

Thank you for Attending the Pre-Submittal Meeting for RFQ 2023-01



- You will be muted during the presentation to limit background noise.
- The meeting is being recorded, including all chat between participants.
- For any problems, please chat with the organizer.

HARRIS-GALVESTON



SUBSIDENCE
DISTRICT

RFQ 2023-01

Pre-Submittal Meeting

Professional Services for Applied
Monitoring of the Land Surface Using
Interferometric Synthetic Aperture
Radar Technology

November 9, 2023

Agenda

1. Subsidence District Overview
2. Project Overview
3. Project Scope
4. RFQ Timeline
5. Questions

Harris-Galveston Subsidence District

The Harris-Galveston Subsidence District (HGSD) is a special-purpose district created by the Texas Legislature in 1975 to prevent further land subsidence in Harris and Galveston counties.



- **Regulation** - Collaborating with nearby groundwater conservation districts, water providers, and other water agencies to manage groundwater use through water planning and groundwater regulation by means of permitting.
- **Science & Research** – Monitoring water usage and land surface movements as well as analyzing the best-available predictive models and investigating subsidence impacts.
- **Water Conservation** - Equipping permittees, residents, businesses, and educators with water conservation tools and resources to reduce water usage and empower the community to value water.

Impacts of Subsidence

Groundwater well with casing exposed



New bridge to allow for more freeboard



Flooding from Hurricane Harvey

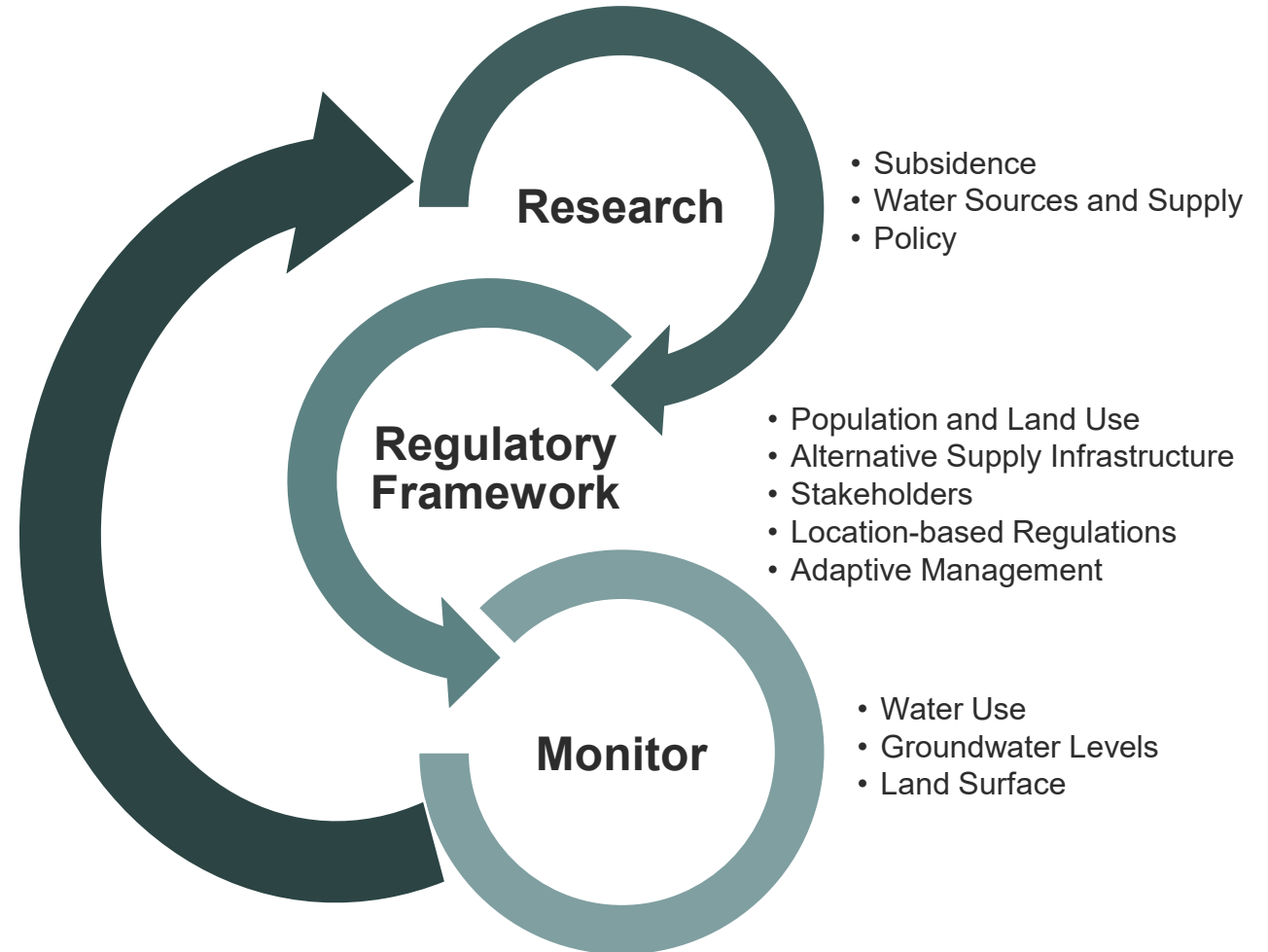


Home foundation remnants inundated



Science-based Groundwater Regulations

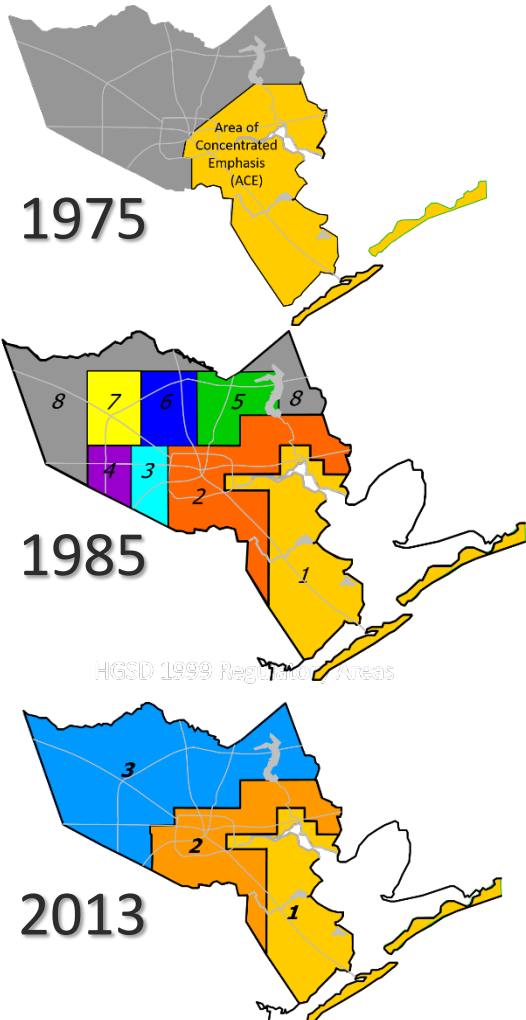
- **Conduct research**
- **Identify where subsidence is occurring**
- **Communicate with stakeholders**
- **Establish a regulatory framework**
- **Implement a monitoring program**
- **Continue research and outreach**



Scan for more details on our regulatory planning. →



Adapting to Change



- Following the creation of the District, groundwater regulation began nearest the coast in the Area of Concentrated Emphasis (ACE).
- As the population grew northward and westward, thereby increasing water use, numerous regulatory plans were developed and implemented.
- The 1999 Regulatory Plan designated the three Regulatory Areas that exist today. By 2013, two regulatory areas were fully converted, and Regulatory Area 3 was put on a revised timeline for conversion:
 - 2025: 40% Groundwater, 60% Alternative Water
 - 2035: 20% Groundwater, 80% Alternative Water

Collaborators and Data Collection

Collaboration with multiple local, state, and federal agencies as well as universities including:

- Groundwater Conservation Districts
- Cities, Water Authorities, and Municipal Utility Districts
- Flood Control Districts
- Texas Water Development Board
- Texas Department of Transportation
- National Geodetic Survey
- U.S. Geological Survey
- University of Houston
- Southern Methodist University
- Texas A&M Corpus Christi – Conrad Blucher Institute



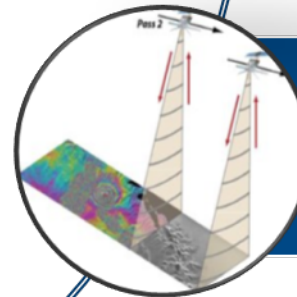
Aquifer Data

- Water Levels
- Lithology
- Extensometers



Water Use Data

- Groundwater Pumpage
- Alternative Water Usage

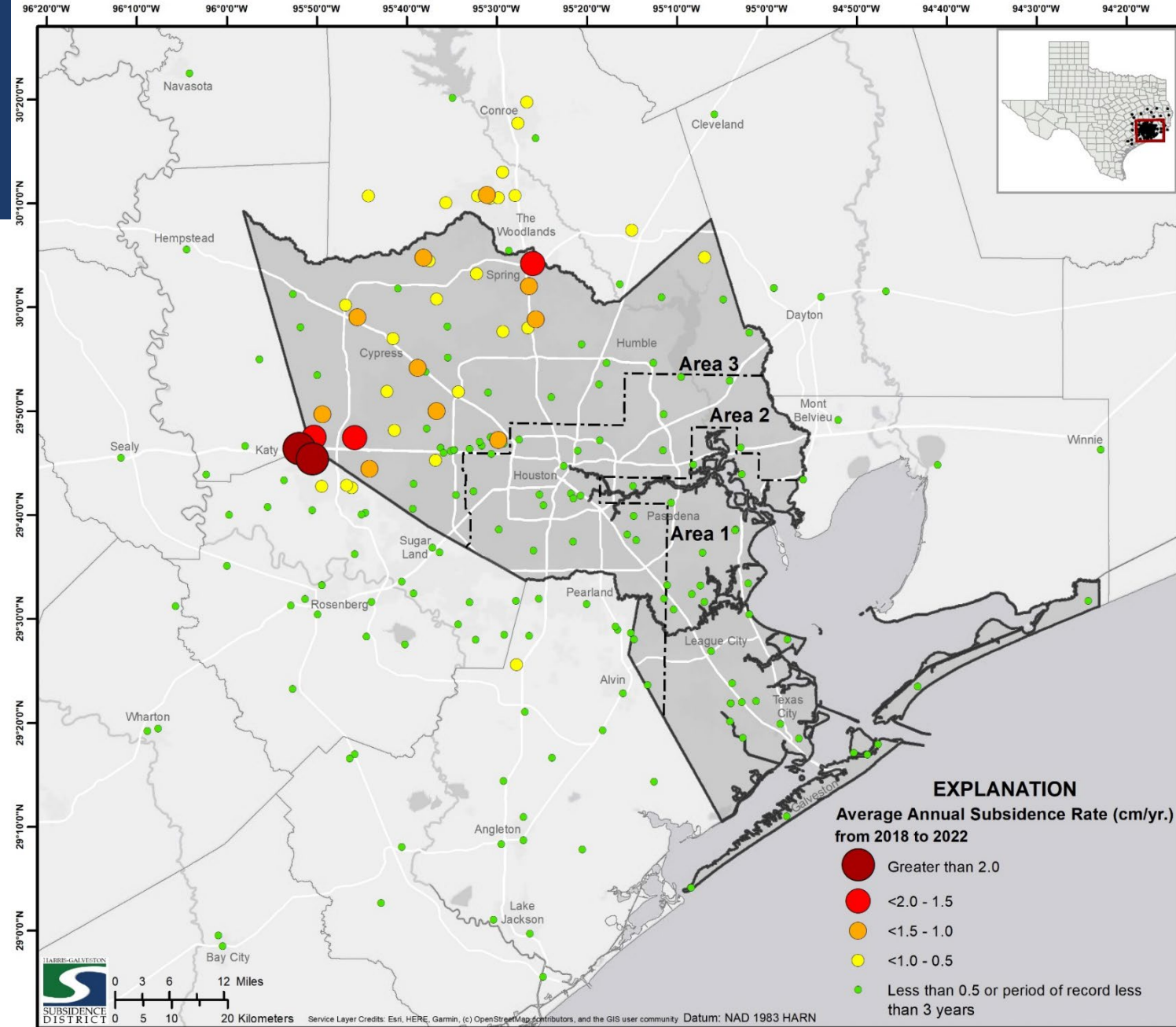


Land Subsidence Data

- GPS
- InSAR
- Benchmark Surveys

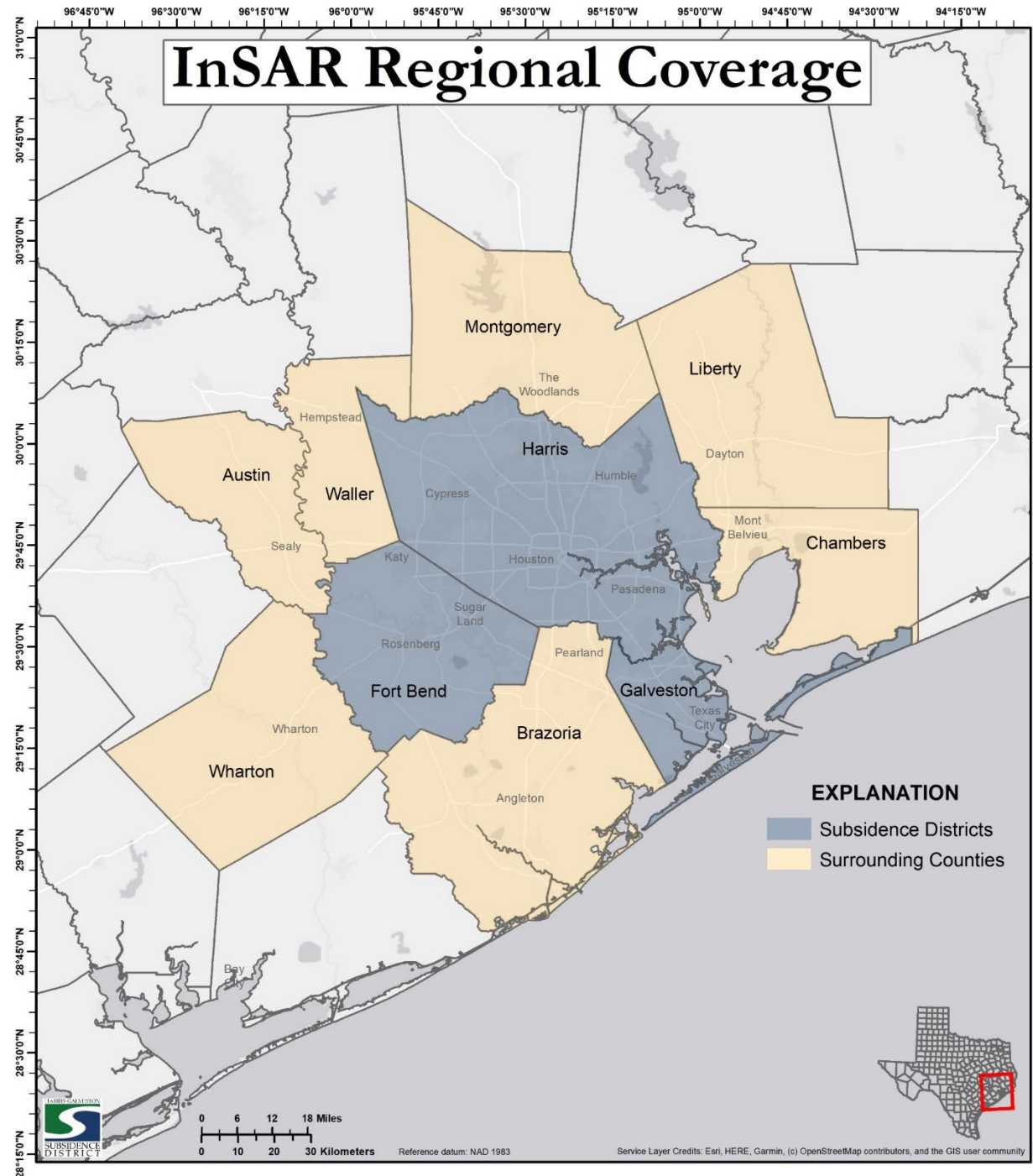
Subsidence Rates

- Area 1 and 2 show the impact of District regulation on subsidence rates.
- Decreased rates were achieved through a collaborative effort to develop infrastructure amongst regional water authorities and the City of Houston.



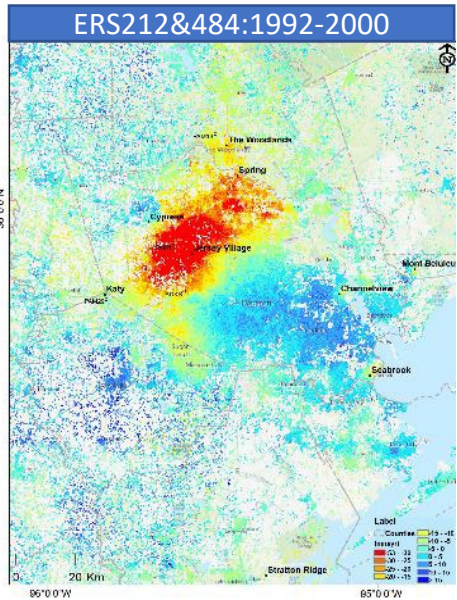
InSAR for Applied Monitoring

Location of expected regional coverage of SAR scenes in the southeast Texas Gulf Coast, USA.

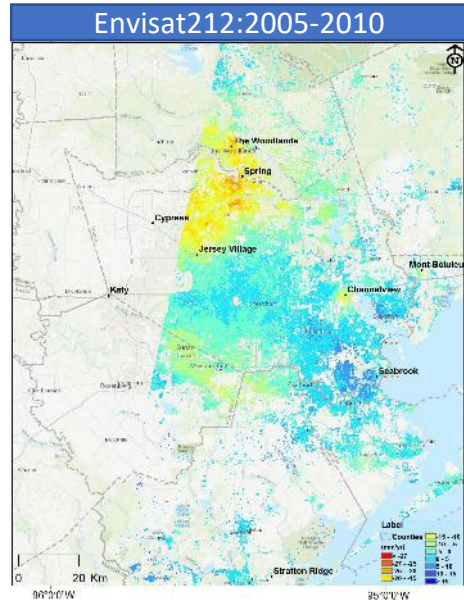


Previous InSAR Work

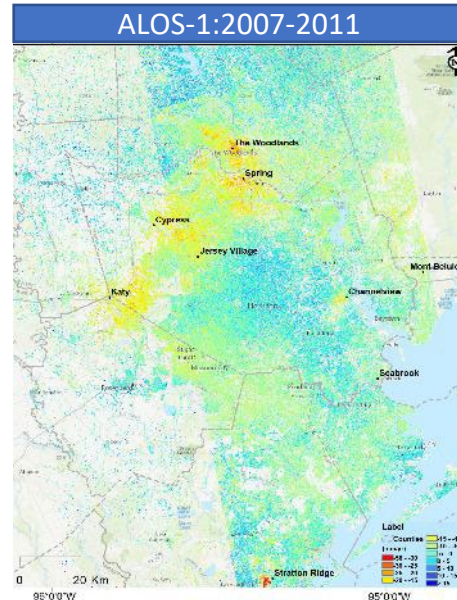
InSAR-derived surface deformation evolution across the Houston-Galveston Region



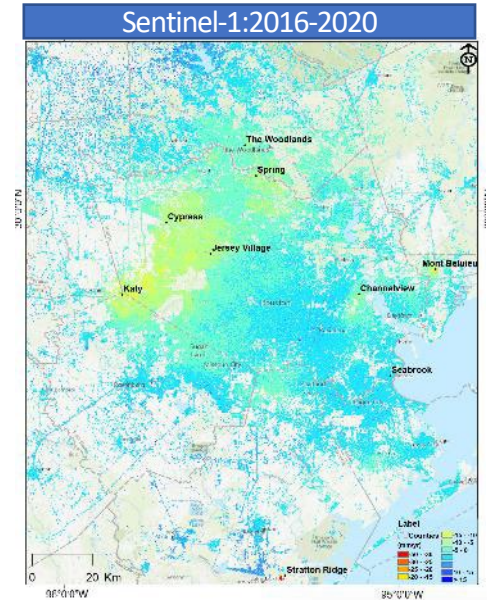
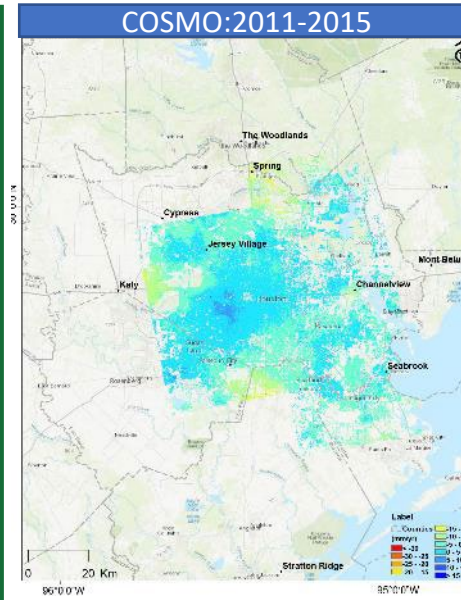
1992-2000
Jersey Village
5 cm/yr.



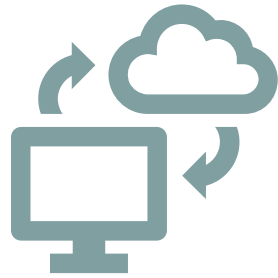
2000-2011
Spring and The Woodlands
2-3 cm/yr.



2012-2020
Katy and Cypress
2 cm/yr.



Drivers for this Project



Routine delivery of InSAR-derived deformation maps to HGSD staff on a quarterly basis, at a minimum.



Flexibility to add other datasets to deformation maps.



High quality deformation maps to be published in HGSD reports and/or peer-reviewed journals.

Overview of Tasks included in RFQ

1. Develop methodology for subsidence monitoring using InSAR
2. Develop platform for analyzing SAR images
3. Prepare documentation of the study

Task 1: Processing Methodology

Consulting teams should:

1. Describe how their approach will address potential processing advantages, limitations, and assumptions on data quality with respect to the greater Houston-Galveston region.
2. Consider and explain the incorporation of other geodetic datasets in terms of processing and quality assurance.
 - HGSD will provide GPS data from our monitoring network of GPS stations.
3. Recommend future improvements and/or processing advancements.

Expected deliverable will be a technical report summarizing the above-mentioned subtasks.

Task 2: Deformation Map Platform

Consulting teams should develop or recommend suitable platform for viewing processed SAR scenes with the following capabilities, at a minimum:

1. Flexibility for HGSD to change time intervals, map scales, and sensor tracks.
2. Importation of other datasets, such as GPS station data, aquifer water-level data, water use data, oil and gas production data, and geological structures.
 - HGSD will provide all data mentioned above except oil and gas production data.
3. Exportation of InSAR-derived land surface deformation data in various formats including geospatial, tabular, and GIS.
4. Dashboard that includes options for prioritization or notification of HGSD defined criteria.

Expected deliverables will be:

- Technical report describing the standard operating procedures and recommended best practices of the proposed platform.
- Access to interactive software or web-based platform with all functionalities as described in the above subtasks.

Task 3: Final Documentation

- Draft Report
- Final Report
- Executive Summary to serve as a user guide for HGSD staff

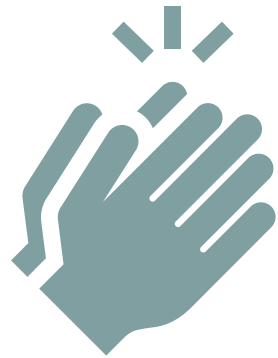
RFQ Timeline

- Release RFQ: Tuesday, October 31, 2023
- Pre-submittal conference: Thursday, November 9, 2023, at 10am CST
- Deadline for questions and inquiries: Tuesday, November 28, 2023
 - Send questions and inquiries to contracts@subsidence.org
 - Answers to all questions, inquiries, and requests for additional information will be issued in the form of Addenda on the District website.
 - If Addenda are issued, receipt of each Addendum must be acknowledged by responding firm in the submittal package.
- Statement of Qualifications (SOQ) submissions due: Friday, December 15, 2023

Questions?

- Please type your question in the chat or raise your hand to be unmuted by the organizer so that you can verbally ask your question.
- Any questions and responses provided during the Pre-Submittal meeting will be posted in an addendum.

Thank You



We appreciate your time today
and interest in this RFQ



Please send additional questions
or inquiries to
contracts@subsidence.org



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Connect with us!