

# **Harris-Galveston Subsidence District**

## **Evaluation of the 1999 HGSD Regulatory Plan**

### **Proposal**

Engage a consultant(s) to aid the District over the next several years in evaluating the effectiveness of the elements and regulations within the 1999 Regulatory Plan by: 1) updating historical data; 2) updating and recalibrating the groundwater model and subsidence models; 3) establishing new population and water demand projections; and 4) assisting in the development and evaluation of various regulatory scenarios and elements of the 1999 Regulatory Plan. The following are general objectives of the work that needs to be accomplished over the next several years.

**Objective 1: Update/recalibrate GW model with current data**

**Objective 2: Update/recalibrate PRESS models with current data**

**Objective 3: Update population and water demand projections through 2060**

**Objective 4: Evaluate effectiveness of 1999 Regulatory Plan using updated models and projections, including review of the Disincentive Fee rate and provisions**

**Objective 5: Revise 1999 Regulatory Plan to address changed conditions and evaluate permitting/exemption provisions**

### **Need for Plan Evaluation**

When the 1999 Regulatory Plan was developed and adopted, assurance was given that the results of its implementation would be evaluated at its major milestones: 2010, 2020, and 2030, in conjunction with updates of population projections corresponding with the decadal Census. The projections of population and associated water demands that were relied upon in the 1999 Regulatory Plan were based on data from 1994, well before the 2000 Census, and nearly 20 years prior to the upcoming 2010 Census. Many changes have occurred since our projections were established, some anticipated and some unexpected. The populations in north and west Harris County, Fort Bend County, and Montgomery County have grown greater than originally projected. In addition, the Texas City area began a surprising growth spurt over the past several years, while the effects of Hurricane Ike have likely stunted growth, at least for the near term, on Galveston Island.

Contrastingly, per capita water demands have seemingly decreased to levels lower than originally projected in some areas. This reduction in per capita demand may be attributed to changes in the plumbing code and water savings fixtures, greater conservation efforts, and overall public awareness, although little hard data exists to substantiate this assertion. Evaluation of the District's regulations will need to utilize the most recent Census data in developing updated population projections and updated water demand projections. Additionally, the 1999 Plan speaks only to the time period through 2030. As part of this evaluation, the District needs to look past 2030 and determine if the existing regulations adequately address expected conditions beyond 2040 and 2050.

Billions of dollars will be spent in Harris and Galveston Counties and in Fort Bend County (due to the FBSD's 2003 Regulatory Plan) over the next several decades to comply with the Subsidence Districts' regulations. The first stages of conversion are nearing full implementation with estimates of \$500 million dollars or more, currently committed to infrastructure and surface-water supplies. It is imperative that the District evaluate and update the existing Regulatory Plan, using the most current data available, to insure that the upcoming stages of regulations adequately address the goals of the District. If changes are needed to be made to any of the existing regulations, permittees and water providers will need as much time as possible to plan for and implement those changes.

The entities that exist today, created to comply with the District's 1999 Plan, were not yet created when the 1999 Plan was adopted. The City of Houston had not built the NE Surface-Water Treatment Plant. There was no Fort Bend Subsidence District (FBSD) 2003 Regulatory Plan and there were no groundwater districts in surrounding counties. Today there are multiple entities involved in groundwater regulation and compliance, including: the FBSD, Lone Star Groundwater Conservation District (GCD), Bluebonnet GCD, Brazoria County GCD, North Harris County Regional Water Authority (NHCRWA), West Harris County Regional Water Authority (WHCRWA), Central Harris County Regional Water Authority (CHCRWA), and the North Fort Bend Water Authority (NFBWA). Additionally, the City of Houston proposed an "early/over" conversion concept, allowed for by the District, which resulted in significant conversions by 2004. This early reduction in groundwater pumping beyond the specified regulatory mandate of 30% was not expected nor accounted for in the 1999 Regulatory Plan.

In 1997, the Texas Legislature began the State Water Plan effort to combine regional water plans into a State Water Plan. Region H (greater Houston area) is now working on their 3<sup>rd</sup> Regional Water Plan. In more recent years, the Legislature mandated that local groundwater districts work cooperatively in Groundwater Management Areas (GMAs) and are now required to develop a joint plan for future groundwater conditions. GMA 14 covers the northern Gulf Coast, including Harris and Galveston Counties.

As a result of all of the many changes that have occurred in our region since the 1999 Regulatory Plan was developed, the District should now embark on a thorough evaluation of the 1999 Plan, incorporating updated and actual data, known conversions, the latest projections of water demand, and working with other surrounding efforts and entities.

## **Work Involved**

There are four main modules of effort required to evaluate the current Plan: 1) population and water demand projection updates, 2) groundwater model updates and recalibrations, 3) subsidence model updates and recalibrations, and 4) regulatory scenario development and review. Each module of this proposal includes work to be performed by staff, consultant, and cooperatively with local, state, and federal agencies. The overall effort should be directed by the District, with input from expert consultants, neighboring regulatory agencies, related state and federal agencies, and affected stakeholders. It is not currently clear how all of the local, state, and federal agencies can, or even if they would, cooperate with this effort. Therefore, it is assumed that part of the beginning stages of this process would involve substantial planning/cooperation meetings with the following entities (but certainly not limited to these): 1) Fort Bend Subsidence District (FBSD); 2) Lone Star GCD, 3) Bluebonnet GCD; 4) Brazoria County GCD; 5) Texas Water Development Board (TWDB); 6) United States Geological Survey (USGS); 7) the City of Houston and other cities; 8) new and existing water authorities; 9) Region H; and 10) GMA14 participants.

The following is a recommended general scope of work:

1. Assist in formulating the final, detailed scope of work for the project with a schedule of milestones for completion; determining potential collaborations with local, state and federal agencies; and developing technical approaches and criteria to be used during the Regulatory Plan review.
2. Data collection, analysis, and management including census data, aerial photography, well pumpage, surface water usage, geologic data, aquifer characteristics, subsidence data, groundwater elevation data, and any other data relative to completing the review of the Regulatory Plan.
3. Develop a comprehensive Geographic Information Systems (GIS) database for well pumpage, existing population, forecasted population, forecasted water usage and pumpage, census data, geographic boundaries, subsidence data, Groundwater Availability Model (GAM) grids, and any other data relative to the regulatory review.
4. Develop the programming necessary to exercise the various databases acquired in the GIS system to efficiently analyze and assess project components including population and water demand forecasting and existing and projected pumping for the project area.
5. Development of comprehensive database of water usage by type and source for the geographic area.
6. Development of projections of population and estimates of water demand for the desired planning horizon and geographic area on a one-square mile grid basis.
7. Update the Northern Gulf Coast Groundwater Availability Model (NGC-GAM) with recent water-use, pump test, and water-level data utilizing the most recent modeling techniques and codes, including subsidence modeling.

8. Recalibration and evaluation of subsidence analytical models including, PRESS subsidence models, extensometers, GPS subsidence monitor sites, and the NGC-GAM subsidence predictive model.
9. Assist HGSD staff in regular meetings with study Stakeholders (i.e., Groundwater Reduction Plans, Regional Water Authorities, Cities, etc.) during regulatory review process to ascertain most up to date information related to conversion plans, update Stakeholders on the status of regulatory review, and provide a forum for input during the process.
10. Assist HGSD staff in the development of modeling scenarios for use in evaluating future conditions and potential regulatory implications.
11. Utilization, modification, calibration, and execution of the NGC-GAM to evaluate and assess modeling scenarios developed by the Consultant Team and HGSD staff.
12. Review regulations and rules affecting issuance of permits and permit exemption, including but not limited to economic hardship exemptions, small use wells, and irrigation and lake makeup wells.
13. Based on results of regulatory review as well as knowledge of stakeholder GRP plans and construction cost estimates, re-evaluate current GRP disincentive fees.
14. Preparation of technical reports and work products with presentations to HGSD Planning Committee and Board of Directors as well as stakeholders, throughout the project duration.

## **Implementation Schedule**

The primary goal of this effort is to evaluate the existing conversion regulations for 2010, 2020, and 2030, with a secondary goal to look beyond 2030 to correspond with Regional Planning efforts to the year 2060. Since the 2010 conversions are nearing completion today, we can incorporate those conversions as actual data in our evaluation. The timeline and critical path for this project is driven chiefly by the requirements for the 2020 and 2030 conversions and the potential that changes may be necessary for those regulations. On a regional scale, much of the planning for the 2020 conversion has already been set in motion. Therefore, it is vital that this regulatory review be initiated immediately and completed in the most expeditious manner as reasonably possible.

Given our current understanding of the schedule for the 2010 Census, the work required to accomplish our goals, and our desire to provide for the most time allowable to address any changes required to the 2020 regulations, we feel that decisions must be made and adopted as early in 2012 as possible. Based on our current understanding, the 2010 Census data will be available in the 2<sup>nd</sup> quarter of 2011. This will leave very little time for developing population and water demand projections, evaluating the results of scenario specific groundwater model and subsidence model outputs, and ultimately crafting any proposed changes to the existing Regulatory Plan.

Because of the compressed schedule, it is critical to initiate immediately and complete as soon as possible all elements of this project not directly tied to the 2010 Census schedule. In order for this evaluation to be completed in 2012, a number of activities need to begin as soon as possible,

including the groundwater model and subsidence model updates and recalibrations, baseline data development, stakeholder process development, updating regional 2010 conversion projects, GIS database creation, development of the overall technical approach and methodology, and reviewing Regulatory Plan elements related to permitting and exemptions. A more precise schedule for this project needs to be developed early in this review process. Technical assistance is needed to develop a detailed scope of work in order to estimate a realistic timeframe for completion.