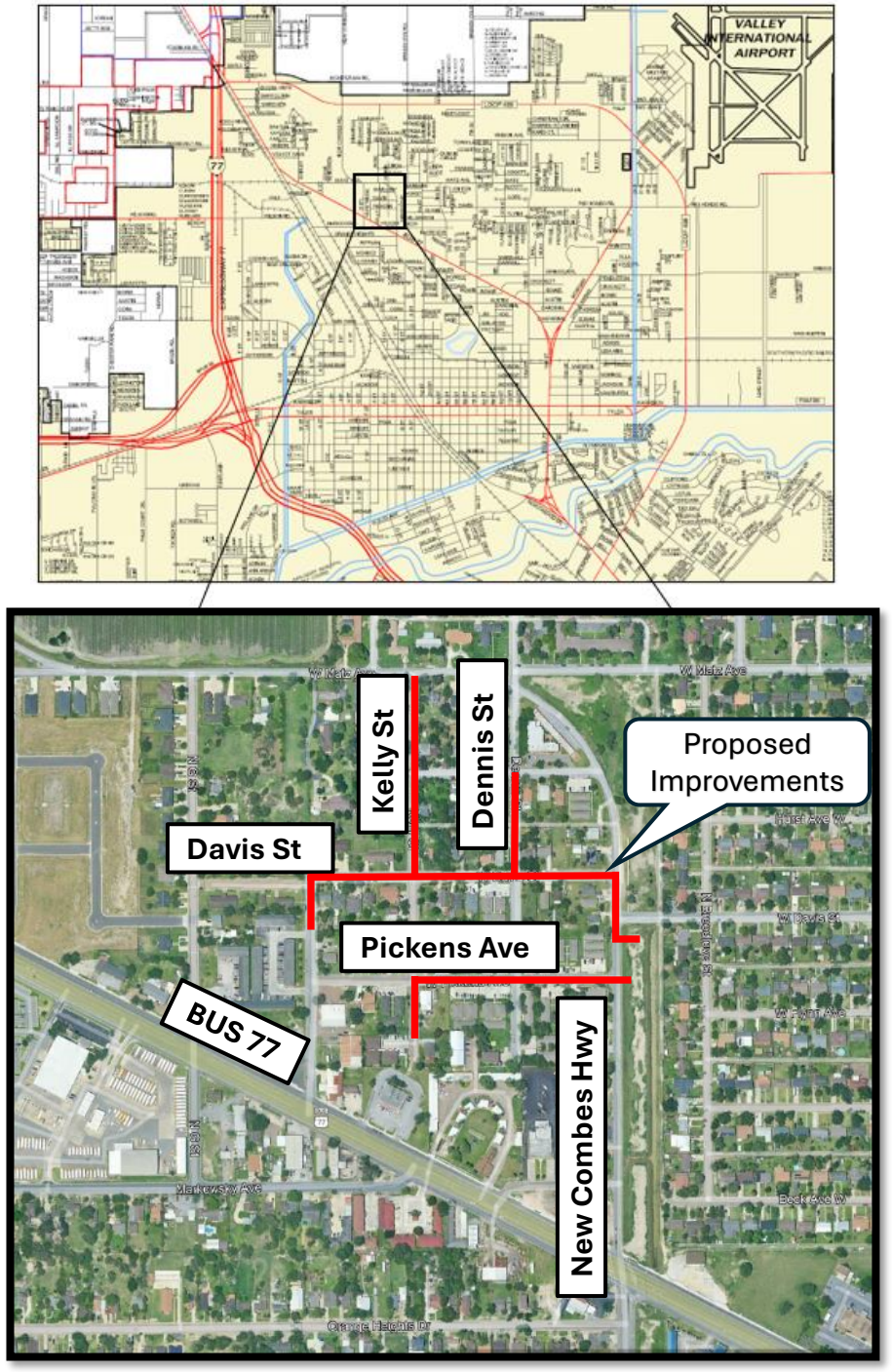
Adequate requirements for drainage infrastructure

- **Since October 2020, the city has required detention ponds or the widening of adjacent ditches for any new subdivision within city limits and its ETJ**
- **In 2008, the city's drainage criteria consisted of a 5-year design storm for evaluating and designing storm sewer systems**
- **Currently, the city requires 50-year detention for new subdivisions, 25-year storm sewer systems for residential and collector streets. This means bigger pipes for heavier storms**
- **Harlingen is the only city in the RGV that requires 25-year storm sewer systems, the rest require 10-year. This is a good thing!**
- **In 2023, the city updated its Flood Damage Prevention ordinance (Chapter 105).**
- **Key changes to Chapter 105:**
  - **Use of FEMA's Base Level Engineering website (a more accurate tool to determine flood depths).**
    Website: FEMA's Estimated Base Flood Elevation (BFE) Viewer (usgs.gov)
  - **Freeboard requirements (in flood prone areas, finished floor elevations for new structures must be 18" to 24" higher than the water surface elevation of a 100-year rain event.**

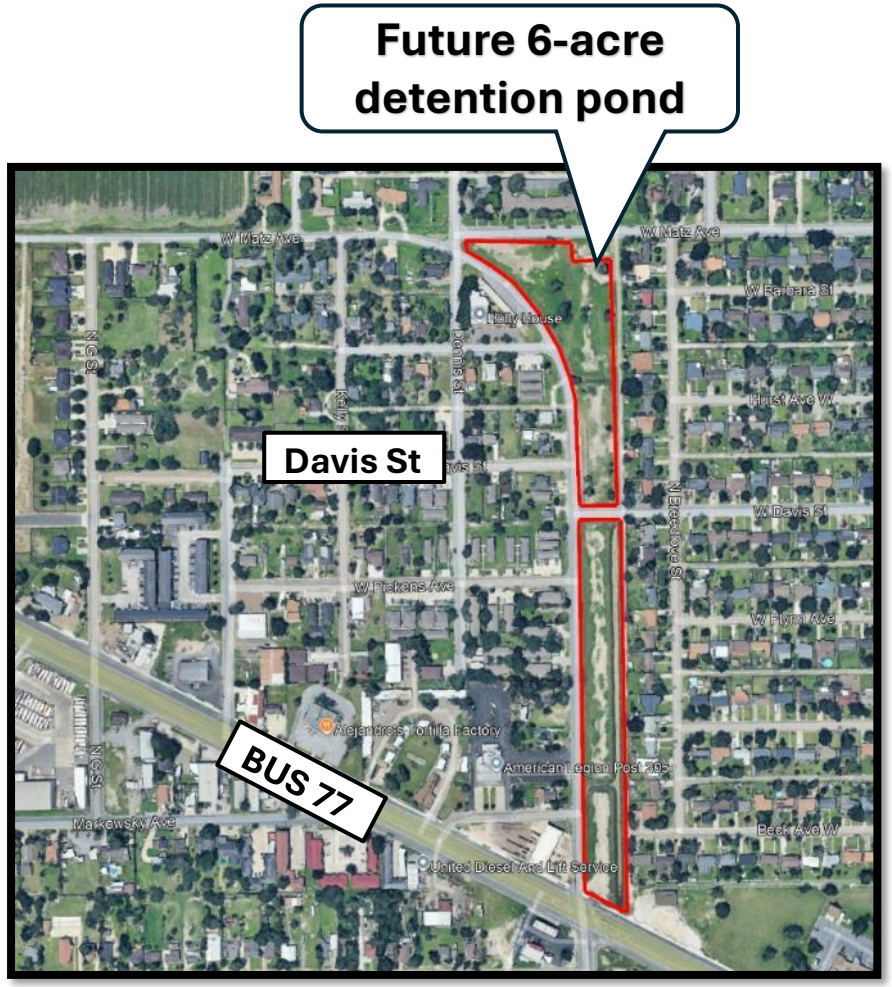
On-going Projects – District 1

Pickens and Davis Stormwater System Improvements (System 23)

- Upsize approximately 3,600 linear feet of stormwater pipes in subdivisions surrounded by Matz Avenue, New Combes Highway Rd, McFetridge St and BUS 77
- Project is in construction, 20% complete
- Estimated cost: $1.96 million
- Future: a 6-acre detention pond east of this system is in the planning stage



Picture of Davis St taken August 19, 2024, facing West. 4 feet by 3 feet storm box culvert visible, replaced a 24” stormwater line. Huge difference!

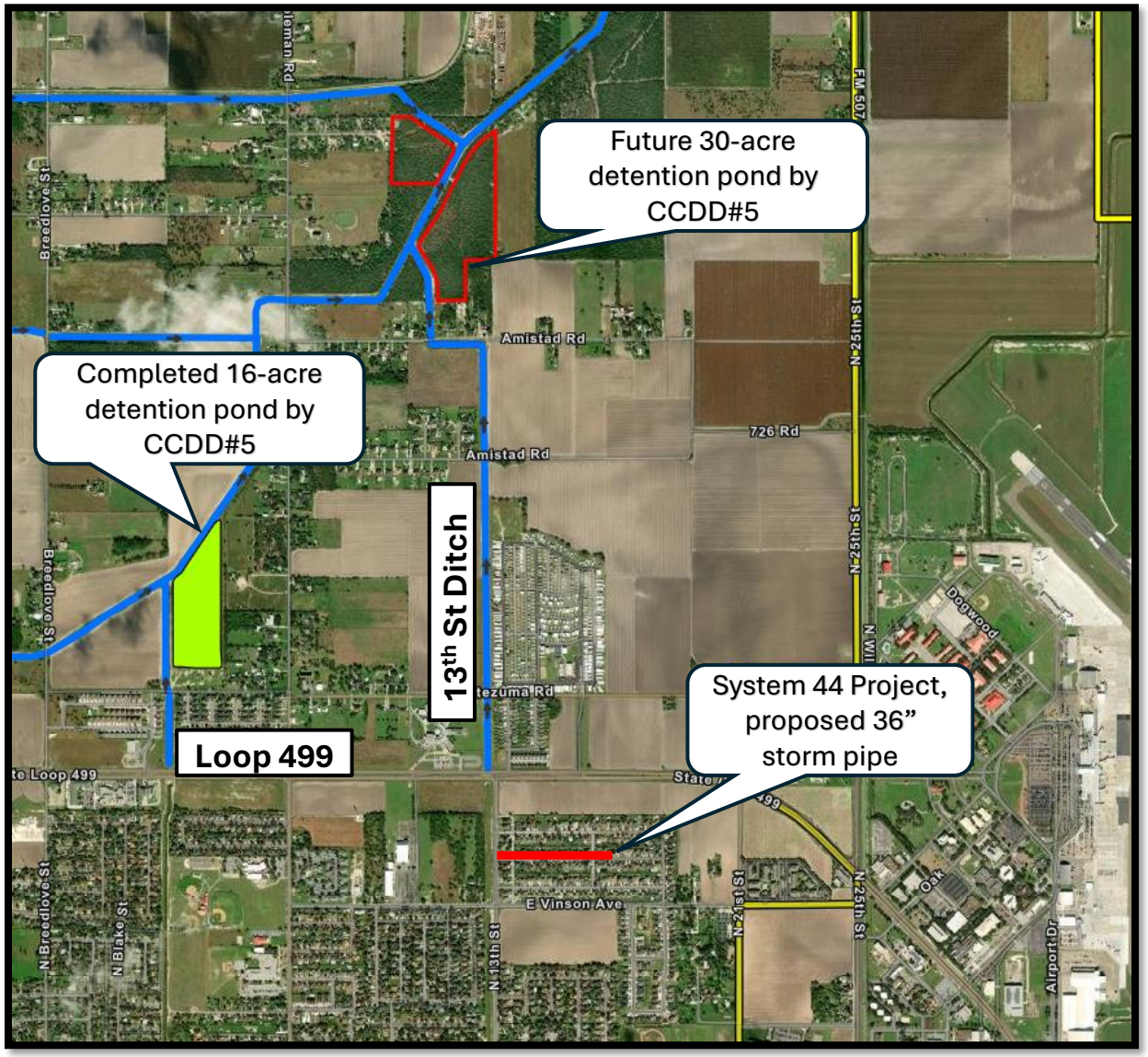


- **Staff recently submitted an application to the TWDB Flood Infrastructure Fund for design and construction**
- **TWDB is reviewing pre-applications and an invitation to submit full applications is expected this month**
- **If invited, staff will submit full application**

On-going Projects – District 1

Adam's Crossing Stormwater System Improvements (System 244)

- Design has been completed
- Adding 1,600 linear feet of 36" storm pipe and a second outfall to 13th Street ditch
- Estimated cost: $627K
- Expecting grant award letter from TDEM to start construction
- Future: a 30-acre detention pond north of this system is in the planning stage (CCDD#5)



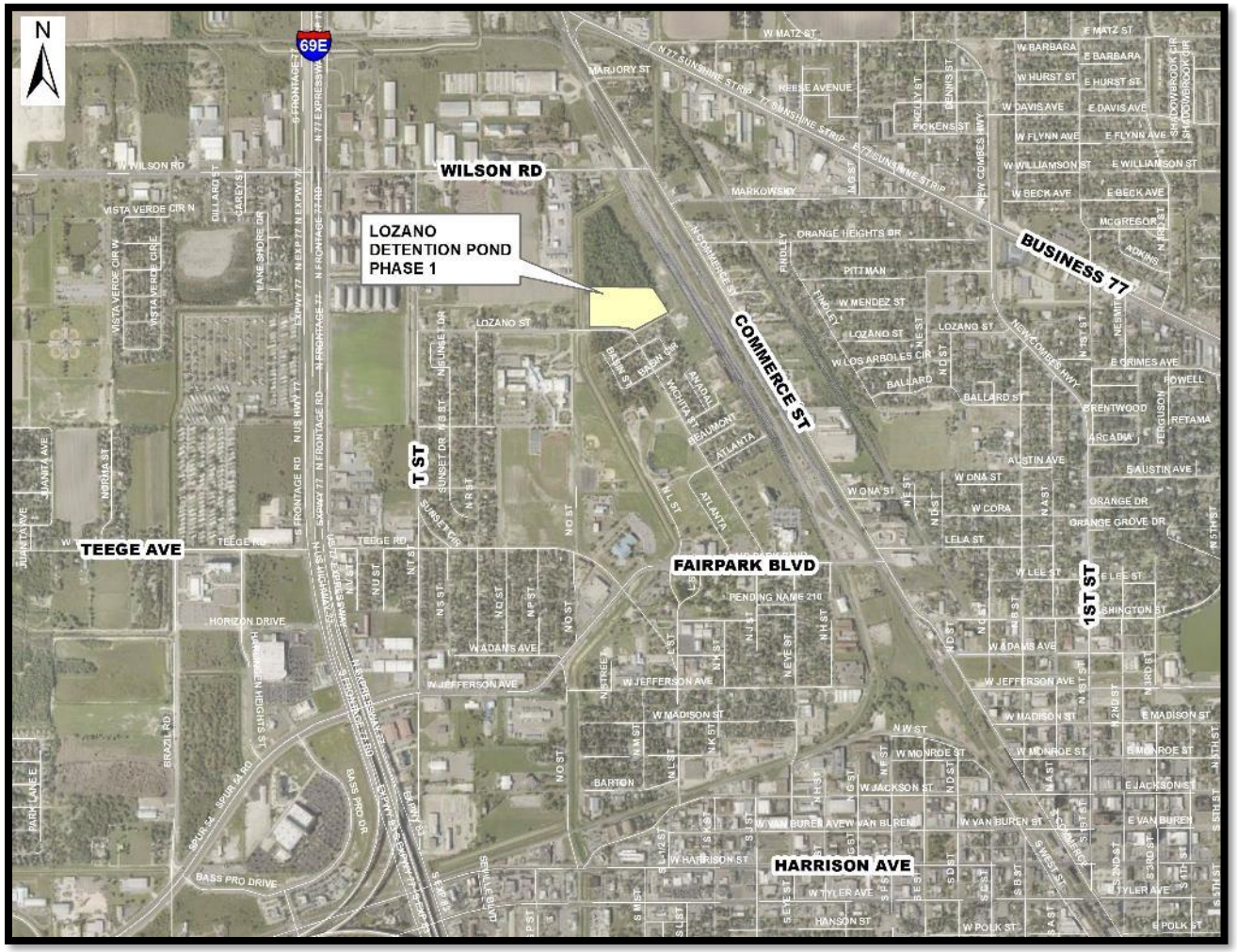
Public Works Improvements for System 244 – District 1

- Approximately 4,400 linear feet of the 13th Street ditch was regraded and widened

On-going Projects – District 2

Lozano Detention Pond

- Approximately 15 acres of detention
- Capable to detain more than 20 million gallons of water, almost the volume of 30 Olympic swimming pools
- Phase I is in construction by Public Works, 85% complete
- Public Works will continue with Phase II after completing Phase I
- Estimated cost for the complete 15 acres is $1 million (in-house)



Picture of Lozano Pond taken September 15th, around 6PM

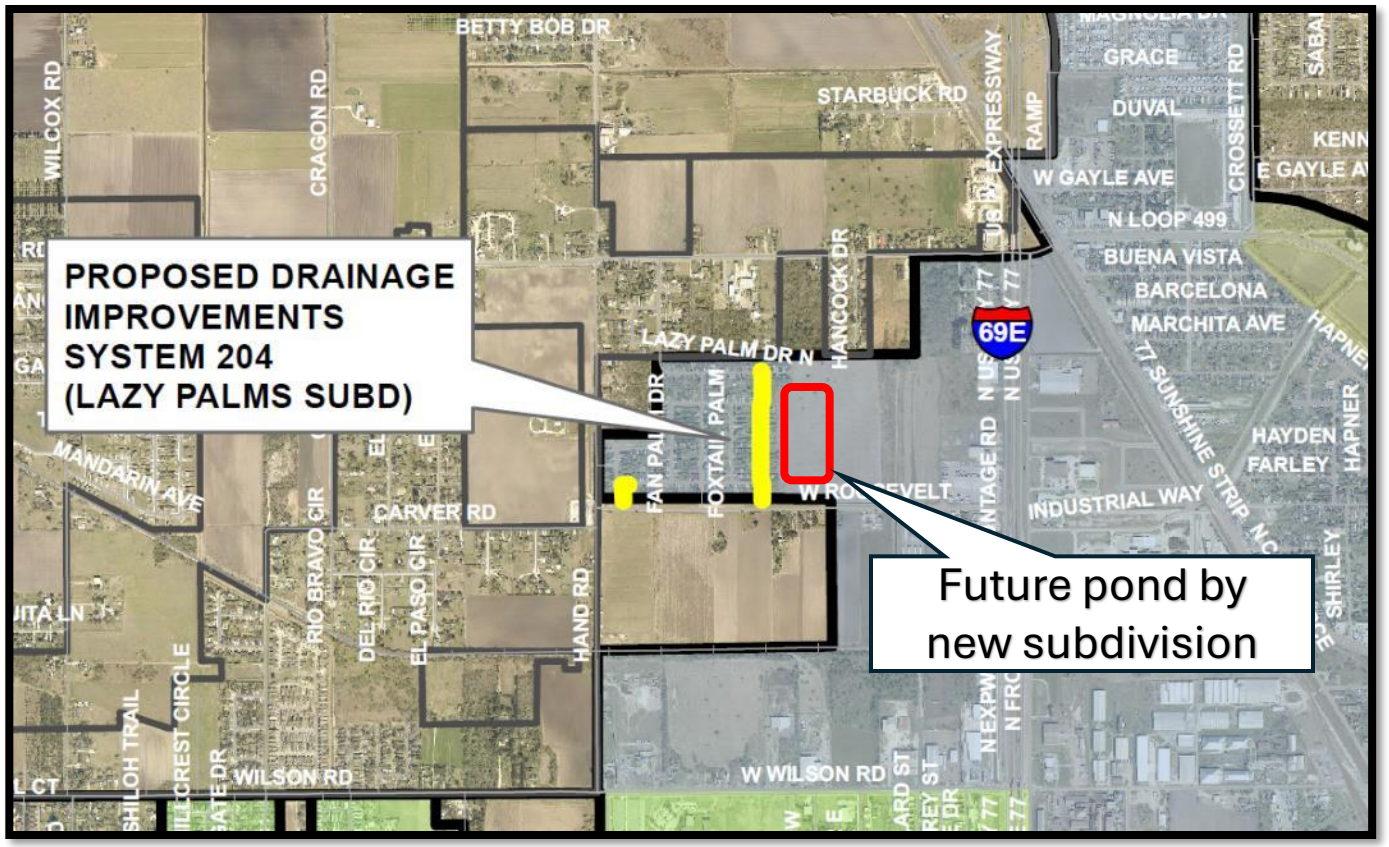
- **All this water is being stored at the pond, and not the streets**

Drone view of Lozano Pond taken September 16th, around 9AM

On-going Projects – District 2

Lazy Palm Subdivision (System 244)

- Replace and upsize approximately 500 linear feet of storm sewer pipe in the Lazy Palm Subdivision
- Construction is starting this month
- Estimated cost: $322K
- The Park at Roosevelt subdivision will build a detention pond as part of the development. Construction also starts this month. System 244 will also connect to this pond to reduce flooding



On-going Projects – District 2

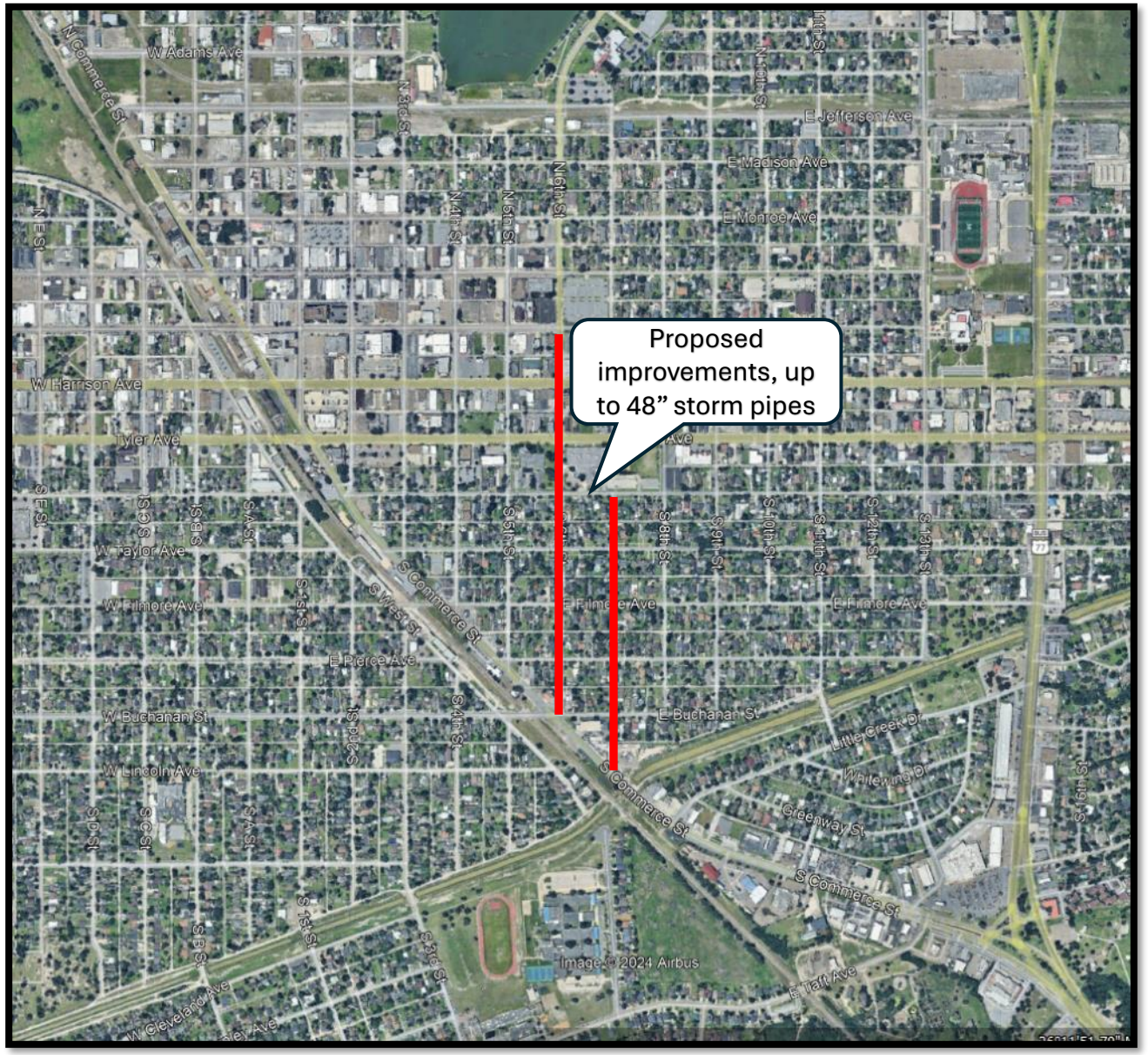
Jefferson Avenue Stormwater System Improvements (System 124)

- Major project that will reduce flooding from 3rd St to 13th St and from Madison to Van Buren
- Includes a 12 feet by 8 feet storm box culvert that will discharge into the Jefferson drainage ditch west
- Includes three 72” storm pipes to cross the railroad tracks at 7th St and Jefferson
- Design is at 95%, expecting to receive railroad permit for crossing by end of 2024
- TDEM Grant funded design and construction, 75/25

On-going Projects – District 2

5th and 7th Stormwater System Improvements (System 21)

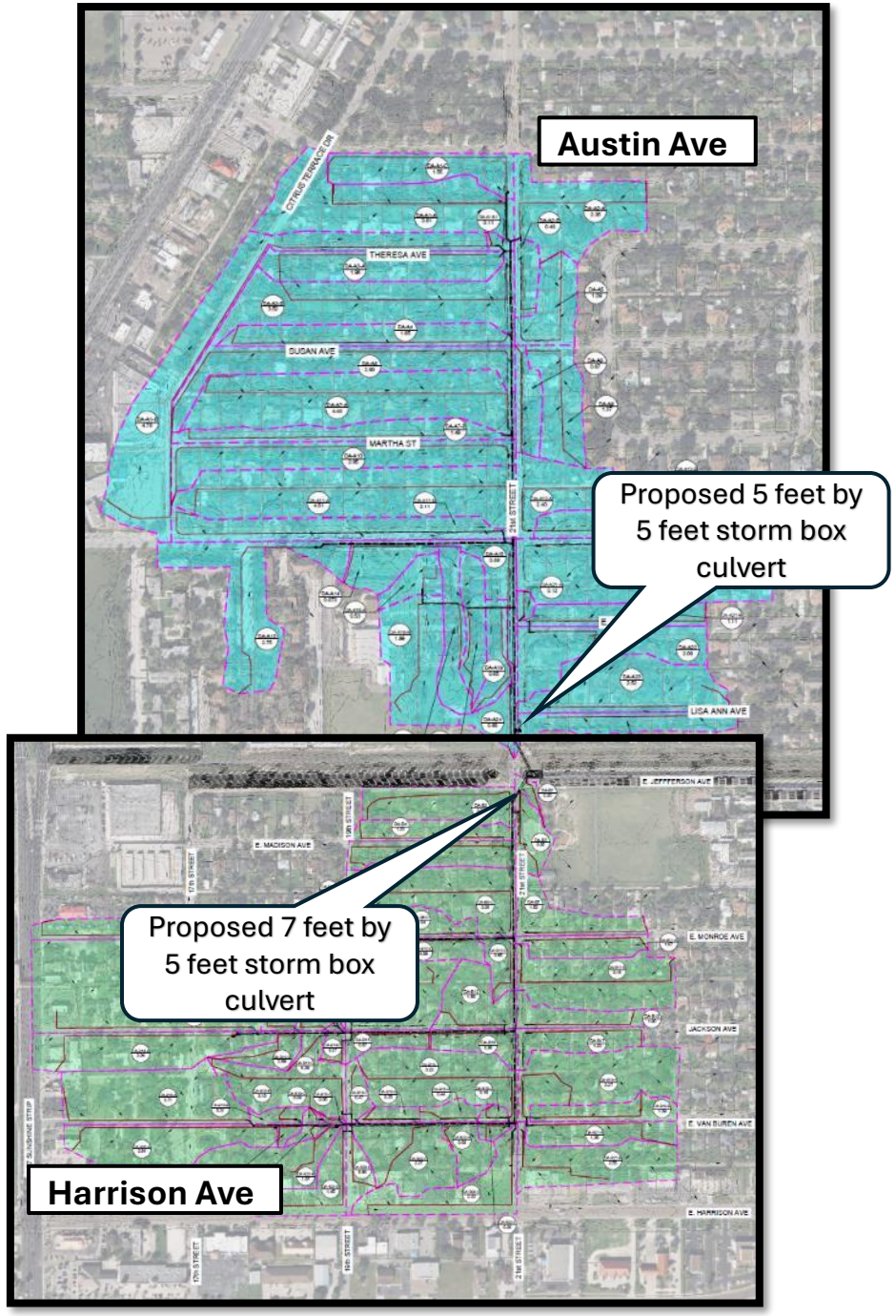
- Project to address flooding mainly on 5th and 7th streets from Commerce to Polk
- System 21 is a large drainage area, this project is the first phase of improvements
- Phase I is currently at 60% design
- Upsized pipes will connect to a future major project in Commerce Street, currently in design, at 20%
- Funded with Pre-Disaster Mitigation Grant earmarked by US Rep. Vicente Gonzalez



On-going Projects – District 3

21st Street Stormwater System Improvements (System 7)

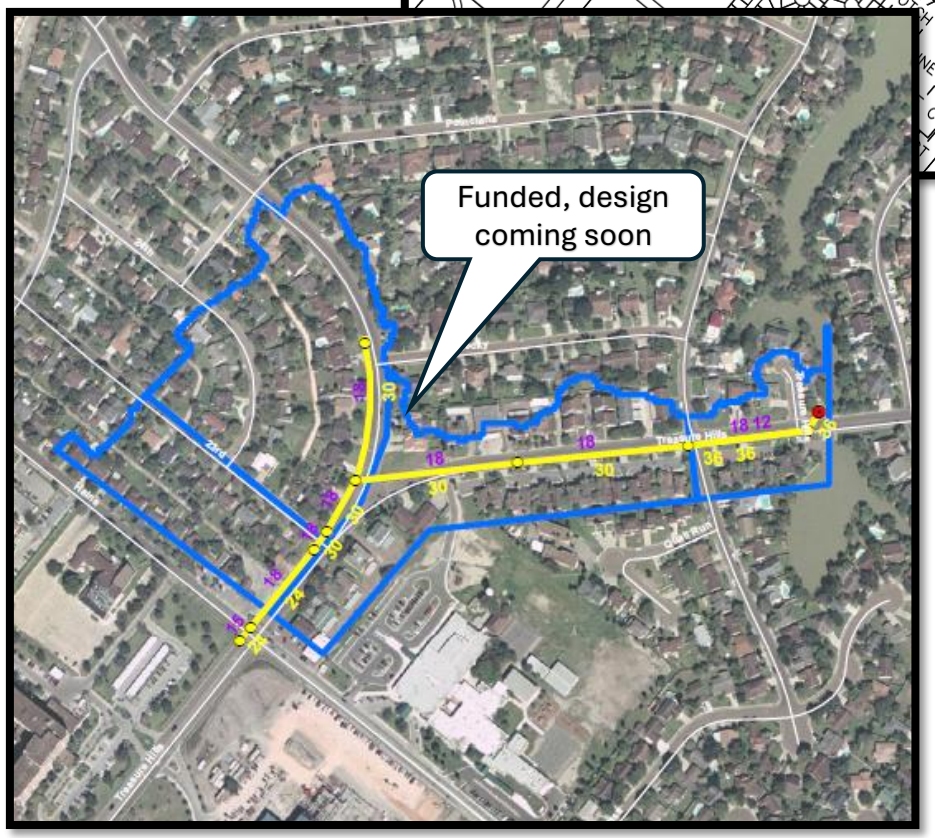
- Major project that will reduce flooding on 21st Street from Austin Avenue to Harrison Avenue
- Includes two large storm box culverts to discharge into the Jefferson drainage ditch
- Design has been completed, awaiting Phase II award from TDEM



On-going Projects – District 3

Jacaranda Stormwater System Improvements (System 122)

- Project will replace stormwater inlets at Jacaranda St from Treasure Hills to Willowicke Street
- Inlets will increase drainage capacity in the street and reduce floodwaters to other streets
- Construction started last week
- This project is a component of a larger project for Treasure Hills
- Future: Treasure Hills and 25th St Stormwater System Improvements project is funded with TDEM, 90/10 cost share
- Expecting award letter from TDEM
- Grant funds will be used for design and construction



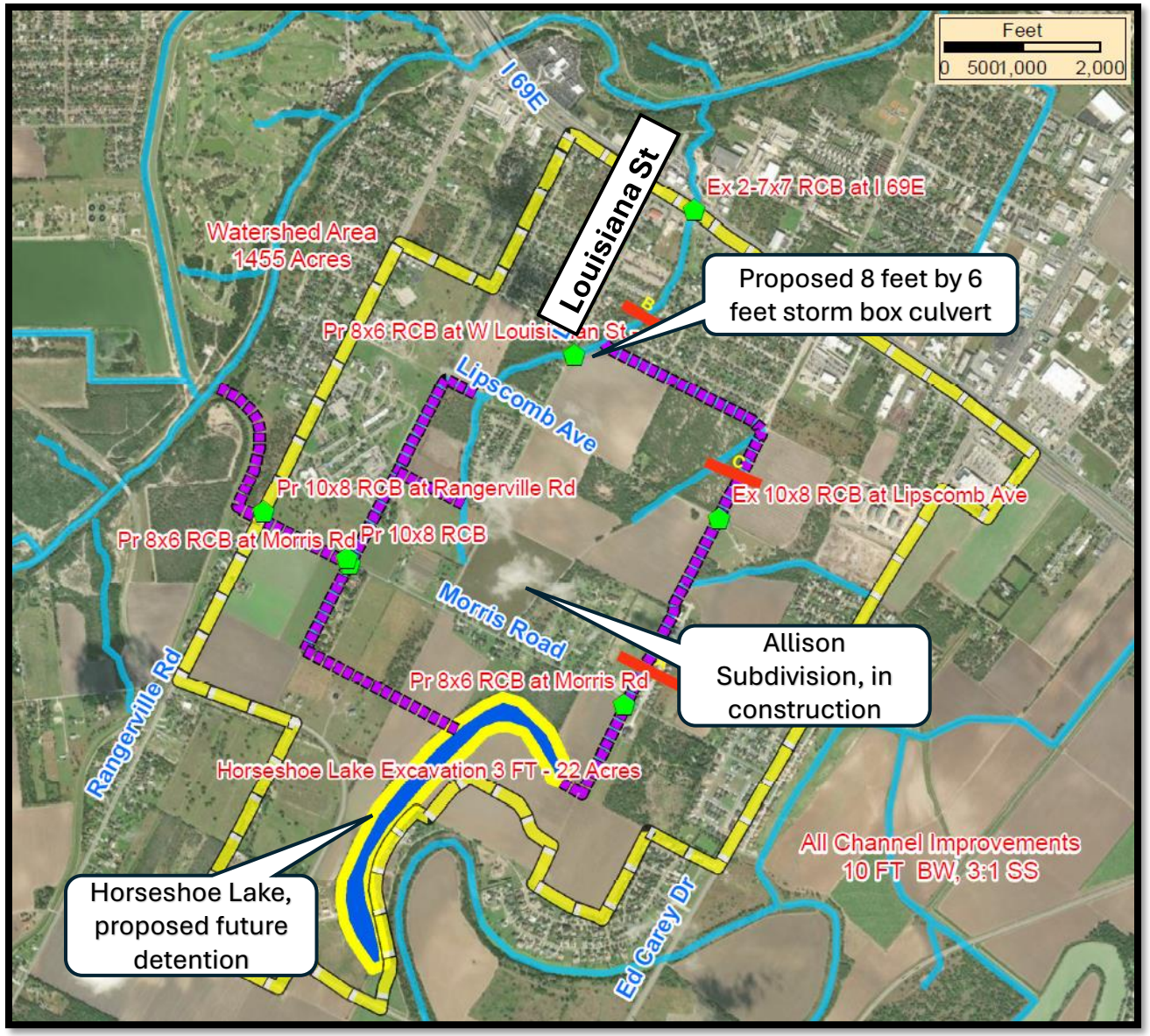
On-going Projects – District 4

Lipscomb Drain Ditch Improvements

- Project upsizes existing 30” storm pipe at Louisiana St with an 8 feet by 6 feet box culvert
- Proposed box culvert to be installed by the Allison Subdivision developer/contractor

Horseshoe Lake Detention Pond

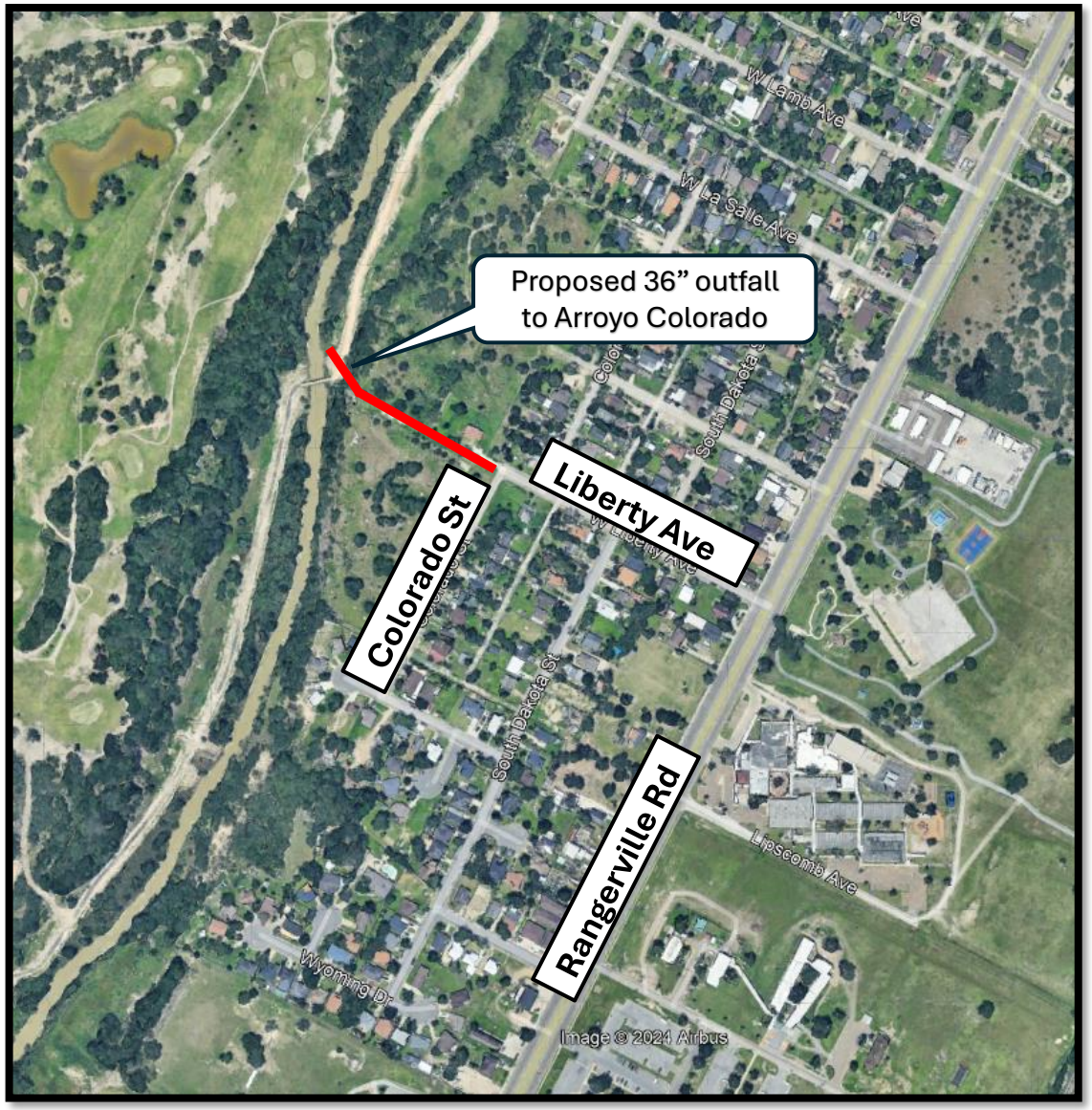
- Staff is working with the Irrigation District #1 to acquire the “Horseshoe Lake,” a lake that is currently dry and will be used for detention



On-going Projects – District 4

Liberty and Colorado Stormwater System Improvements

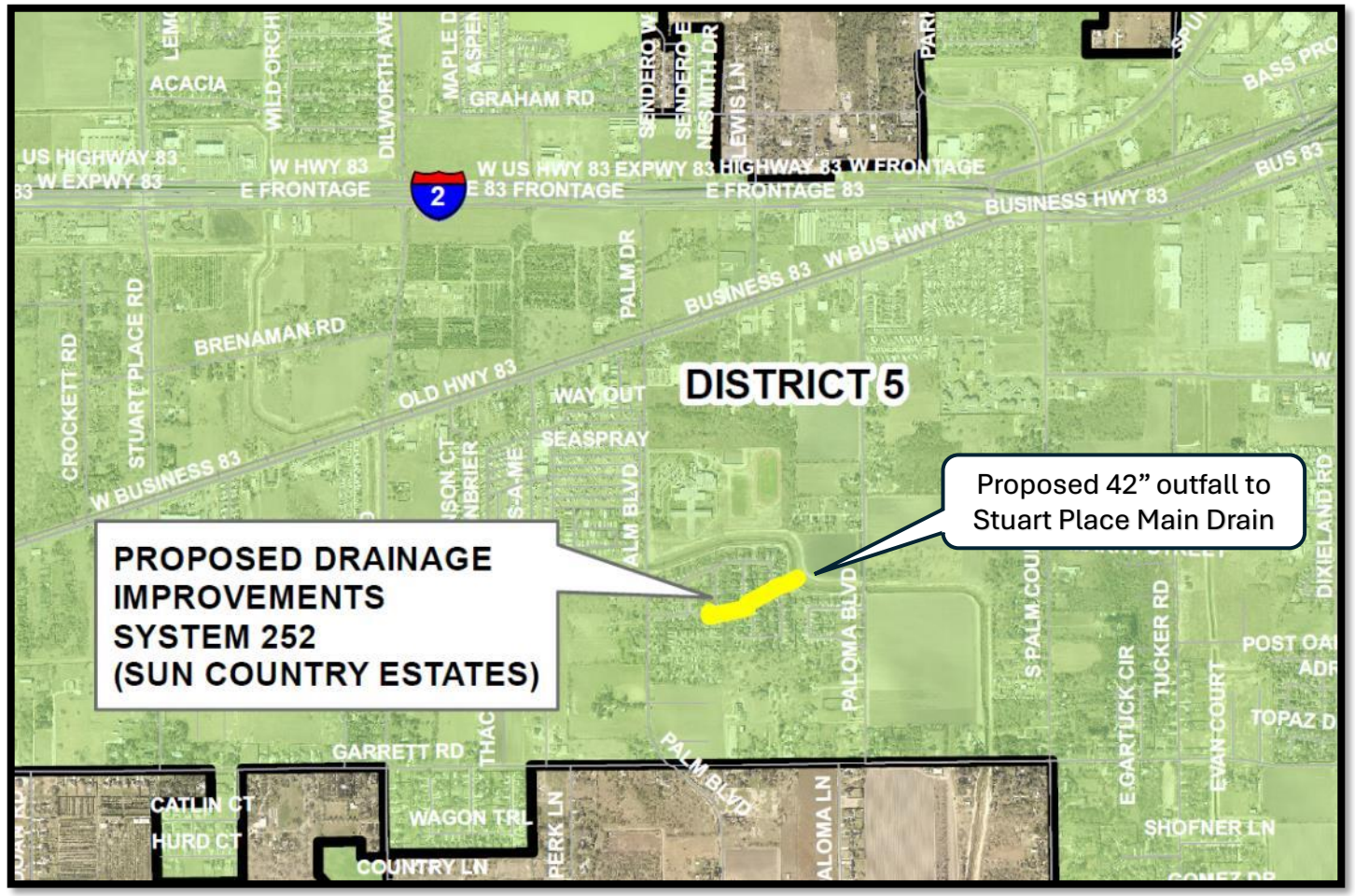
- This project will address localized flooding at the Colorado St and Liberty Avenue intersection
- Staff has completed the design and coordinating with IBWC to acquire outfall permit



On-going Projects – District 5

Sunchase and Sabal Palm Stormwater System Improvements (System 252)

- Replace and upsize approximately 500 linear feet of storm sewer pipe in the Sun Country Estates Subdivision
- Construction is starting this month
- Estimated cost: $322K

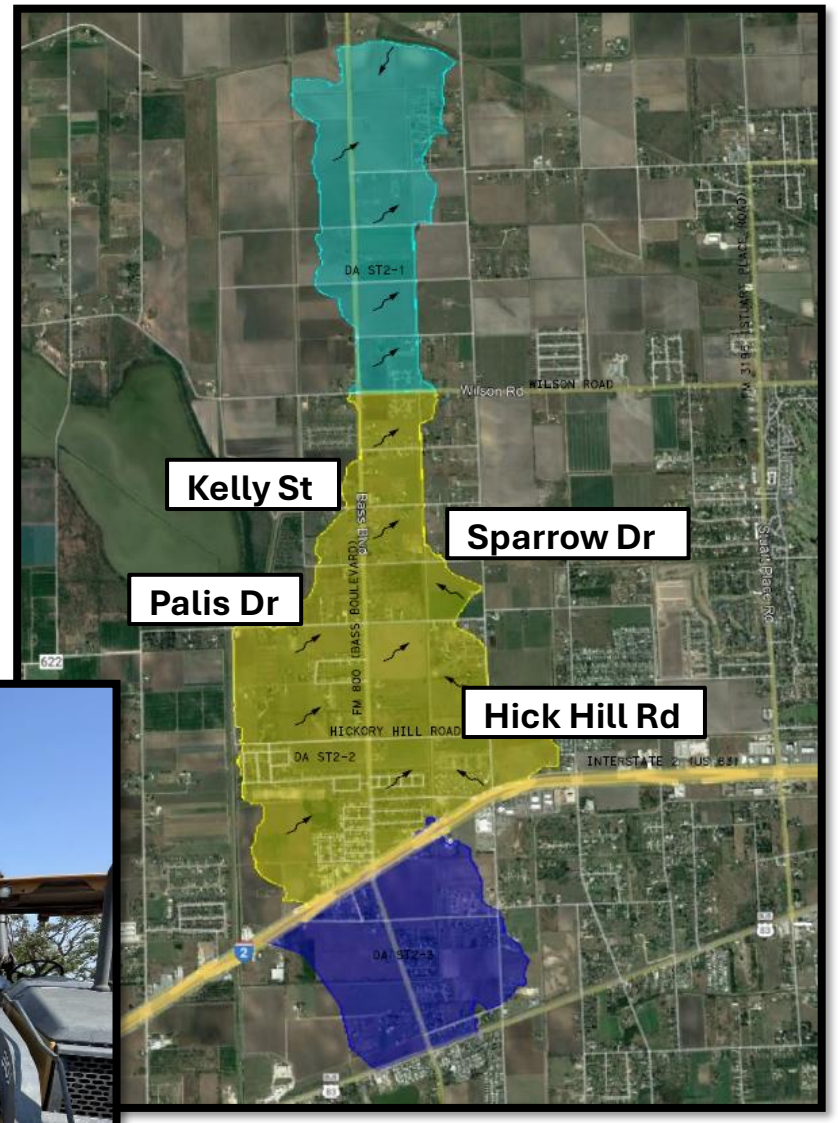


On-going Projects – District 5

Adam's Gardens Irrigation Ditch Culvert Improvements (System S)

- The city completed the culvert at Hick Hill Rd which included two 36" storm pipes increasing the drainage capacity of the ditch. This culvert within city limits

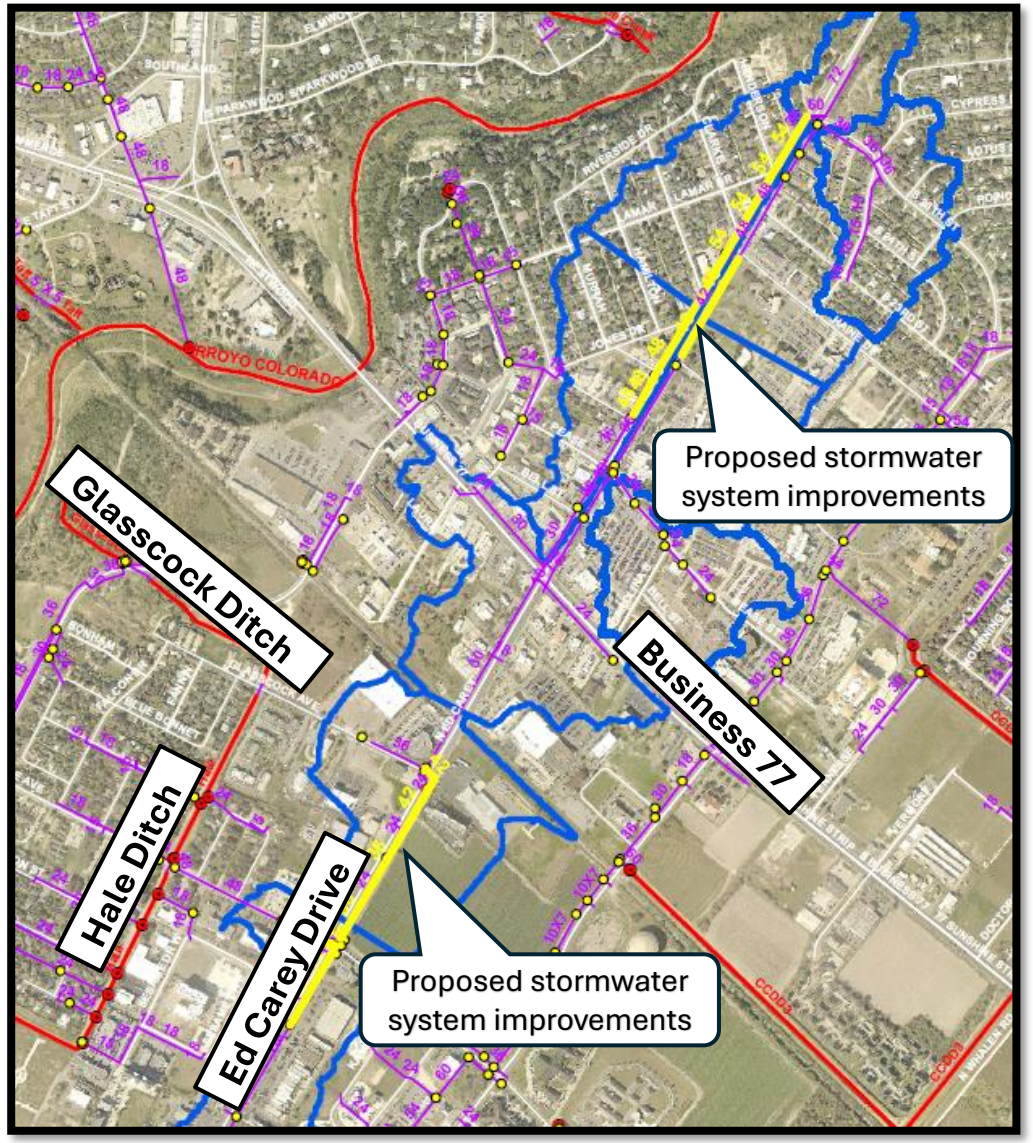
- Staff is coordinating with Irrigation District #1 to upsize the downstream culverts at Palis, Sparrow and Kelly Drive (outside of city limits)



On-going Projects – Districts 2, 3 and 4

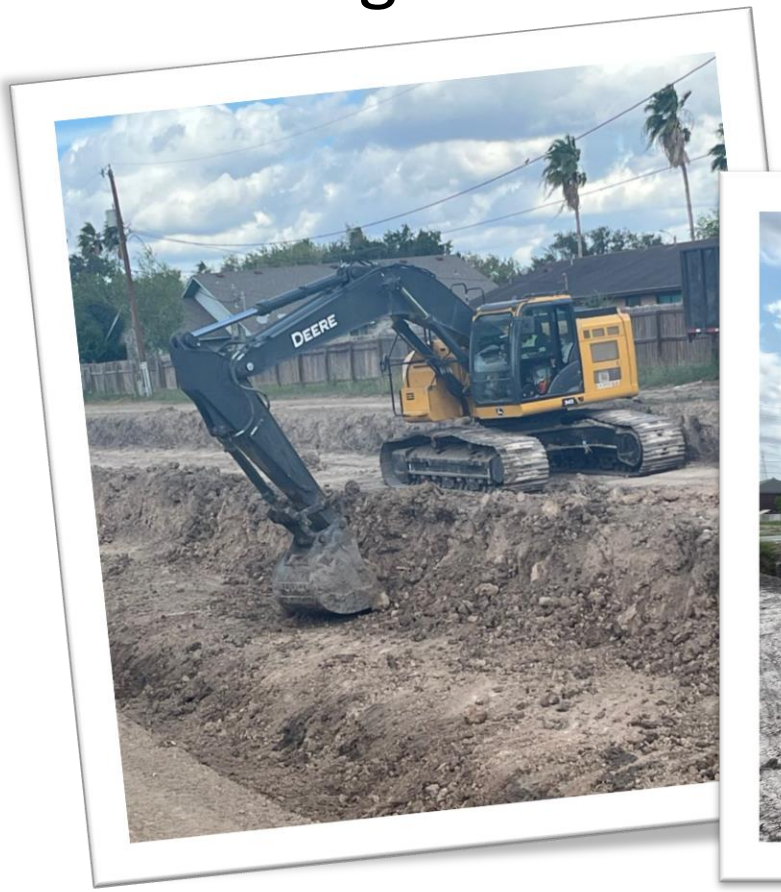
Ed Carey and BUS 77 Stormwater System Improvements (System 100)

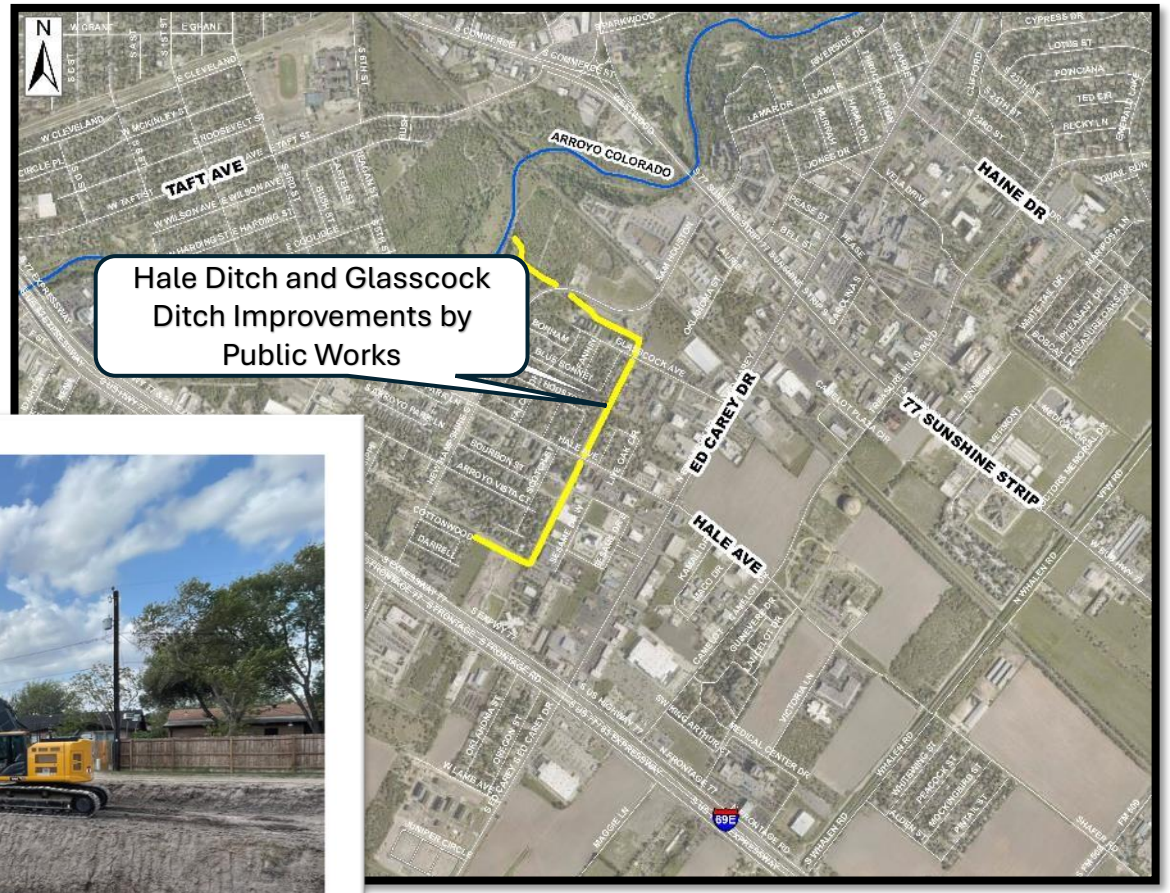
- Major project that will reduce flooding on Ed Carey Drive from Sesame Drive to Riverside Drive
- Upsizes approximately 5,000 feet of underground storm pipes
- Design has been completed
- Staff submitted application to FEMA BRIC grant early in 2024; grant not awarded, staff will re-apply in 2025 with updated Benefit Cost Analysis
- System will discharge to Hale ditch and Glasscock ditch



Public Works Improvements for System 100 – Districts 2, 3 and 4

- Approximately 3,310 linear feet of the Hale Ditch and Glasscock Ditch were regraded and widened

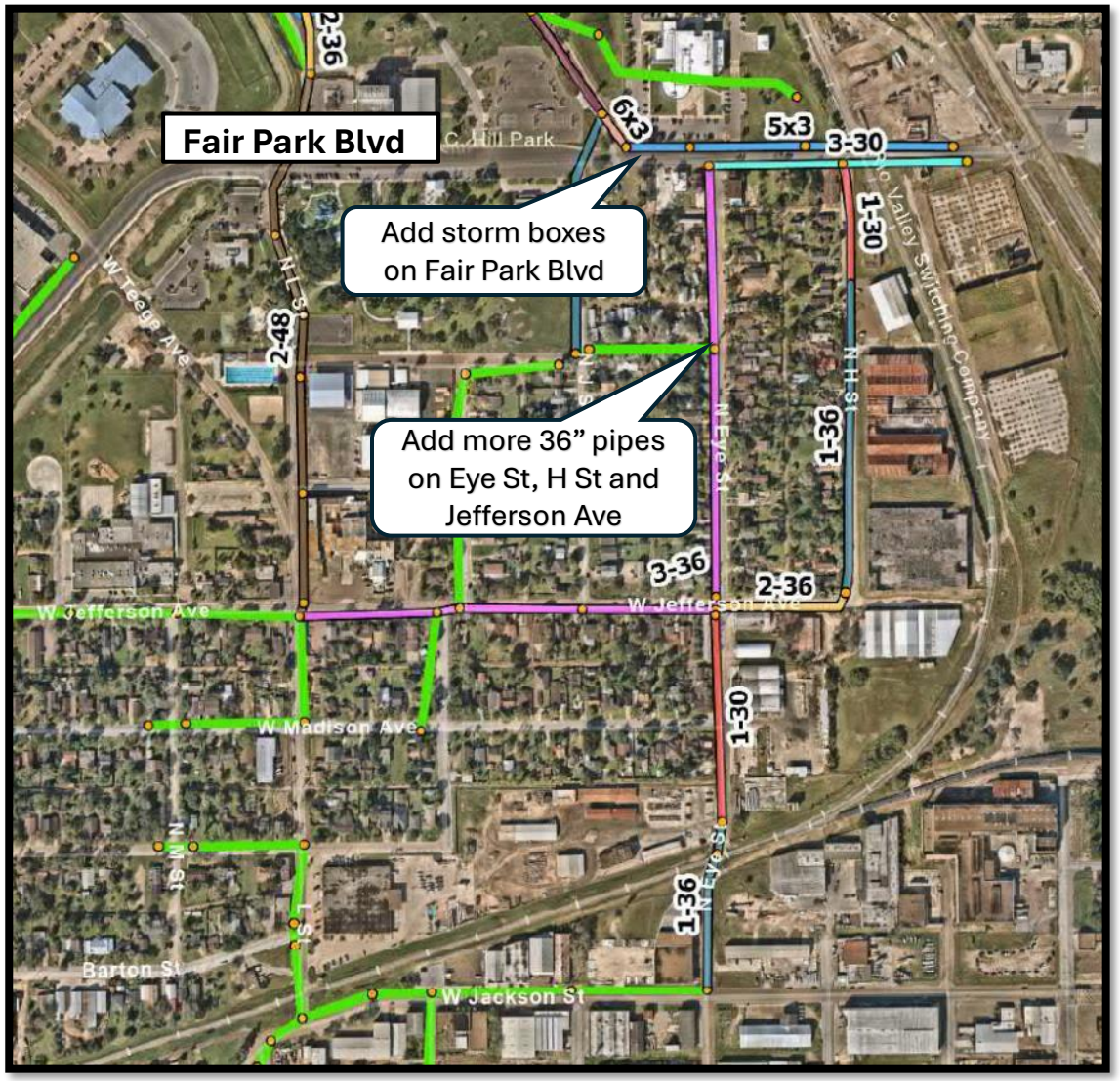




Projects Coming Soon

- Wichita Avenue Stormwater System Improvements

- Eye Street, Fair Park Blvd and West Jefferson Ave Stormwater System Improvements



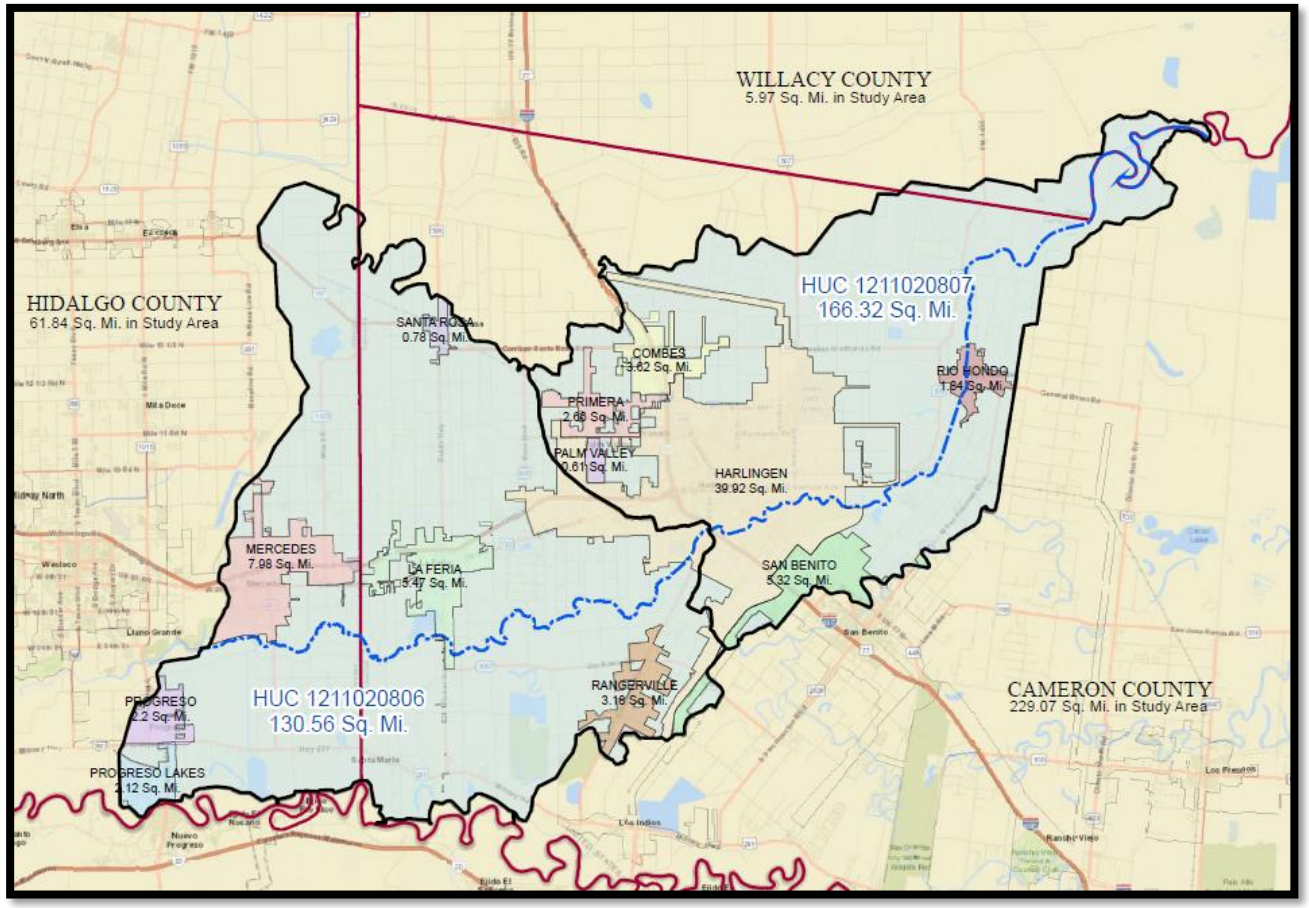
Projects Coming Soon

- Expansion of existing detention ponds at Harlingen Police Department Facility

Picture of HPD East Detention Pond, facing North

Flood Protection Planning Study (Drainage Master Plan) – Coming Soon

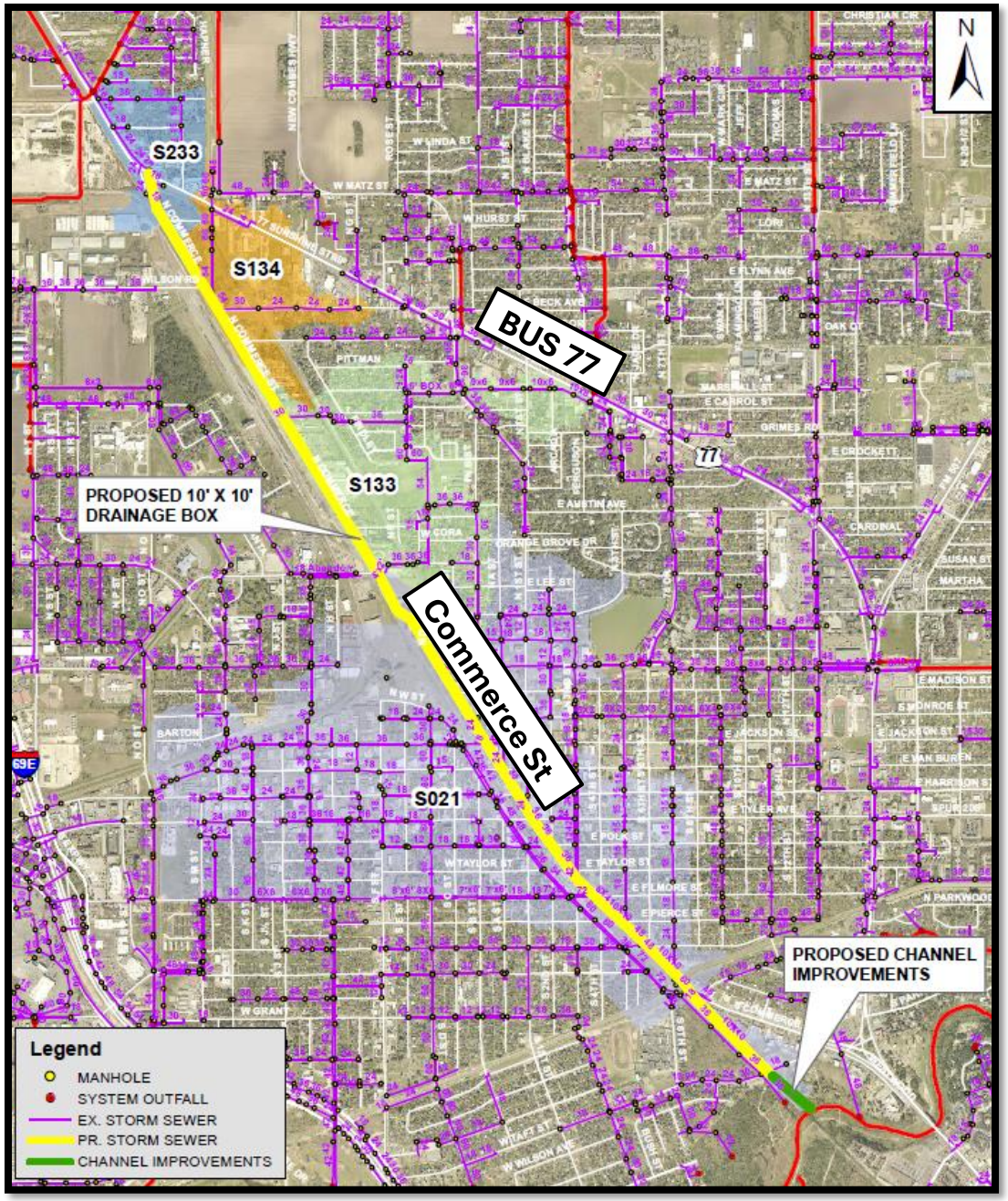
- Planning study that encompasses 297 square miles; area that mainly drains to the Arroyo Colorado
- Includes updated inventory and field survey of existing drainage structures
- Will provide recommendations to staff on drainage policy, drainage criteria and requirements for new development
- Expected to provide conceptual design maps (drainage projects) with alternatives to mitigate or reduce flooding in the city's flood prone areas
- Planned to be the drainage roadmap for the city



Future projects

Commerce Street Project

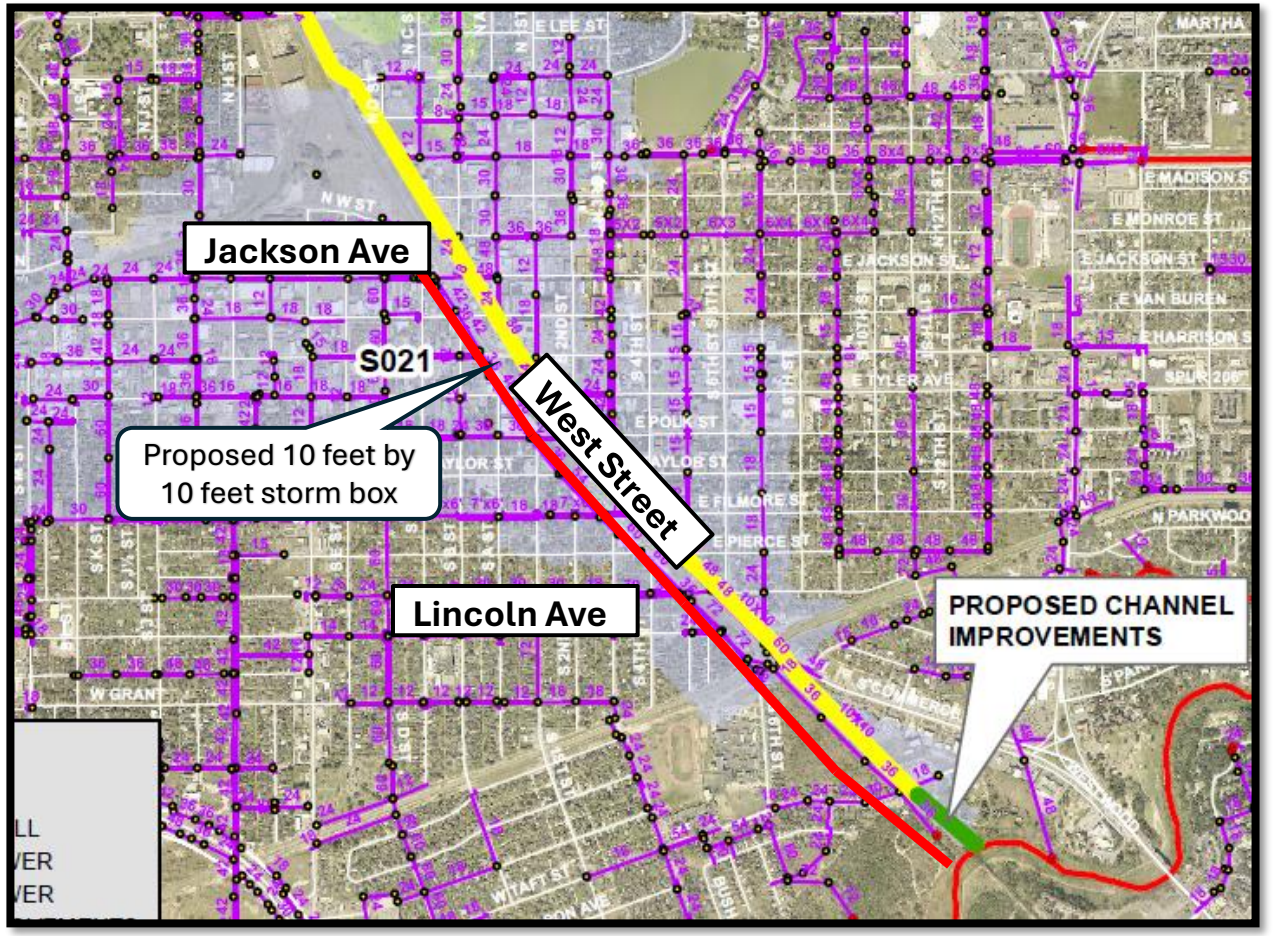
- Major project that proposes 3.2 miles of 10 feet by 10 feet storm box culvert on Commerce St from North BUS 77 to outfall at Arroyo Colorado
- The design of this infrastructure is included in the Commerce St re-design project, currently on-going (design at 20%)
- Planned to greatly reduce flooding in all the streets that intersect Commerce St, and capable to convey a 100-year storm event
- Staff submitted application to FEMA BRIC grant early in 2024; grant not awarded, staff will re-apply in 2025 with updated Benefit Cost Analysis



Future projects

West Street 10x10 Box

- Major project that proposes 1.5 miles of 10 feet by 10 feet storm box culvert on West St from Jackson Avenue to outfall at Arroyo Colorado
- Planned to greatly reduce flooding in all the streets that intersect West St
- This project is in the planning stage, a conceptual design will be presented in the upcoming drainage master plan, scheduled to be completed in May 2025
- Staff recently submitted an application to the TWDB Flood Infrastructure Fund for design and construction
- TWDB is reviewing pre-applications and an invitation to submit full applications is expected this month
- If invited by TWDB, staff will submit full application



Future projects

Harlingen Irrigation Main Canal Conversion

- Major project that proposes to “bury” 4,000 ft of the Harlingen Irrigation Main Canal into an underground stormwater pipe and use the existing canal for drainage to Arroyo Colorado
- A feasibility study was conduced late 2023
- Planned to divert floodwaters to the Arroyo Colorado, instead of the North Main Drain
- Planned to greatly reduce flooding in all streets near existing canal
- Staff submitted application to FEMA BRIC grant early in 2024; grant not awarded, staff will re-apply in 2025 with updated Benefit Cost Analysis
- Staff recently submitted an application to the TWDB Flood Infrastructure Fund for design and construction
- TWDB is reviewing pre-applications and an invitation to submit full applications is expected this month
- If invited by TWDB, staff will submit full application

Public Works Improvements near Harlingen Irrigation Main Canal – Districts 4 and 5

- Approximately 6,330 linear feet (1.2 miles) of ditch cleaning
- Ditch owned by TXDOT, city is executing maintenance agreements with TXDOT for cost reimbursement and cost share

How to report flooding

- **Citizens can report flooding by sending the address of localized flooding and pictures to the following email account:**

reportflooding@harlingentx.gov

- **Pictures with physical addresses alert staff of problem areas**

- **They also assist with securing grant funds, as part of the grant documentation applications**