

# United States Army Corps of Engineers

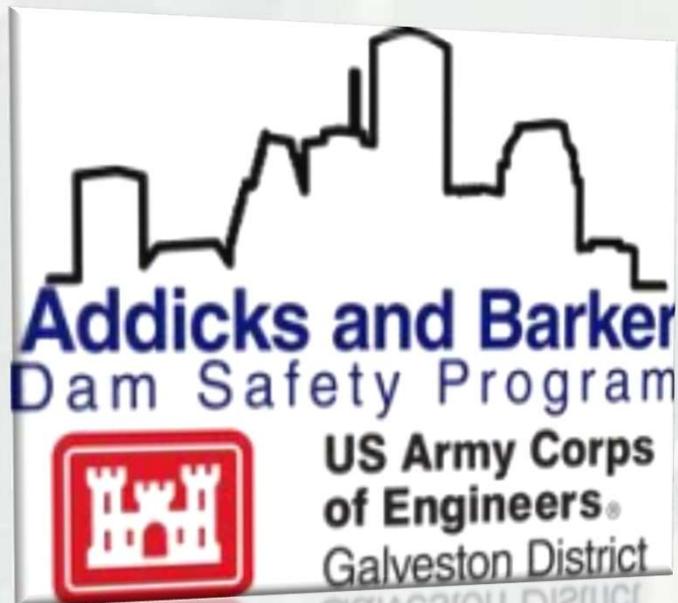
## Addicks and Barker Dam Safety Update

COL Richard P. Pannell  
District Commander, Galveston District  
U.S. Army Corps of Engineers  
March 9, 2016



# Purpose & Agenda

**Inform the public on the role of the U.S. Army Corps of Engineers (USACE) Galveston District, improve awareness and understanding of the Addicks and Barker Dam Safety Program and provide an update on the start of construction.**



- History of Addicks & Barker Reservoirs
- Dam Safety Findings
- Interim Risk Reduction Measures
- Construction of New Outlet Structures
- Post Implementation Evaluation
- Section 216 Study



# USACE Vision

Engineering solutions for the Nation's toughest challenges.

## ***USACE Mission***

*Deliver vital engineering solutions, in collaboration with our partners, to secure our Nation, energize our economy, and reduce risk from disaster.*



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# Project Timeline



Major  
Houston  
Flood

Addicks Dam  
Completed

Dam Safety Modification  
Study and Interim Risk  
Reduction Measures Initiated

Design Completed  
and Construction  
Initiated

Construction  
Complete

1929

1935

1945

1948

1992

2009

2013

2015

2018

2019

2020

Major  
Houston  
Flood

Barker Dam  
Completed

Record Pools  
Addicks (EL. 100.58ft)  
Barker (EL. 95.89ft)

Dam Safety  
Modification Report  
Approved and  
Design Initiated

Initiate  
Section 216  
Study

Post  
Implementation  
Evaluation

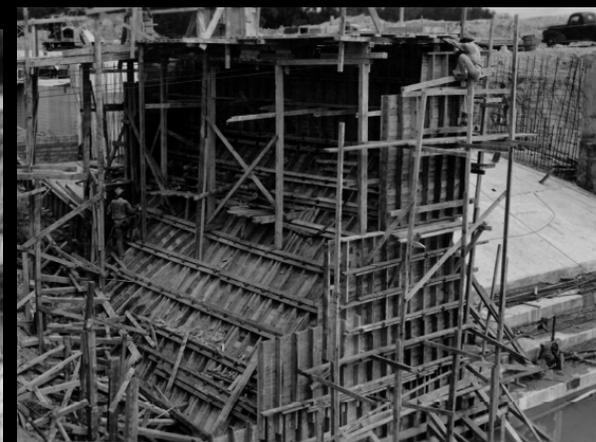


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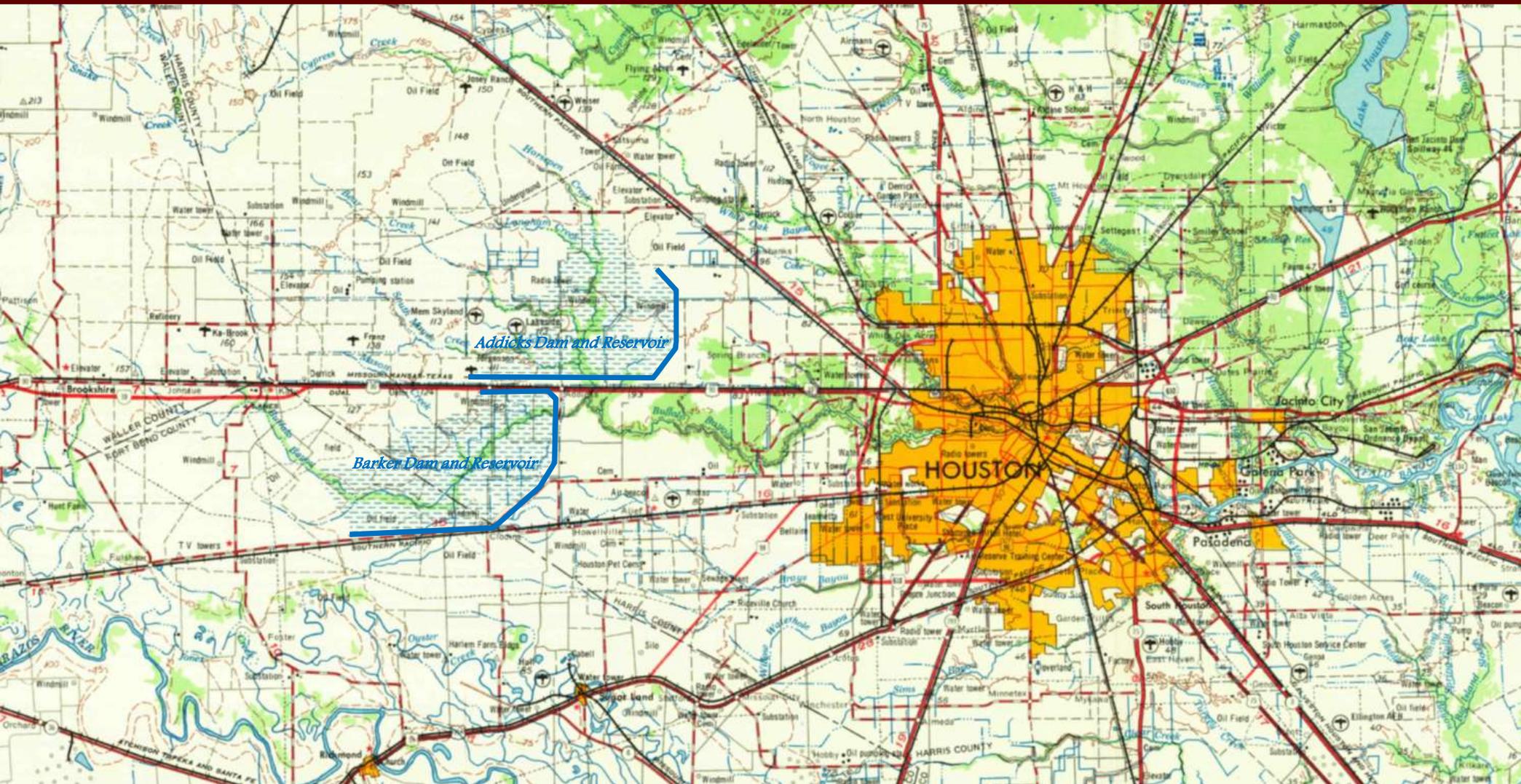
# Construction of Addicks and Barker Dams 1942-1948



# Construction of Addicks and Barker Dams 1942-1948



# Houston with Addicks and Barker Dams 1950's



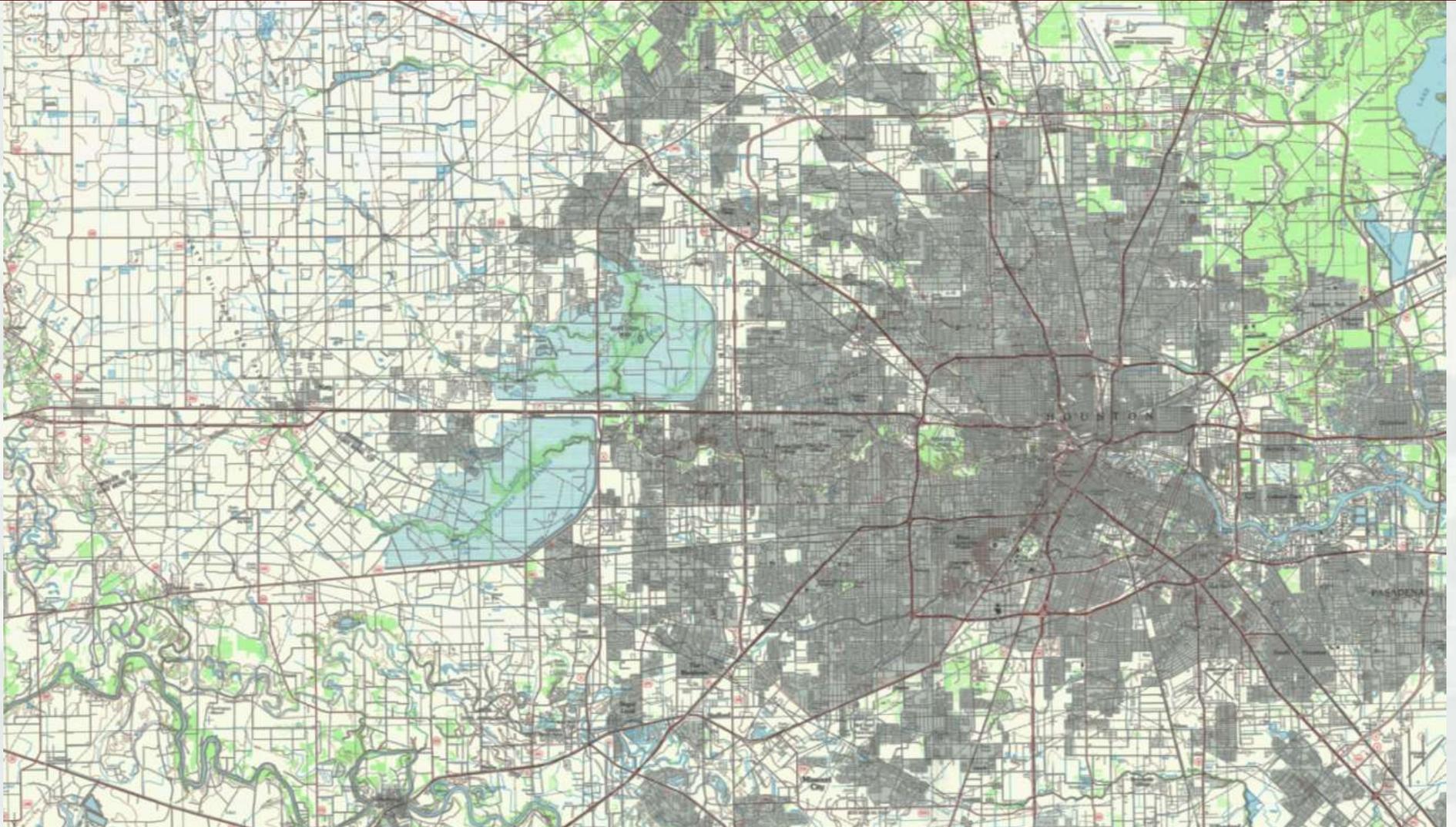
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# Improvements to Addicks and Barker Dams

- 1963  
Gated the conduits to provide additional protection from flooding to the downstream
- 1978-1982  
Constructed seepage control at both dams (included slurry trench cutoff walls and seepage blankets)
- 1986-1991  
Raised the main dam embankment to provide freeboard (eliminate possibility of waves overtopping)
- 1987-1988  
Armored the uncontrolled spillway at the ends of the dams with roller-compacted-concrete



# Houston - 1992



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# Addicks Reservoir Record Pools

Record High Pool - Elevation 97.46 feet-NAVD 1988 on March 9, 1992

Recent High Pool - Elevation 95.51 feet-NAVD 1988 on May 31, 2015



**Addicks Reservoir  
May 31, 2015**



**Bunker Hill Village**



**March 4, 1992**



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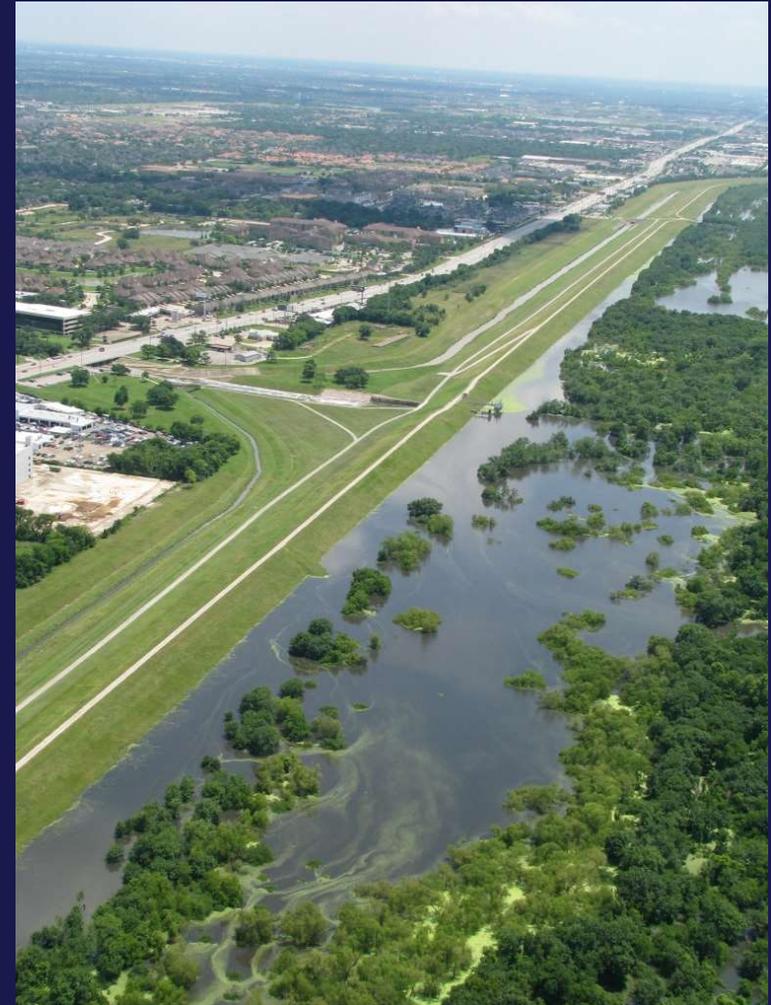
# Barker Reservoir Record Pools

Record High Pool - Elevation 93.60 feet-NAVD 1988 on March 6, 1992

Recent High Pool - Elevation 91.87 feet-NAVD 1988 on June 1, 2015



## Barker Reservoir June 1, 2015



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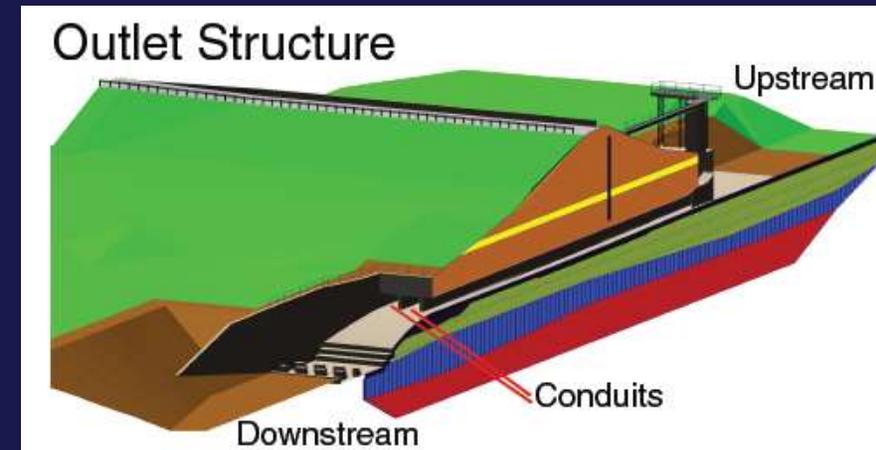
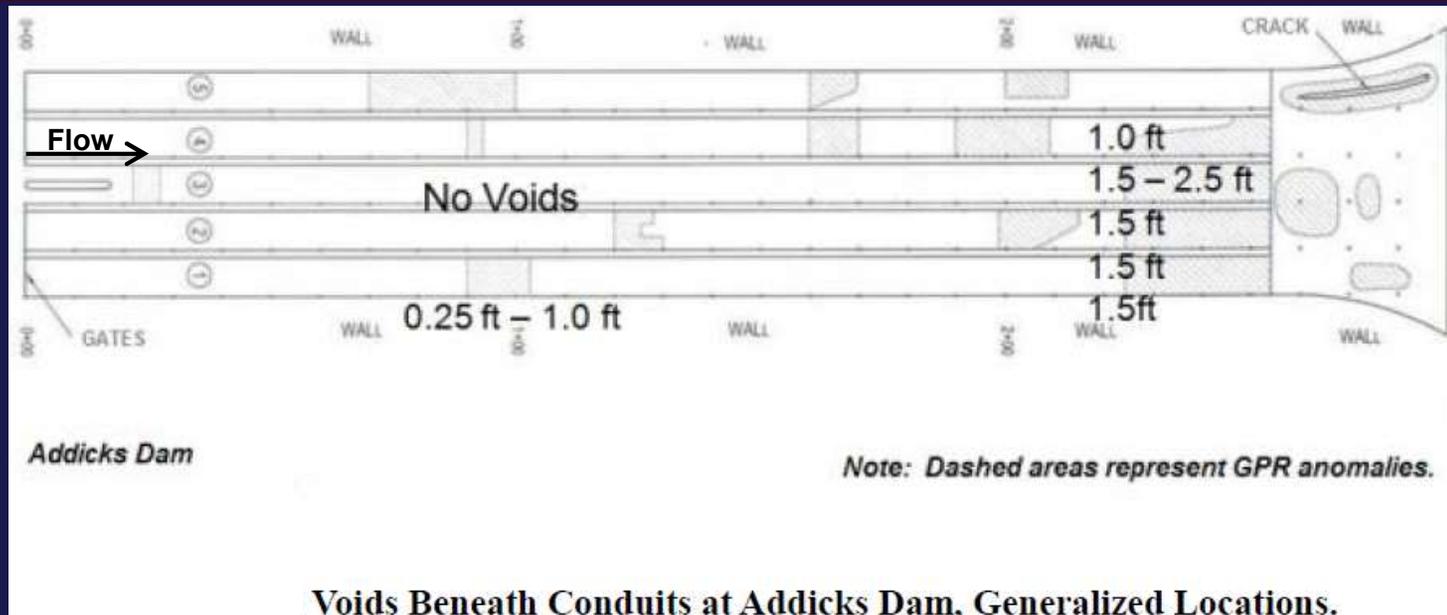
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# Corps' Dam Safety Assessment

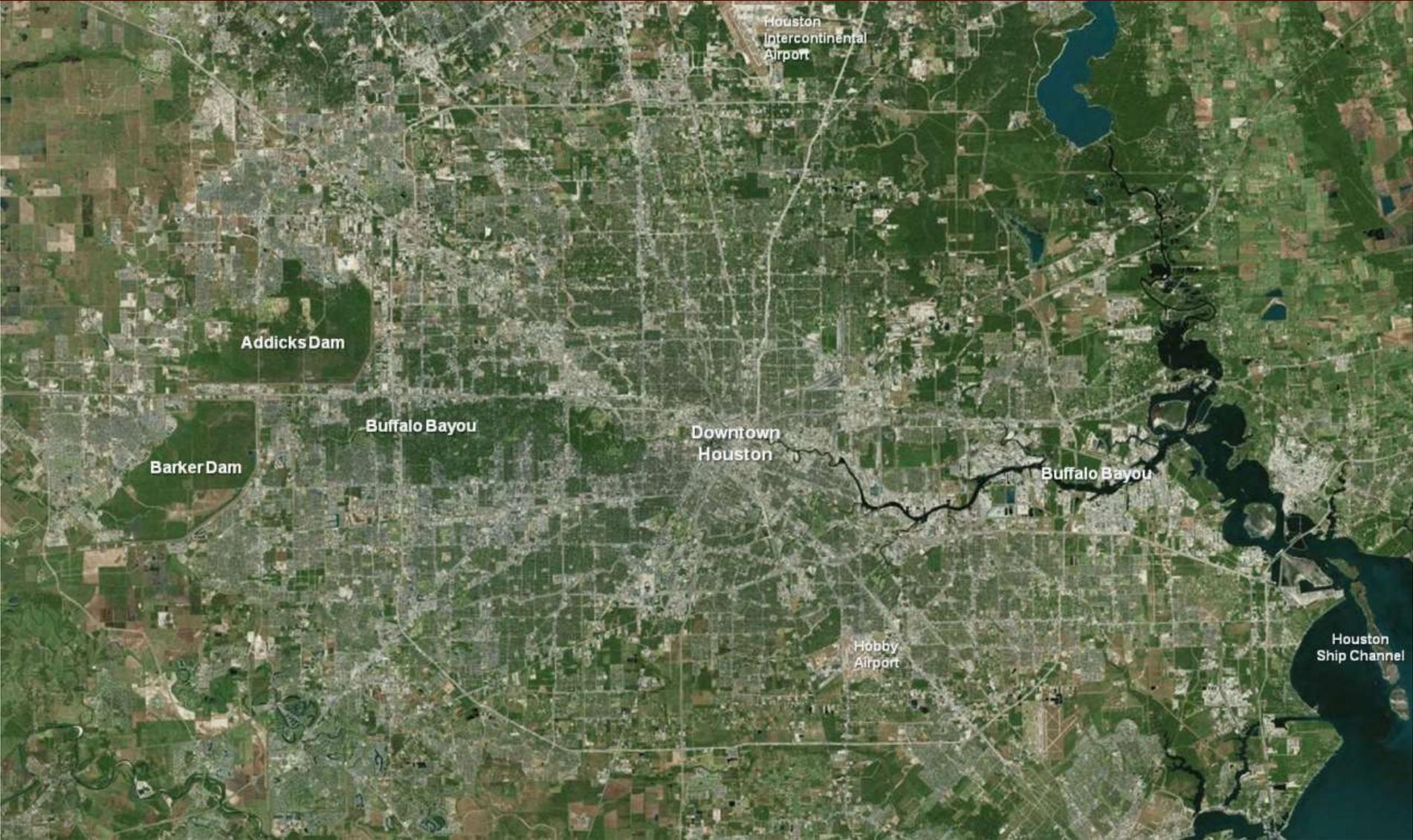
- **Corps continually inspects its dams nationwide. It owns and operates 707 dams at 557 projects. These projects reduce risk and strengthen the nation's economy through infrastructure.**
- **Life and safety are paramount.**
- **Living with dams is a shared responsibility.**
- **Addicks and Barker Dams Assessment (2009)**
  - **Reliability of Structural Features**
    - **Outlet Structures Seepage and Piping**
    - **Ends of the Dams**
  - **Potential Consequences**
    - **Densely Populated Urban Environment**
    - **Critical Economic Infrastructure**



# Dam Safety Findings - Seepage, Piping, and Voids



# Houston – 2009



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# Interim Risk Reduction Measures

## Grouting of Conduits and Parabolic Chute



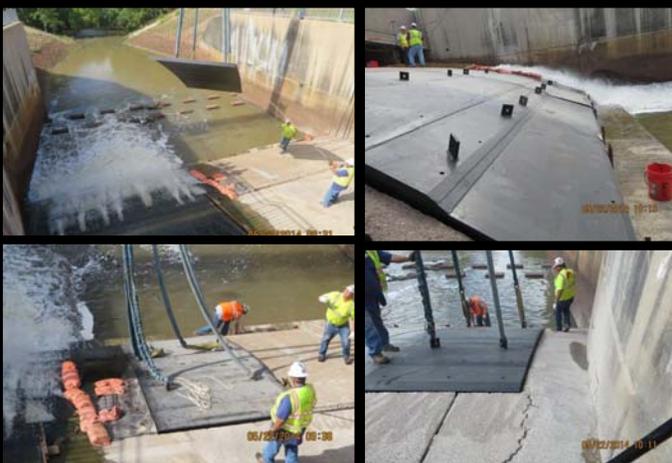
## Granular Filter Around Ends of Conduits



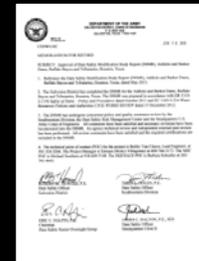
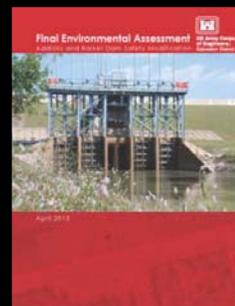
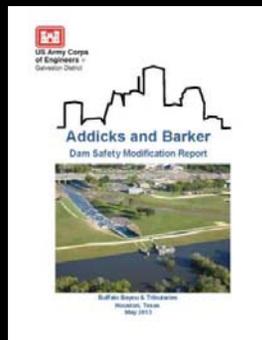
## Barker Gate Replacement



## Parabolic Chute Slab Steel Plate



## Dam Safety Modification Study



## Gate Operators & Emergency Generators



# New Outlet Structures Design and Construction

Summer 2015

- Plans and Specifications Completed
- Continuing Contract awarded to Granite Construction Company in the amount of \$71,902,340 for the construction of the modifications to the dams
- Construction Completion May 2019



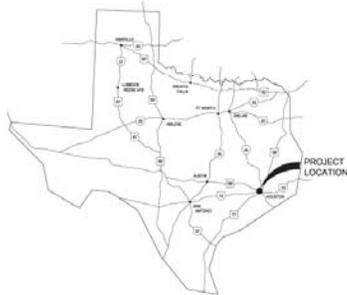
Buffalo Bayou and Tributaries  
Addicks and Barker Dams  
Harris and Fort Bend Counties, Texas  
New Outlet Structures and Cutoff Walls  
VOLUME 1 - ADDICKS DAM



Buffalo Bayou and Tributaries  
Addicks and Barker Dams  
Harris and Fort Bend Counties, Texas  
New Outlet Structures and Cutoff Walls  
VOLUME 2 - BARKER DAM

SIGNATURE AFFIXED BELOW INDICATES OFFICIAL  
RECOMMENDATION AND APPROVAL OF ALL DRAWINGS  
IN THIS SET AS INDEXED ON FOLLOWING SHEET  
BAUTISTA, TERRY, F. 12  
31939047

APPROVED BY: TERRY F. BAUTISTA, P.E.  
TITLE: CHIEF, ENGINEERING & CONSTRUCTION  
OFFICE: GALVESTON DISTRICT  
DATE: 08/12/15  
(AS REQUIRED BY ENGINEER  
REGULATION ER 1110-1-6152)



RFP# W912G6-15-R-0001  
CONTRACT # W9126G-15-C-0037  
FY: 15

Office of the District Engineer  
U.S. Army Engineer District, Galveston  
Corps of Engineers  
Galveston, Texas

RFP NO. W9126G-15-R-0001  
CONTRACT NO. W9126G-15-C-0037

BUFFALO BAYOU AND TRIBUTARIES, HOUSTON, TEXAS  
ADDICKS AND BARKER DAMS  
HARRIS AND FORT BEND COUNTIES, TEXAS

PROJECT MANUAL  
FOR  
NEW OUTLET STRUCTURES AND  
CUTOFF WALLS

JUNE 2015



AMENDMENTS 0001  
THRU 0010 POSTED

DEPARTMENT OF THE ARMY  
GALVESTON DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 1229  
GALVESTON, TEXAS

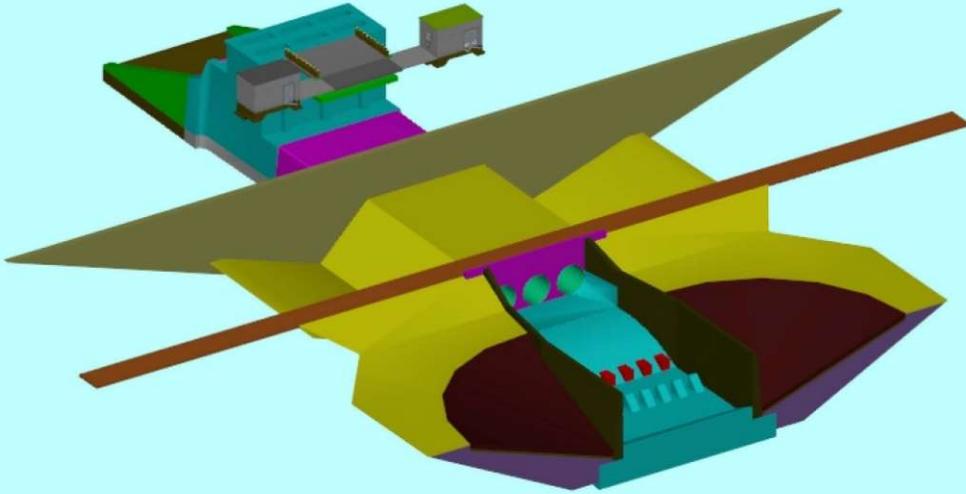
"INCREASE PROFIT - SUBMIT VECPS"



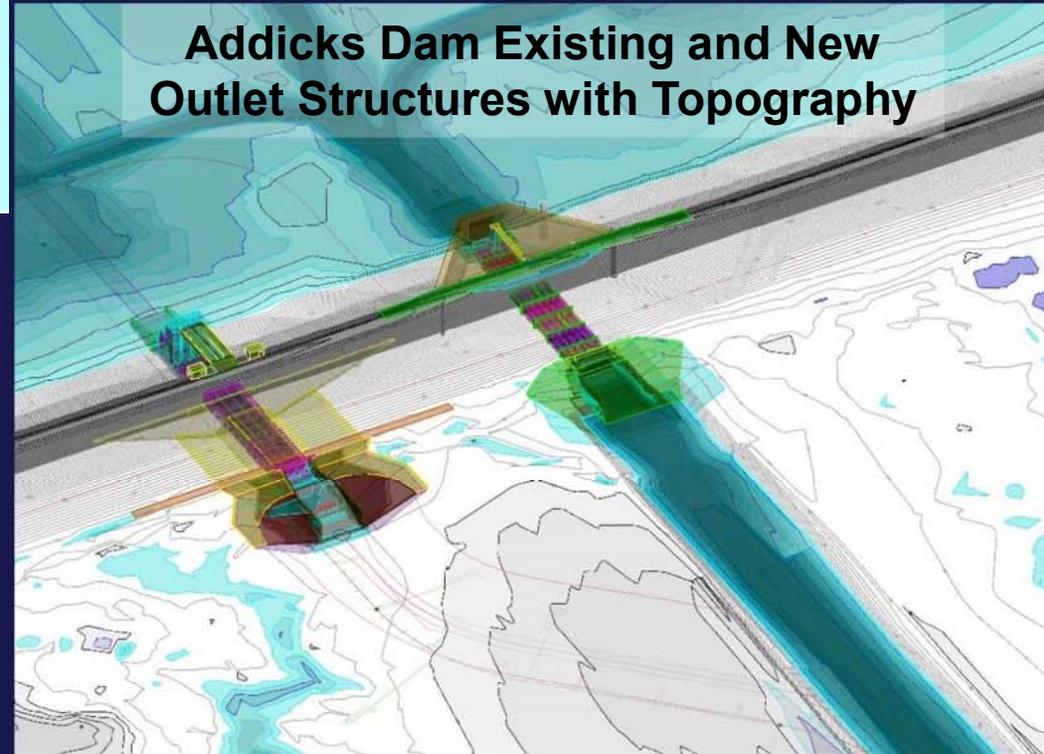
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# Addicks and Barker Dams 3-D Model

**Barker Dam New Outlet Structure**



**Addicks Dam Existing and New Outlet Structures with Topography**



# Addicks Dam



Addicks Reservoir

1- Borrow Area

2- Haul Road

3 - Low Water Crossing

Approximate Location of New Structure



Addicks Reservoir

Existing Structure

# Addicks Dam 1 - Borrow Area



# Addicks Dam 2 - Haul Road



# Addicks Dam

## 3 - Low Water Crossing



# Barker Dam



Interstate 10

Barker Reservoir

Approximate  
Location of New  
Structure

Existing Structure

Barker Ditch

Clodine Ditch

Construction  
Offices

Hwy 6

Buffalo  
Bayou

# Barker Dam Staging Area

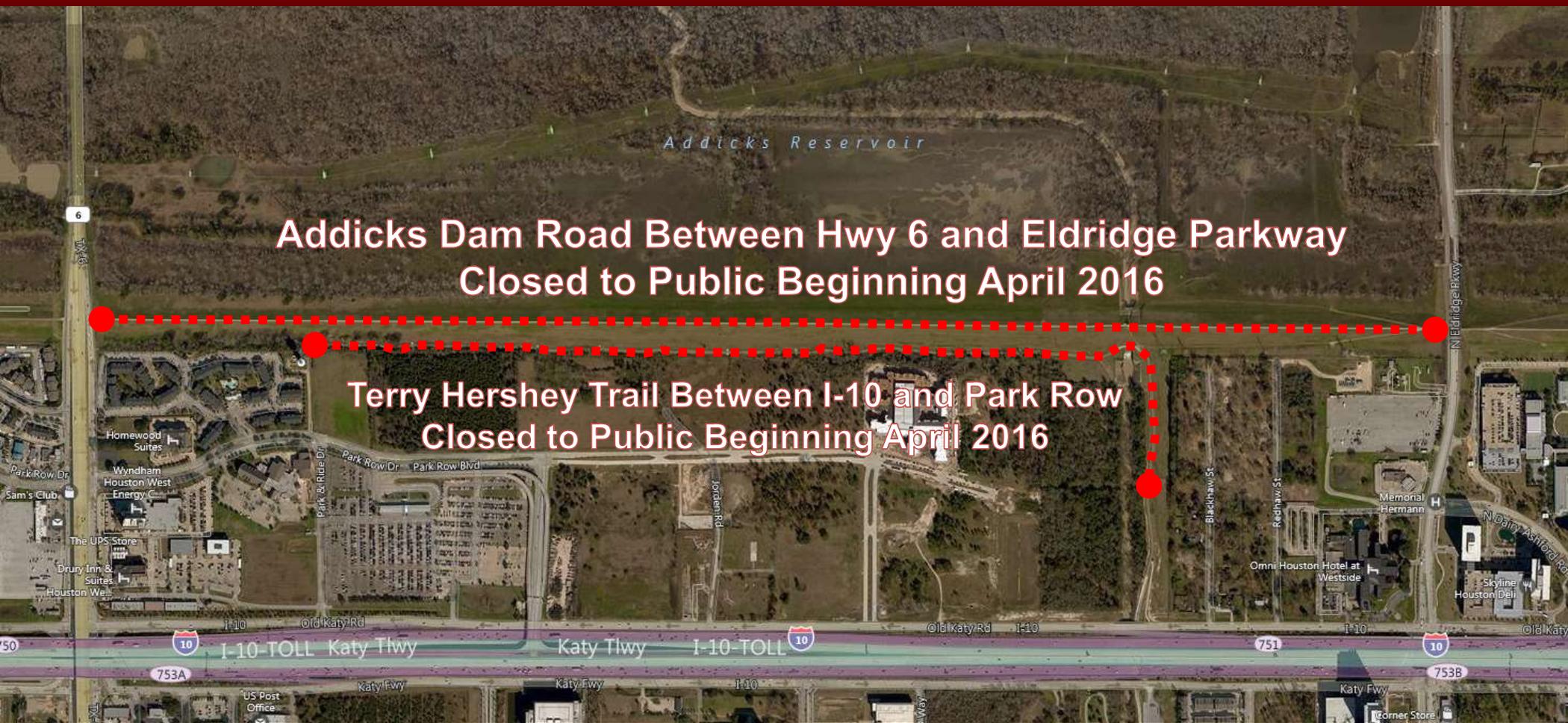


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# Addicks Dam Hike and Bike Trail

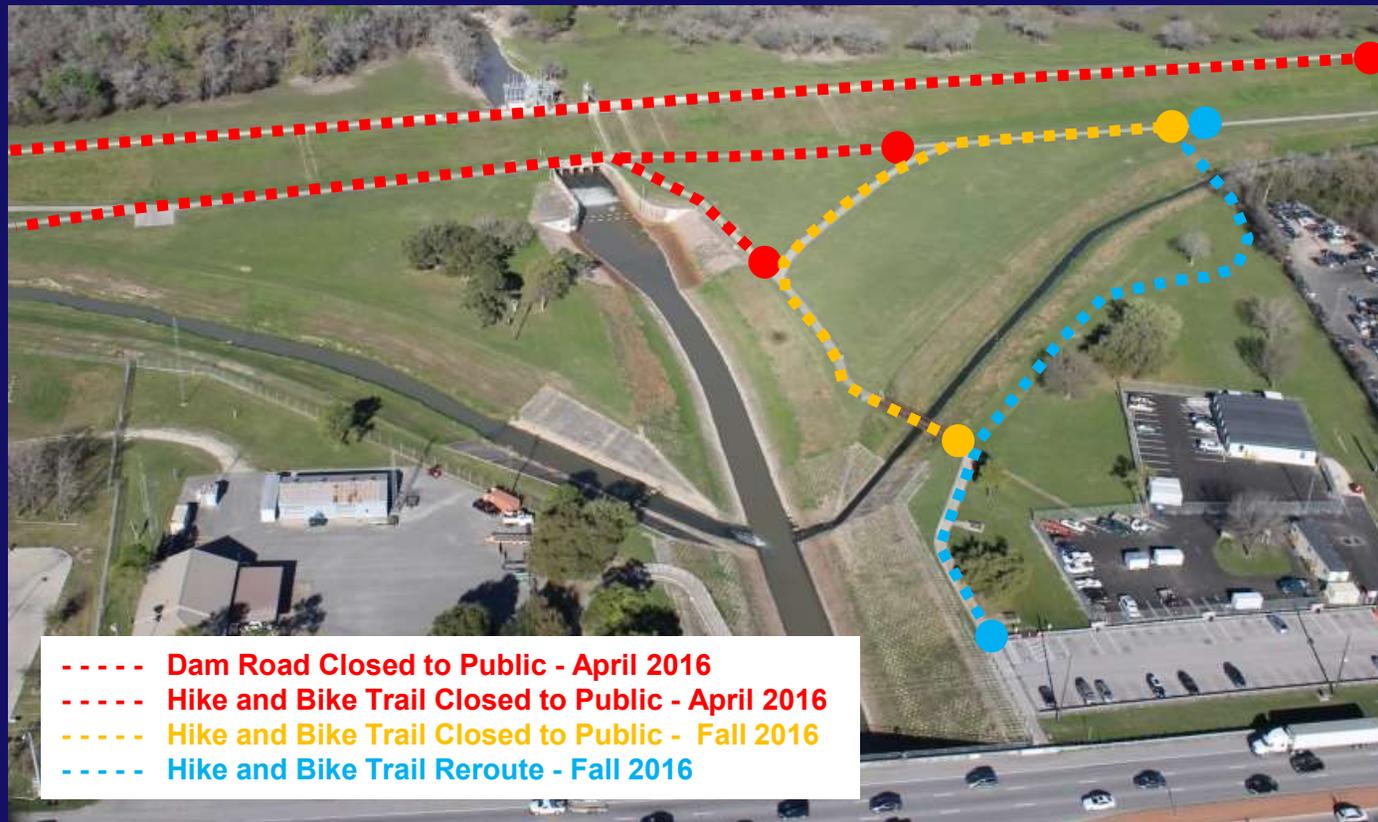


# Barker Dam Hike and Bike Trail

Noble Road

Barker Dam Road Between Noble Road and New Outlet Structure  
Closed to Public Beginning April 2016

George Bush Trail Between Noble Road and New Outlet Structure  
Closed to Public Beginning April 2016



# Addicks and Barker Dams Post Implementation Evaluation

- **Once construction is complete a Risk Cadre comprised of subject matter experts will conduct a risk assessment of the dams to verify that the modifications adequately addressed the dam safety issues**
- **The dam safety classification will be revised based on the results of the risk assessment**



# Auxiliary Spillways at Ends of Dam



Addicks Auxiliary Spillway



Barker Auxiliary Spillway



# Addicks and Barker Reservoirs Section 216 Watershed Study

- A study is required to identify and recommend a plan to address the risk associated with the potential flow around the ends of the dams when the reservoir level reaches the crests of their respective auxiliary spillways.
- The study will also address the non-breach flood risk and potential operational concerns upstream and downstream of Addicks and Barker Dams.
- HCFCD Non-Federal Sponsor Letter of Intent (50% cost share)
- Start of Study is contingent on appropriation of Federal funding



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# Benefits



- Has protected the 4<sup>th</sup> largest city in the nation against loss of life for nearly 70 years
- Has enabled continued growth of the city
- Has prevented \$10 billion in potential flood damages
- Reduces risks against loss of life and property
- Provides recreational opportunities



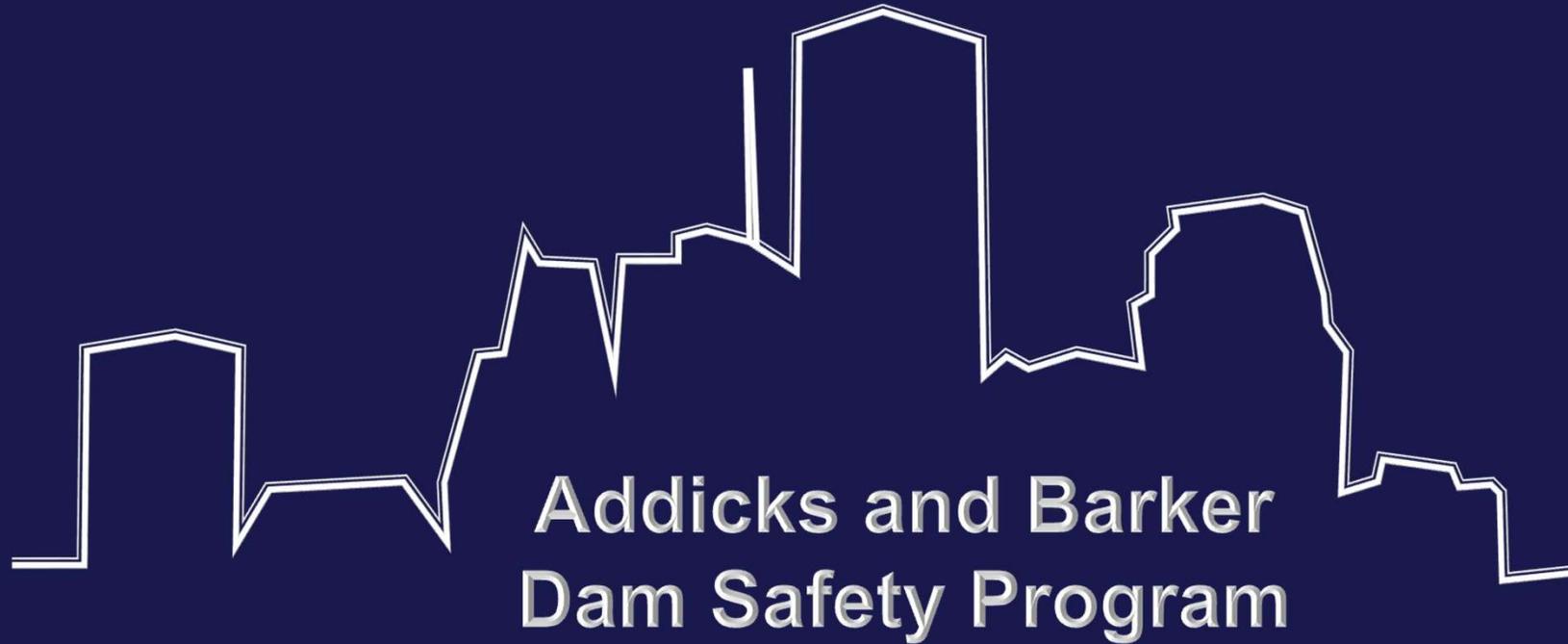
# Summary

- **Houston is NOT in imminent danger of flooding from Addicks and Barker**
  - Addicks and Barker are normally dry reservoirs
  - Addicks and Barker are continually monitored, inspected, and maintained
  - Improvements have been undertaken over the years—this is an ongoing process
- **Public safety is our number one priority**
- **Dam failure is not likely due to completed “Interim Risk Reduction Measures”**
- **Living with dams is a shared responsibility. We will continue to work closely with local agencies and partner with the greater Houston Community for flood reduction and recreation**
- **Construction updates will be posted online at [www.swg.usace.army.mil](http://www.swg.usace.army.mil) and <http://geospatial.swg.usace.army.mil/storymaps/ceswg/AddicksBarker2>**



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# QUESTIONS



Addicks and Barker  
Dam Safety Program

Thank You



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