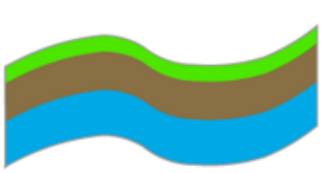

AGS

Advanced Groundwater Solutions, LLC

RFQ No. 07-2022
BRAZOS VALLEY GROUNDWATER CONSERVATION DISTRICT HYDROGEOLOGY SERVICES

August 12, 2022

Brazos Valley Groundwater Conservation District

www.advancedgw.com

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I. LETTER OF INTEREST

AGS
Advanced Groundwater Solutions, LLC

August 12, 2022

Brazos Valley GCD
Attn: Alan M. Day, General Manager
P.O. Box 528
Hearne, Texas 77859
aday@brazosvalleygcd.org
clopez@brazosvalley.org

Dear Alan and Board of Directors:

Advanced Groundwater Solutions, LLC (AGS) is ready to serve Brazos Valley GCD as described in your Request for Qualifications (RFQ) for Hydrogeology Services. AGS is a registered Geoscience and Engineering firm in Texas, and we specialize in professional consulting services related to groundwater, hydrogeology, and water resources. Our team has served the needs of many GCDs across Texas for over 20 years, and several of our staff have relevant experience with Brazos Valley GCD and GMA 12, and all of our professionals have experience in the Carrizo-Wilcox Aquifer.

AGS principals include James Beach, PG and John Nelson, PG. The following key personnel will be available to support Brazos Valley GCD at any time for these services.

Name	Title	Telephone
James Beach, PG	Principal Hydrogeologist	(512) 796-8636
Chris Drabek, PG	Senior Hydrogeologist	(281) 989-1983
Ty Davidson, PE	Senior Engineer	(512) 217-8502

James Beach is authorized to contractually negotiate and obligate AGS and should also be contacted for clarification.

James Beach, PG
james.beach@advancedgw.com
P.O. Box 741
Dripping Springs, TX 78620
(512) 796-8636

Sincerely,
Advanced Groundwater Solutions, LLC

James Beach, PG

II. STATEMENT OF QUALIFICATIONS

II A. Firm History

Advanced Groundwater Solutions, LLC (AGS) was formed in January 2021 by James Beach, PG and John Nelson, PG, who had worked together professionally for 21 years at their previous firms. Prior to forming AGS, James was a principal with LBG-Guyton Associates. After LBG-Guyton was acquired by WSP, James managed 15-20 professionals in Texas and the southwest US. John Nelson was a Senior Associate at LBG-Guyton Associates and worked with John Seifert for 25 years prior to John Seifert's retirement from WSP. John Nelson was also responsible for business operations in Houston for WSP. James and John have been trusted advisors to their clients in the groundwater industry since 1989. They formed AGS to provide specialized professional groundwater consulting services to clients in the groundwater and water industry, including Groundwater Conservation Districts (GCDs) in Texas. Other experienced professional geoscientists and engineers have been added to the AGS team to enhance the breadth of our professional groundwater experience.

Full resumes for James, Chris, and Ty are included in Attachment A. Supporting resumes for John Nelson, PG, Bill Stein, PG and Peter Lyman, PE are also included. Below is a brief description of qualifications for the three key personnel working with Brazos Valley GCD.

James Beach, PG is principal hydrogeologist at AGS with 33 years' experience in professional groundwater consulting. He has 20 years of experience helping GCDs develop management plans and rules, design groundwater monitoring networks, assess DFCs/MAGs for joint groundwater planning, groundwater availability model runs and assess impacts of potential rules. Additional GCD support includes review of studies assessing strategies in state water plan and future groundwater pumping, assessing ASR and brackish groundwater, recharge, stream-aquifer interaction, water budgets, impact of developments, and long-term sustainability. James was prime author and modeler on four TWDB GAMs, and contributor on several other GAMs. He has assisted GCDs in developing rules and policies, the development of well spacing rules and interactive tools to assess well spacing, evaluating permits and the assessment of impacts of proposed production. James has worked for numerous groundwater conservation districts throughout the state of Texas and has provided technical support for litigation as both a testifying expert and consulting expert. He has provided testimony in multiple cases at district, SOAH, and TCEQ hearings. He has worked closely with GCDs and legal teams to develop strategies for communication and illustration of groundwater concepts and technical issues.

Chris Drabek, PG has 20 years of experience in assisting GCDs assess future water demands and groundwater availability, develop groundwater level monitoring networks, assess change in water levels for the DFC process, assess historical and current groundwater pumping, update groundwater availability model files as part of the GMA planning process, review brackish groundwater resources and update of rules and management plans. Chris has also reviewed hydrogeologic reports, well spacing requirements and groundwater flow modeling efforts related to well permit applications. Chris has performed special studies related to groundwater production and water level response and has assisted with groundwater flow modeling scenario development, GIS mapping and 3D model development. He has also provided technical support for litigation proceedings, including Brazos Valley GCD. Chris has worked for the Brazos Valley GCD (20 years), Lone Star GCD (18 years), North Texas

GCD, Red River GCD, Cow Creek GCD, Headwaters GCD, Guadalupe County GCD, Colorado County GCD and Harris Galveston Subsidence District.

Ty Davidson, PE has 24 years of groundwater consulting experience, including assisting GCDs develop well spacing rules; performing a multivariate analysis of spring flow, streamflow, and groundwater levels for Barton Springs/Edwards Aquifer CD; developing groundwater level monitoring networks; managing well information and aquifer data; assessing current and historical pumping; assessing changes in water levels for the DFC process; and updating of GCD rules. Ty has also reviewed historical pumping based on power consumption, and reviewed well permitting and aquifer test reports. Ty has worked for the Barton Springs/Edwards Aquifer CD, Cow Creek GCD, Headwaters GCD, Bandera County River Authority & Groundwater District, North Texas GCD, Red River GCD, Clearwater GCD, Prairielands GCD, and the Reeves County GCD.

John Nelson, PG is a Principal at AGS and a Professional Geoscientist in Texas and Registered Professional Geologist in Mississippi with 33 years of professional and practical consulting experience in hydrogeology and groundwater resources evaluation, planning and development, groundwater well and pump equipment design for municipal, public and industrial water supplies, water well construction consultation and field observations and consultation for existing water well and pumping equipment rehabilitation and repair. John has completed groundwater and well projects numerous areas in Texas plus sites in Nevada, northern Arizona, northern Michigan, eastern Missouri and central Mississippi. Many of the projects in Texas have involved technical studies and/or public supply or industrial water wells completed in the Chicot, Evangeline, or Jasper Aquifer (Gulf Coast Aquifer) and the Catahoula Aquifer in southeast and east Texas. Additional studies and water well projects have been completed in the Carrizo, Carrizo-Wilcox, Simsboro, Sparta, Yegua or Queen City Aquifer in southeast, east, central and south-central Texas, the Trinity, Woodbine or Paluxy Aquifer in north-central Texas and the Ogallala Aquifer in the southern high plains of Texas.

II B. Financial Capability and Stability

AGS has the financial capability and stability to correctly, timely, and reliably perform the requested services for the District. AGS principals and most staff have established credible careers in consulting and have a stable client base and business practices to ensure that the company is well funded and responsibly managed for long-term stability. In our first 18 months, we have established a stable client list, a backlog of work, and continue to have new opportunities. AGS has the financial means and stability to weather business cycles and the wherewithal and experience to expand services as needed to meet the Districts needs and balance Brazos Valley GCD's demands along with those of other clients.

The firm's financial capability has been demonstrated by the investments made in professional personnel, employee benefits, professional liability insurance, hardware, software, field equipment, and support of professional organizations such as Texas Alliance of Groundwater Districts and Texas Water Conservation Association. AGS principals are committed to maintaining this financial capability and stability by adhering to sound business practices and a business model and management approach that is focused on cost-effective professional services for the groundwater industry.

II C. Professional Memberships, Certifications and Licenses

All AGS professionals are registered and have advanced degrees in geology, hydrogeology, hydrology, or engineering. Our combined experience offers broad groundwater expertise to address Brazos Valley GCD issues.

AGS has corporate memberships with the National Ground Water Association, Texas Groundwater Association, Texas Water Conservation Association, Texas Alliance of Groundwater Districts and Texas Groundwater Association.

James Beach is a Professional Geoscientist registered in the State of Texas (#2965). He is a board member of Texas Water Conservation Association.

Chris Drabek is a Professional Geoscientist registered in the States of Texas (#4564) and Louisiana (#405).

Ty Davidson is a Professional Engineer in the States of Texas (#92799).

II D. Company Experience And Qualifications

AGS is a registered Geoscience and Engineering firm in Texas. We specialize in professional consulting services related to groundwater, hydrogeology, and water resources. AGS has many types of clients in the water industry, including water supply entities, groundwater conservation districts, municipalities, industrial and manufacturing companies, river authorities, utility districts, engineering firms, attorneys, and many other entities. Throughout Texas, AGS works on both sides of the table of groundwater management. In other words, AGS serves GCDs in some areas and water suppliers in other areas, and that is beneficial to Brazos Valley GCD because we understand technical issues from both perspectives and can bring that experience to the board to inform decision-making. This broad perspective allows AGS to provide a balanced approach to help meet regulatory goals and provide practical guidance to the District from a groundwater development and conservation perspective.

Management Plans and Rules

AGS staff have extensive experience working with groundwater conservation districts across the state of Texas. James Beach, PG has served and continues to serve as lead consulting groundwater hydrologist to several groundwater conservation districts. Recently, AGS has supported the update of Management Plan for Lone Star GCD and Middle Trinity GCD. Over the past 6-8 years, AGS professionals have successfully supported the development the implementation of Rules and Management Plans in Prairielands, Red River, North Texas, Brazos Valley, Clearwater, Middle Trinity, Lone Star and Reeves County Groundwater Conservation Districts.

Quantitative Hydrogeologic Evaluation

AGS routinely assesses aquifer demands, historical pumping impacts, and aquifer storage and recharge. We use available data from pumping and step tests to characterize aquifer hydraulic properties and flow systems and patterns. We have evaluated groundwater and surface water interaction, aquifer recharge and impact analysis from pumping and permit applications. We have used historical data and quantitative models to assess long-term water groundwater supply using groundwater availability models and other quantitative techniques. We have provided technical support for litigation strategies, permit hearings, and SOAH hearings.

We use data mining and visualization techniques to develop conceptual models for aquifers and to complete predictive modeling of various planning and development scenarios. We review hydrogeologic reports and hydrogeologic data submitted with permit applications for several Districts to help review wellfield impacts and long-term viability.

Groundwater Availability Modeling

AGS personnel have expertise in developing and using Groundwater Availability Models including experience working with the TWDB Carrizo Wilcox (South, Central and North), Yegua-Jackson and Brazos River Alluvium GAMs. Just as importantly, we have extensive recent experience helping GCDs understand and document the limitation of the GAMs in local application for rules and aquifer management. AGS staff has used all of the GAMs that are relevant to the Brazos Valley GCD. James Beach, Chris Drabek and Ty Davidson have developed the conceptual models for several TWDB GAMS, developed input for and processing output from many TWDB GAMs, and have developed pumping datasets to assess impacts from pumping and to develop DFCs.

Permitting Support, Data Collection and Analysis, Pumping Impact Analysis, Rules, and Contested Case Hearings

AGS personnel have assisted GCDs in the following:

- reviewing aquifer tests, hydrogeological and modeling reports, TCEQ Chapter 230 Groundwater availability certifications, and well construction to support permitting,
- developing defendable, science-based water well spacing, production allocation, and other rules,
- developing groundwater level monitoring networks,
- geophysical log interpretation and stratigraphy,
- aquifer test analysis,
- managing well information and aquifer data with databases and GIS,
- applying local hydrogeologic understanding to develop appropriate local-scale models,
- assessing current and historical exempt and permitted pumping,
- assessing changes in water levels for the DFC process,
- reviewing power consumption records for historic use permits,
- performing modeling and providing written and verbal testimony for contested case hearings.

Other Professional Services

AGS will be available to perform the tasks described below:

- Evaluate water well permit applications and related hydrogeologic data and reports to assess potential impacts of existing and proposed pumping.
- Discussion, review, recommendations of District Rules, Management Plan, Monitoring Program, Annual Report, or other technical tasks related to policies and programs to support the District's mission and goals.
- Assist District staff and Board of Directors with studies and programs focused on the collection and analysis of scientific data regarding aquifer systems and impacts on the District's groundwater resources and those in the region.
- Assist with work on GMA-related joint planning efforts (including analysis on proposed DFCs and DFC related documents).
- Serve as expert witness to testify on potential impacts of an application, rules, management plan, and/or DFCs, as requested by the Board and/or General Manager.

- Attend regular and special meetings of the Board, either in person or virtually, as requested.
- Be available for consultation with General Manager, other District staff and/or legal counsel.
- Other general consulting tasks as requested.

II E. Listing Of Projects

AGS personnel have served as consulting groundwater hydrologists in an ongoing capacity or on a project basis for tasks requested in the Brazos Valley GCD RFQ for the following Districts over the last ten years.

AGS currently works with the following GCDs as needed:

- Lone Star GCD – ongoing contract to be primary consulting hydrogeologic firm
- North Texas GCD – ongoing contract to review Hydrogeologic Reports and other hydrogeologic tasks
- Red River GCD – ongoing contract to review Hydrogeologic Reports and other technical and hydrogeologic tasks
- Clearwater GCD – ongoing contract to provide specialized services for modeling and DFCs
- Middle Trinity GCD – ongoing contract as primary consulting hydrogeologic firm
- Reeves County GCD – ongoing contract as primary consulting hydrogeologic firm
- Guadalupe County GCD – project support on mitigation issues
- Brazos Valley GCD – support to Groundwater Consultants, LLC for permit applications, modeling review, etc.

Additionally, AGS has completed project related work as follows:

- Cow Creek GCD – special groundwater availability study to assess acreage production limits
- Headwaters GCD – special groundwater availability study to assess acreage production limits

II F. Clients Producing Groundwater in the District

AGS has no clients producing groundwater in Brazos or Robertson County. In the past, AGS has performed some well design work for the City of College Station as a subconsultant to a large engineering firm. If contracted by BVGCD, AGS commits to gain approval from the District prior to undertaking work that could conflict with BVGCD.

II G. Experience With The Major And Minor Aquifers In the District

AGS professional staff have experience in the Brazos River Alluvium, Yegua-Jackson, Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro and Hooper aquifers within Brazos Valley GCD. Experience includes development of specialized groundwater models such as refined GAMs, hydrogeologic and stratigraphic interpretations, water quality assessments, potential monitoring well evaluations, DFC analysis, development or updating of management plan and rules, well spacing assessments, evaluation of production allocations, surface water – groundwater interaction, review of hydrogeologic reports, and other projects. For water users, AGS professional staff have completed groundwater availability studies and assisted with water well rehabilitation, well testing and construction projects.

In 20 years of supporting Brazos Valley GCD (from LBG-Guyton Associates to WSP and with AGS continuing as a subconsultant to Ground Water Consultants, LLC), AGS professional staff have institutional knowledge of the groundwater resources of Brazos and Robertson Counties and are very well versed in the hydrogeology relating to the District including: the historical progression of groundwater development within the District; public water supply well and oil and/or gas well or test hole geophysical log availability; historical and current groundwater production data for the major and minor aquifers of

the District; historical and current water level data (prior to and following the establishment of the Brazos Valley GCD observation well program); historical groundwater quality data, and familiarity with the online Brazos Valley GCD Groundwater Management Application.

II H. Proof of Insurability

AGS current insurance limits are summarized below. AGS will provide a certificate of insurance to the District if selected.

Client#: 58142 ADVANGRO

ACORD **CERTIFICATE OF LIABILITY INSURANCE**

DATE (MM/DD/YYYY): 2/04/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer any rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Chyrl Sherrill
The Nitsche Group 143 E Austin Street Giddings, TX 78942 979 542-3666	PHONE (A/C, No, Ext): 979-540-2244 FAX (A/C, No): E-MAIL ADDRESS: ChyrlS@thenitschegroup.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Scottsdale Insurance Company	41297
INSURER B : Texas Mutual Insurance Company	22945
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED: Advanced Groundwater Solutions, LLC, P.O. Box 741, Dripping Springs, TX 78620

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR X BI/PD Ded:1,000 GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT LOC OTHER:			VRS0005668	01/05/2022	01/05/2023	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG $	$1,000,000 $250,000 $5,000 $1,000,000 $2,000,000 $1,000,000 $
A	AUTOMOBILE LIABILITY ANY AUTO OWNED AUTOS ONLY SCHEDULED AUTOS X HIRED AUTOS ONLY X NON-OWNED AUTOS ONLY			VRS0005668	01/05/2022	01/05/2023	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) $	$1,000,000 $ $ $ $
A	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $0			VES0003610	01/05/2022	01/05/2023	EACH OCCURRENCE AGGREGATE $	$2,000,000 $2,000,000 $
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y/N: N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		0002058171	01/05/2022	01/05/2023	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $1,000,000 $1,000,000 $1,000,000
A	Professional Liability			VRS0005668	01/05/2022	01/05/2023	$2,000,000 Aggregate $1,000,000 Claim Limit	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

As per policy provision, Certificate Holder is listed as additional insured in regard to the general liability policies as provided by blanket additional insured endorsement when required by written contract.

II I. Conflicts of Interest

AGS is not aware of any conflicts of interest with the Brazos Valley GCD or its Board of Directors and is willing to file appropriate forms as required under Chapter 176, Local Government Code.

III. CERTIFICATE OF NON-DISCRIMINATION (Exhibit B)

CERTIFICATION OF NON-DISCRIMINATION

TO BE EXECUTED BY RESPONDENT AND SUBMITTED WITH STATEMENT OF QUALIFICATIONS

Respondent hereby certifies in performing work or providing services for the District, there shall be no unlawful discrimination in its hiring or employment practices, and Respondent shall comply with applicable federal and Texas anti-discrimination laws.

IN WITNESS WHEREOF, the undersigned has executed this Certificate of Non-Discrimination this 12th day of July, 2022.

RESPONDENT:

Type or print complete legal name of firm)

BY: _____
(Signature)

NAME: James A. Beach
(Type or Print)

TITLE: Principal
Type or Print)

ADDRESS: Box 741

CITY Dripping Springs STATE Tx

ZIP 78620

IV. REFERENCES (Exhibit C)

REFERENCES **Respondent shall provide a minimum of three (3) References with three (3) or more years' experience with the Respondent.**	
REFERENCE #1	
NAME	North Texas GCD
ADDRESS	5100 Airport Dr
CITY, STATE ZIP CODE	Denison, TX 75020
TELEPHONE #	(855) 426-4433
CONTACT	Drew Satterwhite
DATES OF SERVICE	AGS (2021-present), Beach/Davidson/Stein/Drabek (2014-2020)
DESCRIPTION OF SERVICES	Hydrogeology, modeling, rules, management plan, DFCs, permit reviews
REFERENCE #2	
NAME	Lone Star GCD
ADDRESS	655 Conroe Park North Drive
CITY, STATE, ZIP CODE	Conroe, TX, 77303
TELEPHONE #	(936) 494-3436
CONTACT	Samantha Reiter
DATES OF SERVICE	AGS (2021-present), Beach/Drabek/Davidson (2003-2017, 2020-present)
DESCRIPTION OF SERVICES	Stratigraphy, modeling, hydrogeologic report review, rules, MP, DFCs
REFERENCE #3	
NAME	Reeves County GCD
ADDRESS	119 South Cedar
CITY, STATE, ZIP CODE	Pecos, TX 79772
TELEPHONE #	(432) 445-9961
CONTACT	Greg Perrin
DATES OF SERVICE	AGS (2021-present), Beach/Davidson/Drabek (2016-2020)
DESCRIPTION OF SERVICES	Monitoring, rules, MP, permit review, DFCs, spring evaluation, other

Attachment A - Resumes

James Beach, P.G.

Experience

33 years

Professional Qualifications

-Professional Geoscientist #2965, State of Texas

Areas of Expertise

- Numerical Modeling

-Quantitative Hydrogeology

-Model Development and Calibration

-Long Term Water Availability Assessments

-Stakeholder Communication

CAREER SUMMARY

James Beach is a Professional Geoscientist in Texas with over 30 years' experience in professional consulting in groundwater and surface water hydrology, water resources development and planning, groundwater well field design and development, permitting, environmental assessments, numerical flow and solute transport modeling, quantitative contamination evaluations, litigation support, and expert witness work. James has been successful in business leadership and operations, cost center management, business development and client management, corporate and project risk management, and employee development and management.

Mr. Beach has worked on regional planning efforts in eight of the sixteen regional planning areas of Texas. He has also worked on projects around the US and abroad. His expertise in quantitative hydrogeology includes experience in assessment of groundwater availability and quality in many aquifer systems; evaluation of current and projected water supply and demand; identification of critical groundwater areas and long-term availability; groundwater/surface water interaction; groundwater model development, use and interpretation; GIS applications and mapping; development of water-management strategies; well field design (vertical and horizontal); public/regulatory interaction, and report preparation.

James has extensive groundwater consulting experience in the Carrizo-Wilcox Aquifer throughout Texas, including BVGCD. He has been involved with GMA 12 planning, wellfield development, and groundwater availability studies in the central portion of the Carrizo-Wilcox Aquifer for multiple clients. In the GMA-12 area, he has been responsible for assessing impacts from large pumping projects, including those in Post Oak Savannah, Lost Pines, and Brazos Valley GCDs, permitting and permit review, quantitative hydrogeologic evaluations, and modeling assessments. He has tracked projects in GMA 12 as it pertains to modeling DFCs/MAGs an overlap of project impacts. He has used the recent GMA 12 TWDB GAM (version 3.02) and other models extensively to assess impacts and is familiar with the most recent scenario (S-19) from the GMA 12 process. He has completed many groundwater availability assessments to evaluate the long-term capacity of wellfields throughout the Carrizo-Wilcox Aquifer and has completed wellfield design for several projects in the northern, central, and southern portions of the Carrizo-Wilcox aquifer.

EDUCATION

M.S. in Hydrology, New Mexico Institute of Mining Technology — 1989

B.S. in Hydrology, Tarleton State University — 1987

PROFESSIONAL EXPERIENCE

Evaluation of Groundwater Availability in Texas
Completed fundamental hydrogeologic research in almost every major and minor aquifer in Texas. Developed new GAMs or modified/used existing TWDB GAMs to develop groundwater availability estimates and long-term impacts from current and proposed groundwater usage. Projects included estimation of recharge, pumping distribution, estimation of exempt pumping, model development and calibration, as well as developing appropriate predictive scenarios. Clients have included the private landowners, industry, TWDB, developers, and groundwater conservation districts. Objectives vary from evaluating groundwater availability, estimating impact of new production, helping develop Desired Future Conditions, developing adequate monitoring plans, addressing permit issues, and developing management approaches for water users and districts.

Evaluation of Groundwater Availability in the Carrizo-Wilcox Aquifer
Used existing MODFLOW groundwater flow model in northeast and central Texas to develop availability estimates and to determine the long-term impacts from projected groundwater demand. Evaluation helped identify potentially critical areas and aided in the development of a set of wells throughout the region to help assess future water-level changes.

San Antonio Water System

- Interaction with groundwater conservation districts/GMAs and evaluation of DFCs/MAGs
- Permitting of Gonzales Carrizo wells
- Carrizo ASR groundwater model development and use
- Use of EAA MODFLOW model to optimize Carrizo ASR injection
- Hydrogeologic characterization of potential brackish groundwater projects
- Planning and implementation of SAWS brackish Wilcox project
- Modeling and permitting of SAWS Injection wells
- Model develop for northern Bexar County Trinity groundwater model

- Evaluation of Bexar Met wells in Trinity Aquifer and Carrizo Aquifers
- Assessment and modeling of potential Local Carrizo wellfield
- Support for well design and construction services

Development of T-Bar Wellfield – Midland County Freshwater Supply District

Project included providing hydrogeologic field support during test hole drilling, sample collection, hydrogeologic assessment, evaluation of screen intervals and well designs, wellfield layout, water quality assessment, and model development to assess long-term production.

El Paso Water Utilities Integrated Water Management Plan

PM to develop and update El Paso Water Utilities Integrated Water Management Plan consistent with the State Water Plan. Project tasks included working closely with EPW staff to evaluate conservation approaches, water demand and availability projections, political and regulatory considerations, and ultimate selection and costing of appropriate strategies to meet demands from multiple sources.

Development of Igneous-Bolson Aquifer Groundwater Availability Model

Served as project manager and primary modeler to develop a 3-layer MODFLOW model to simulate groundwater flow in the west Texas Bolson and Igneous aquifers. All model data was developed and evaluated within ArcGIS and was compatible/interchangeable with the Groundwater Vistas. Model development and calibration included assimilation of historical pumping and water level data, as well as aquifer characteristics. Aquifer water levels and streamflow data were used to calibrate and verify the steady state and transient models. Predictive simulations, which incorporated 50-year demand projections and potential drought conditions, were used to assess aquifer impact and groundwater availability.

Lipan Aquifer Groundwater Availability Model, Texas

Collected and evaluated available hydrogeologic data from groundwater district and state databases. Developed a two-layer MODFLOW model to simulate groundwater availability from the upper alluvial aquifer and the lower Permian limestone aquifer. All model data was developed and evaluated within ArcView GIS and was completely compatible and interchangeable with Groundwater Vistas. Steady state and transient calibration were completed, and the model was verified with the most recent “heavy-use” water level trends and irrigation usage. The model incorporated stream-aquifer interaction as well as spatially and temporally varying recharge and pumping.

Carrizo-Wilcox Wellfield Permits
Completed modeling using the TWDB Queen City/Sparta-Carrizo-Wilcox MODFLOW GAM to develop appropriate permitting strategies. Modeling included the use of specialized code to simulate pumpage reduction based on water level declines as specified in groundwater conservation district rules.

Brackish Groundwater Injection Well, Bexar County, Texas
Simulated brine concentrate injection and pressure buildup for a new 4,800-foot concentrate injection well at the SAWS Twin Oaks ASR facility to support TCEQ injection well application.

Multivariate Analysis, Barton Springs, Texas
PM for task to use multivariate statistical analysis of springflow, precipitation, streamflow, and groundwater levels in support of drought management and triggering methodology for Barton Springs/Edwards Aquifer Conservation District. Barton Springs flow was statistically modeled with multiple linear regression techniques.

Basin Flow Model, Paris, France
Was lead modeler and project manager for a project that developed a regional model which incorporated five hydrogeologic units into a 12-layer flow model to support performance assessment for a proposed radioactive waste repository. The model also incorporated stream-aquifer interaction and evaluated potential variability under future climate and water demands. Adjoint-sensitivity analysis was also performed to address the model's sensitivity and to identify the most critical data needs.

Nacatoch and Blossom Aquifers Brackish Studies to Assess Brackish Production Zones for TWDB
Managed two projects aimed at determining potential brackish groundwater production zones in the downdip slightly and moderately saline zones. Salinity estimates were derived from the evaluation of geophysical logs to determine the down-dip extent of the 10,000 mg/L TDS boundary and calibrated with water sample data. Brackish groundwater production zones were evaluated using various pumping scenarios to determine potential impacts to the nearby users. Additionally, in-place groundwater volume calculations were completed for each salinity zone. The stratigraphic, lithologic, and hydrochemical data generated from these projects will be added into TWDB's Brackish Resources Aquifer Characterization System (BRACS) database.

Horizontal Well Assessment, Planning, Modeling, Permitting, and Testing

Xcel Power had limited production from vertical wells (40 gpm) in the Ogallala aquifer with relatively small saturated thickness, which was the catalyst for the horizontal well feasibility study. A groundwater model was developed to assess economic feasibility of horizontal wells and to support permitting. Surface geophysical surveys and test borings were completed to optimize the location of the horizontal well. Worked with the drilling contractor to develop innovative well screen and development approach to complete a highly productive well (1000 gpm).

Consulting and Modeling Support for GMA 8

Worked with multiple groundwater districts to assess future pumping projects, potential demands, regional water strategies, and management goals to develop appropriate modeling scenarios and results to guide decision makers in selecting DFCs. Project led to a follow-up contract to serve as technical consultant to GMA 8 to complete the Explanatory Report.

Texas Regional Water Planning – (TWDB Regions A, D, E, F, H, I, J, M, N)

Served as general or groundwater consultant on regional planning teams to complete quantification of groundwater resources, evaluation of current and projected water supply and demand, identification of critical groundwater areas, development of water management strategies, development of a water supply plan, use of TWDB GAMs to assess groundwater availability, public interaction and presentations, and report preparation. Working with the RWPGs in these projects helped to identify regional groundwater concerns and strategies to meet future demand.

Joint Groundwater Planning – (Central, East, and West Texas)

Was integrally involved in the initial round of Joint Groundwater Planning for GMAs across Texas. Worked with groundwater conservation districts, municipalities, industrial users, irrigators, and other stakeholders to navigate through the process of setting DFCs in several GMAs in Texas. Specific tasks included assessing the hydrogeologic reasoning for DFCs, utilizing GAMs and other models to simulate the impact of DFCs, and providing alternative approaches for developing DFCs. Worked for various clients in eleven of the sixteen GMAs.

CHRISTOPHER DRABEK, P.G.

Experience

-23 years

Professional Qualifications

-Licensed Professional Geoscientist No. 4564, State of Texas

-Licensed Professional Geoscientist No. 405, State of Louisiana

Areas of Expertise

-Groundwater Availability

-Fresh and Brackish Groundwater Resources

-Regional Water Planning

-Groundwater Conservation District Consulting

-Hydrogeology and Stratigraphy

-GIS

-Database Management

CAREER SUMMARY

Christopher Drabek is a Professional Geoscientist with 23 years of experience related to groundwater resources and large capacity water well projects, including groundwater availability evaluations, planning studies, groundwater conservation district water resource investigations, brackish groundwater resource exploration and development, aquifer storage and recovery, groundwater and surface water quality evaluations, water well permitting, GIS applications and mapping, database development and management, groundwater flow modeling and field inspections of large capacity water well drilling, geophysical logging of the well pilot hole, installation of the well surface casing and well screen and blank liner, well development, well pumping test and water sampling operations and general site construction.

Mr. Drabek has extensive groundwater consulting experience throughout the state of Texas and has performed work on groundwater resource projects in Alabama, Louisiana, Mississippi, New Mexico, Oklahoma and abroad including Papua New Guinea and the Dominican Republic. He has performed work for water providers (public water supply), industrial facilities (mining, power, underground gas storage facilities and paper mills), oil and gas companies, agricultural water users (irrigation), governmental agencies, attorneys, engineering firms and water well contractors. He has completed an extensive number of technical studies and / or water well projects in the Chicot, Evangeline, Jasper and Catahoula aquifers (Gulf Coast Aquifer system). Additionally, he has performed technical studies for the Carrizo, Carrizo-Wilcox, Simsboro, Sparta, Yegua and Queen City aquifers in southeast, east, central and south-central Texas, the Trinity, Woodbine and Paluxy aquifers in north Texas and the Capitan Reef Aquifer in west Texas.

EDUCATION

M.S., Environmental Science – Emphasis: Hydrogeology Texas A&M University, Corpus Christi, Texas,	2000
B.S., Environmental Science, Texas A&M University Corpus Christi, Texas,	1999
B.S., Geology, Texas A&M University, Corpus Christi, Texas	1999

SUMMARY OF PROFESSIONAL EXPERIENCE

January 2021 – Present: Advanced Groundwater Solutions LLC, Senior Hydrogeologist, Houston, Texas
October 2019 – January 2021: Lead Hydrogeologist, WSP USA, Houston, Texas
January 2018 – October 2019: Senior Hydrogeologist, WSP USA, Houston, Texas
January 2012 – December 2017: Senior Hydrogeologist, LBG-Guyton Associates, Houston, Texas
August 2002 – December 2011: Hydrogeologist II, LBG-Guyton Associates, Houston, Texas
April 2001 – July 2002: Technical Specialist, Rimkus Consulting Group, Corpus Christi, Texas
January 1999 – April 2001: Research Assistant, Center for Water Supply Studies at Texas A&M University, Corpus Christi, Texas

PROJECT EXPERIENCE

Brazos Valley Groundwater Conservation District, Brazos and Robertson Counties, Texas
Assist the Brazos Valley Groundwater Conservation District (BVGCD, District) in addressing groundwater resources and management issues of the District since 2002. A great understanding of the subsurface geology within the District, which includes the Brazos River Alluvium, Yegua, Sparta, Weches, Queen City, Reklaw, Carrizo, Calvert Bluff, Simsboro and Hopper aquifers/formations, has been acquired with experience. Evaluate historical static water levels and groundwater pumping within the District to determine the relationship between groundwater pumping and water level decline. Review and evaluate water chemistry data the aquifers within the District. Review geologic faulting within the District. Model review and support were provided to estimate pumping effects in the District using the Texas Water Development Board (TWDB) Carrizo-Wilcox, Yegua-Jackson and Brazos River Alluvium Groundwater Availability Models (GAM). Review hydrogeological reports submitted in support of permit applications. Assemble and review current and historical District groundwater pumping and permitting data by well and aquifer. Future water demands and groundwater availability were evaluated from the major aquifers within the District. Work was performed to assist the District in the Groundwater Management Area (GMA) 12 future aquifer conditions planning process. Assist with the development of a three-dimensional model for BVGCD. Assist with the development and

maintenance of the District's groundwater water-level monitoring program. Evaluate water level data to monitor water level declines relative to the District's Desired Future Condition (DFC) goals. Develop numerous presentations, memorandums and reports for BVGCD to address groundwater resources and management.

Lone Star Groundwater Conservation District, Montgomery County, Texas

Assist the Lone Star Groundwater Conservation District (LSGCD) in addressing groundwater resources and management issues in Montgomery County from 2003 to 2017and 2019 to present. A great understanding of the subsurface geology that comprise the Chicot, Evangeline, Jasper and Catahoula aquifers in Montgomery County has been developed over the years. Project tasks include the development and expansion of the District's groundwater water-level monitoring program, review of brackish water resources in Montgomery County and the development of a groundwater flow model for the Catahoula Aquifer. Assist with a Strategic Planning Study commissioned by the District, which included the evaluation of the adequacy of the areal coverage of monitoring wells, available water level data and groundwater production data for the Chicot, Evangeline, Jasper and Catahoula aquifers. Various groundwater flow model simulations were developed regarding future groundwater availability as part of the Strategic Planning Study. Projects also include the evaluation of the LSGCD groundwater production database and assigning historical and current groundwater production amounts by well to the Chicot, Evangeline, Jasper and Catahoula aquifers. Changes in artesian head for the Chicot, Evangeline, Jasper and Catahoula aquifers were reviewed in support of the DFC process. Perform geologic mapping of hydrogeologic units in support of a LSGCD subsidence study. Review hydrogeological reports submitted in support of new well registration and/or permit applications or amendments.

Groundwater Management Area 12, Bastrop, Brazos, Burleson, Falls, Fayette, Freestone, Lee, Leon, Limestone, Madison, Milam, Navarro, Robertson and Williamson Counties, Texas

Provide assistance with the Groundwater Management Area 12 joint planning process since 2005 as support for the Brazos Valley Groundwater Conservation District. Tasks performed include review of regional groundwater pumping and aquifer response, review of permitted groundwater pumping of the Groundwater Conservation Districts within the GMA, review of regional groundwater quality, groundwater modeling support and development of future / predictive groundwater pumping estimates as part of the Desired Future Condition (DFC) planning process. Groundwater Depressurization /

Drawdown Reports (Formerly known as Underburden and Pumpage Reports) submitted to the Texas Railroad Commission for the Walnut Creek Mine in Robertson County and the Alcoa Inc. Sandow Mine in Milam County were reviewed as part of the joint planning process.

Groundwater Resources Study for Milam, Burleson, Brazos and Robertson Counties, Texas

Evaluate water well, groundwater quality, and water level data to assess the possibilities for future groundwater development from the Carrizo-Wilcox as part of a regional groundwater resource study. Oil and gas electric logs were used to estimate geologic formations, sand thickness and groundwater quality within the study area. Geologic cross sections and isopach maps were developed based on data obtained from the electric logs.

Study of Carrizo and Simsboro Aquifers for Providing Larger Quantities of Groundwater, Brazos, Burleson and Robertson Counties, Texas

Project tasks include the use of lease maps to outline areas of interest for the potential development of large capacity water wells in the Carrizo-Wilcox Aquifer within an 1,160 square mile study area. The Carrizo Aquifer and Simsboro Aquifer (part of the Wilcox Group) were the principal aquifers of interest. Review of electric logs from public and private sources that span the depth of the Carrizo and Simsboro aquifers in the vicinity of the study area was completed to improve the understanding of the subsurface geology. Estimates of aquifer top and bottom elevations and depths, aquifer thickness and estimates of potential pumping rates were developed for the Carrizo and Simsboro aquifers as part of the study.

Groundwater Study for a Potential Manufacturing Facility Located North of Calvert, Texas, Robertson County, Texas

Perform a study regarding the development of a groundwater supply for a planned manufacturing facility located north of Calvert, Texas in Robertson County. The desired groundwater supply was about 275 acre-feet per year with a desired well pumping rate of about 200 to 300 gallons per minute. The study provided conclusions and recommendations regarding the potential for obtaining the desired groundwater supply from the Simsboro Aquifer required by the facility, the water quality in the general vicinity of the facility and suggestions for a test hole or test well and water sampling operations to obtain information on depth specific intervals that appear favorable for providing the desired groundwater supply.

Evaluation of the Brackish Groundwater Resources of the Wilcox Aquifer Southern Bexar, Atascosa and Wilson Counties, Bexar, Atascosa and Wilson Counties, Texas

Assist with study to determine new water well potential in areas of the Wilcox Aquifer with brackish groundwater. Project tasks included the collection and analysis of water well, water quality, water level and oil and gas test hole or well data to evaluate the possibilities for groundwater development. Provided field inspections of drilling operations, well logging, casing installation, and well testing and sampling for three test wells and three monitoring wells completed in the Wilcox Aquifer that ranged in depth from 1,250 to 2,660 feet. Assist in preparation of design drawings for eight brackish production wells in the Wilcox Aquifer that ranged in depth from 1,200 to 1,700 feet. Assist with field inspections of drilling operations, well logging, and casing installation of brackish production wells.

Tyler Davidson P.E.

Experience

-25 years

Professional Qualifications

-Professional Engineer, State of Texas, #92799

Area of Expertise

-Water Well Design

-Groundwater availability

CAREER SUMMARY

Tyler Davidson has over 20 years of experience in professional groundwater consulting. His experience includes work in the Carrizo and Wilcox Aquifers in Texas, including: ASR feasibility studies for municipal and regional water suppliers; local and regional groundwater availability studies; well design, construction, and rehabilitation; conceptual Groundwater Availability Model (GAM) development for the Texas Water Development Board; various county-scale water availability studies for groundwater conservation districts; and preliminary designs and cost estimating for regional water planning groundwater supply projects.

He is familiar with most modern tools of hydrologic analysis, including geophysical log interpretation, various methods of pumping test interpretation, GIS, statistical analysis with R, and the design and use of relational and object-oriented databases for efficient aggregation and use of spatial and hydrologic data from disparate sources.

EDUCATION

M.S., Civil Engineering (Hydrology), Auburn University, Auburn, Alabama — 1996

B.S., Civil Engineering, Auburn University, Auburn, Alabama — 1994

PROFESSIONAL EXPERIENCE

Public Water Supply Well Design and Specifications for New Well Field, Gonzales County, Texas: this project involved the site selection and design of seven new public water supply wells for the Guadalupe Blanco River Authority (GBRA) completed in the Carrizo Aquifer system in Gonzales County, Texas. Wells are approximately 1,400 feet total depth, with a 20” diameter casing.

Test Wells and Monitoring Wells, San Antonio Water Supply, Gonzales County, Texas: this project involved construction observation of a four-site test well program in the Carrizo Aquifer for the SAWS Buckhorn Wellfield. Performed construction observation on 12 monitoring wells and two test wells, including sample logging, geophysical log interpretation, oversight of drilling and casing installation activities, and enforcement of contract specifications. Evaluated pumping test data for each test and observation well.

Public Water Supply Well, Bastrop County, Texas: this project involved construction observation and testing of a public water supply well completed in the Simsboro Aquifer. Performed construction observation of a production well, including sample logging, geophysical log interpretation, oversight of drilling and casing installation activities, and enforcement of contract specifications. The well was 1,400 feet total depth, with a 20” casing. Evaluated a long-term constant-rate test and step test for the well.

Assessment of Aquifer Storage and Recovery, City of College Station, Texas. Completed a preliminary hydrogeologic assessment of ASR for the city in the Simsboro formation of the Wilcox Aquifer, including assessing hydraulic properties, water quality, operational efficiencies, wellfield layout, and impacts of natural gradients.

Brackish Public Water Supply Well Design and Specifications, Bexar County, Texas: this project involved the design of a new 1,400 gpm well completed in the Wilcox Aquifer supplying source water to the San Antonio Water Systems H2Oaks desalination facility. The project involved design, bidding, permitting, and construction observation.

Carrizo and Wilcox Monitoring Wells, Aqua Water Supply Corporation, Caldwell and Bastrop Counties, Texas: this project involved design and observation of a three-site monitoring well program. Two wells were completed in the Carrizo Aquifer in southern Caldwell County, and one well was completed in the Simsboro formation of the Wilcox Aquifer in Bastrop County. Performed well design, geophysical log interpretation, production interval selection, pumping test analyses, and construction observation.

Public Water Supply Well Design and Specifications, Dimmit County, Texas: this project involved the design of two public supply wells completed in the Carrizo Aquifer for a public water system in Dimmit County, Texas. Prepared plans and specifications for the projects, managed the bidding and selection process, provided construction observation, performed final submersible pump selection, and submitted final completion information to TCEQ.

Feasibility Assessment of Aquifer Storage and Recovery of Reclaimed Wastewater, City of Austin, Texas: This project included evaluation of potential sites for infiltration basins, core sampling and testing, infiltration assessment, groundwater modeling, conceptual horizontal well design for shallow river alluvium, assessment of groundwater movement and recovery efficiency, and cost estimates. Optimized the size of infiltration basins and production wells to minimize cost and maximize recovery.

Regional Groundwater Quality Studies, Multiple Planning Regions, Texas: conducted extensive analyses of geographic and geologic water quality for all regulated drinking water constituents in major and minor aquifers in Texas Water Planning Regions D, E, F, J, M, and I. Prepared text and figures for water quality sections of the State Regional Water Plan for these regions.

Public Water Supply Well Design and Specifications for Hickory Well Field Expansion, McCulloch County, Texas: this project involves the design of five new public water supply wells for the City of San Angelo completed in the Hickory Aquifer in McCulloch County, Texas. Wells are approximately 2,900 feet total depth, with a 14” diameter casing.

Public Water Supply Well Design and Specifications for flowing well, Bexar County, Texas: this project involved the design of a new 7,000 gpm well completed in the Edwards Aquifer at Mission Pump Station for San Antonio Water System. The project involved design, bidding, permitting, and construction observation.

Public Water Supply Well Design and Specifications for New Well field, Comal County, Texas: this project involved the site selection and design of four new public water supply wells for New Braunfels Utilities, completed in the upper Trinity aquifer for a municipal water system in Comal County, Texas. Prepared plans and specifications for the wells and lineshaft pumps, managed the bidding and selection process, provided construction observation, performed final pump selection, and submitted final completion information to TCEQ.

Public Water Supply Well Design and Specifications, Bexar County, Texas: this project involved the design of a new 7,000 gpm well and pump at Micron Pump Station for San Antonio Water System. The project involved design, bidding, permitting, and construction observation.

AGS
Advanced Groundwater Solutions, LLC

JOHN W. NELSON, P.G.

Experience

31 Years

Professional Qualifications

-Professional Geoscientist #4027, State of Texas

-Registered Professional Geologist, #0453, State of Mississippi

Areas of Expertise

-Hydrogeology and Stratigraphy

-Aquifer Testing

-Model Parameterization-Well Construction

CAREER SUMMARY

John Nelson is a Professional Geoscientist in Texas and Registered Professional Geologist in Mississippi with 31 years of professional and practical consulting experience in hydrogeology and groundwater resources evaluation, planning and development, groundwater well and pump equipment design for municipal, public and industrial water supplies, water well construction consultation and field observations and consultation for existing water well and pumping equipment rehabilitation and repair.

John began his professional career in 1989 and initially worked as a Groundwater Hydrologist for William F. Guyton Associates, primarily on groundwater and public supply and industrial water well projects in southeast Texas and northern Nevada. Project responsibilities included developing and managing projects, preparing scopes of work, budget estimates, proposals and contracts, and managing project billing and financial reports. John has been successful in technical consultation work, project and employee management and business and client development.

Projects completed to date have been in numerous areas in Texas plus sites in Nevada, northern Arizona, northern Michigan, eastern Missouri and central Mississippi. Many of the projects in Texas have involved technical studies and/or public supply or industrial water wells completed in the Chicot, Evangeline or Jasper Aquifer (Gulf Coast Aquifer) and the Catahoula Aquifer in southeast and east Texas. Additional studies and water well projects have been completed in the Carrizo, Carrizo-Wilcox, Simsboro, Sparta, Yegua or Queen City Aquifer in southeast, east, central and south-central Texas, the Trinity, Woodbine or Paluxy Aquifer in north-central Texas and the Ogallala Aquifer in the southern high plains of Texas.

EDUCATION

M.S. in Geology, Mississippi State University	1988
B.S. in Geology, Murray State University	1986

Master's thesis: Structural and Geomorphic Controls of the Karst Hydrogeology of Franklin County, Alabama

PROFESSIONAL EXPERIENCE

County, Montgomery County, Brazoria County, Texas

Multiple Cities, Utility Districts and Water Suppliers - Performed groundwater and water supply work for numerous water systems and public and industrial water suppliers and moderate to large capacity wells completed in the Chicot, Evangeline, Jasper or Catahoula Aquifer throughout most of the Houston metropolitan area. Perform hydrogeologic, groundwater availability and development, potential pollution hazard and site assessment studies for planned public supply well sites and small to very large developments and property tracts. Completed multiple groundwater and water well projects for larger land and residential developments or cities including those for The Woodlands, Kingwood, Cinco Ranch, Greatwood, City of Sugar Land, Fairfield, Elyson, Bridgeland, City of Pearland, Lakes of Savannah, Sedona Lakes, Meridiana and many others, . Prepare well, pump, and motor parameters and design data, prepare and review well and pump specifications, evaluate geophysical logs, sand sieve analyses, well construction recommendations, pumping test and/or pump and motor data and perform field inspections of well drilling, logging, construction and/or pumping test operations for numerous, moderate to large capacity public supply wells completed in the Chicot, Evangeline or Upper Jasper Aquifer. Plan and evaluate well and/or pump rehabilitation work and projects to restore or increase the well pumping rate, decrease sand production, remedy well casing structural failures or reduce selected inorganic chemical or radionuclide concentrations to acceptable levels for public supply and assisted with testing of water wells following rehabilitation.

City of Houston, Texas

City of Houston Public Supply Wells Design and Construction Suppliers - Jersey Village, Spring Branch, Bellaire Braes, Plantation Hills, Kingwood, Katy Addicks, District 73, District 71, Sharpstown and Park Glen Well Fields or Service Areas: Responsible for well design, review of pilot hole, well completion and testing data and logs, construction oversight and/or field inspections for 17 new City of Houston public supply wells completed in the Evangeline Aquifer.

City of Houston, Texas
City of Houston New Water Well and Well Collection Line for District 203 - Responsible for management, review and evaluation of pilot hole and well drilling, construction, logging, testing and site inspection work for a new public supply well at a remote location and construction of a new well collection line to the existing District 203 water

City of Houston, Texas
City of Houston Water Well and Pump Rehabilitation - Responsible for oversight of well rehabilitation and pump equipment replacement, field inspections and testing for City of Houston water well rehabilitation projects for multiple City wells throughout the City service areas.

San Jacinto River Authority (SJRA), The Woodlands, Texas – Montgomery County
Responsible for performing hydrogeologic site evaluations and/or potential pollution hazard studies for completed and planned public supply wells and numerous other possible well sites. Preparation of well, pump, and motor parameters data and well specifications for large capacity public supply wells. Review and evaluation of geophysical logs, sand sieve analyses, well construction data and completion recommendations, water level, pumping test, pump and/or motor data for 38 moderate to large capacity, public supply wells completed in the Evangeline or Upper Jasper Aquifer in The Woodlands. Perform and/or evaluate well and pump performance tests of public supply wells. Planning work, preparation of well and pump rehabilitation technical specifications and contract documents, data evaluation, construction management, inspection and testing for multiple well, pump and motor rehabilitation projects for moderate to large capacity public supply wells from 2000 – 2015. Technical review and pumping equipment inspection in 2017 and 2019. Review and evaluation of well, groundwater pumpage, water-level, aquifer and hydrogeologic data for Evangeline and Jasper Aquifers.

William B. Stein, P.G.

Experience

35 years

Professional Qualifications

-Professional Geoscientist: Texas #1402

-Certified Professional Geologist, American Institutes of Professional Geologists, #10441

Area of Expertise

-Hydrogeology and Stratigraphy

-Aquifer Testing

-Model Parameterization

-Well Construction

CAREER SUMMARY

William (Bill) Stein is a Professional Geoscientist in the State of Texas and has over 35 years of professional experience in the field of hydrogeology. He has conducted a variety of groundwater studies on many aquifers throughout Texas including Carrizo-Wilcox Aquifer.

Bill has supervised drilling, construction and conducted sampling and pumping tests of numerous wells. He has assisted with design and planning of drilling programs, supervised well construction, and tested public supply wells for private and public entities. He has supervised geophysical logging and utilized those logs to construct productive wells. Bill has made evaluations utilizing existing geophysical logs from various sources to identify optimal well sites and wellfields.

Bill has conducted numerous water availability studies. He has performed numerous pumping tests utilizing computerized data logging equipment and analyzed test data using a variety of industry methods. Bill has conducted geochemical and water-quality analyses and made interpretations of the data. He has performed groundwater modeling using analytical techniques to determine future aquifer conditions. Bill has performed many quantitative and qualitative analyses of gravel, sand, karstic limestone and fracture volcanic rock groundwater systems.

EDUCATION

Bachelor of Science in Geology — 1987
University of Texas at San Antonio

Master of Science in Geology (Hydrogeology) — 1993
University of Texas at San Antonio

CERTIFICATIONS/SOCIETIES

Professional Geoscientist in Texas, #1402

Certified Professional Geologist, American Institute of Professional Geologists # 10441

Texas Ground Water Association – Past President of Geoscience Division, Board Member

National Ground Water Association

South Texas Geological Society

PROFESSIONAL HISTORY

2021 – present: Senior Hydrogeologist, Advanced Groundwater Solutions, San Antonio, Texas
2018 – 2021: Supervisory Hydrogeologist, WSP USA, San Antonio, Texas
2016 – 2018: Associate Vice President, LBG-Guyton Associates, San Antonio, Texas
2013 – 2015: Senior Associate, LBG-Guyton Associates, San Antonio, Texas
2003 – 2012: Associates, LBG-Guyton Associates, San Antonio, Texas
1994 – 2003: Senior Hydrogeologist, LBG-Guyton Associates, San Antonio, Texas
1993 – 1994: Hydrogeologist, LBG-Guyton Associates, San Antonio, Texas
1991 – 1993: Groundwater Hydrologist, William F. Guyton Associates, Austin, Texas
1989 – 1991: Hydrologist (Geology), U.S. Geological Survey, Water Resources Division, San Antonio, Texas
1986 – 1989: Hydrologic Technician, U.S. Geological Survey, Water Resources Division, San Antonio, Texas
1984: Geologic Technician, Raba-Kistner Engineering Consultants, San Antonio, Texas

RELAVENT PROJECT EXPERIENCE

SAWS Brackish Desalination Project, south of San Antonio (2005-2020). Bill supervised construction and testing of 13 production wells, 3 test wells and seven monitor wells. Assisted with developing well specifications and supervise drilling, logging, and construction of brackish test wells. Wells were completed single and dual string to depth ranging from about 1,350 to 1,800 feet. Upper casing diameter was 16- to 18-inches and screen diameters were 10- to 12- inches. Bill conducted pumping tests and sampling. He wrote reports that summarize and evaluate results.

SAWS Buckhorn Wellfield near Nixon, Texas (2003-2004, 2017). Bill supervised test and monitor wells constructed in the Carrizo and overlying aquifers for SAWS well fields in Gonzales County. Assist with report preparation summarizing wells. Bill provided sampling of wells in wellfield to evaluate corrosion.

Elmendorf, Texas, (2018-2020). Bill provided well design and specifications for 4 single-string wells completed into Wilcox Sand. Three wells were completed at depths of about 600 feet with 10-inch

diameter surface casing swaging to 6-inch diameter screens. Wells were test at rates up to about 600 gallons per minute.

Petty Ranch, Maverick County, Texas (2019-2020). Bill installed transducers in 10 ranch wells completed into the Carrizo Aquifer for long-term water level monitoring. Data is downloaded monthly and emailed to Bill for processing, formatting and graphing.

Faith Ranch, Dimmit County, Texas (2012-2014). Bill provided an evaluation of Carrizo Wells on a large ranch including pumping tests and sampling of seven production wells, groundwater modeling and reporting.

Robertson County, Texas (2007-2008). Bill performed consulting on two supply wells for Texas Utilities. The client was the contractor, Russell Drilling. Bill evaluated geophysical logs, well cuttings, performed pumping tests and wrote reports on wells completed into the Simsboro and Hooper Formations for power plant and contracted driller.

Gonzales County, Texas (2001-2002) Schertz-Seguin LGC wellfield. Bill was responsible for supervising drilling of public-supply wells in the Carrizo Aquifer. Client: Schertz-Seguin Local Government Cooperation.

Atascosa and Karnes County, Texas. Bill reviewed and assisted with well specifications and construction oversight for two public water supply wells completed into the Carrizo Aquifer for El Oso WSC. Both wells were two-string construction. One well was 3,300 feet deep and completed with 18-inch diameter surface casing and 12-inch diameter blank and screen. The other well was 4,400 feet deep with 12-inch diameter surface casing and 6-inch diameter blank and screen.

Pleasanton, Texas. Bill was the hydrogeologist assisting with well design, observations of drilling, construction and testing of a PWS well constructed with dual string to a depth of 1,900 feet with 18-inch diameter surface casing and 12-inch diameter screen and blank.

Moore, Texas. Bill assisted with well design, observations of drilling, construction and testing of PWS well for Moore WSC. Well was completed single string 12- inch diameter to depth of about 600 feet.

Bastrop County, Texas (2005-2007). Bill worked on the Aqua S-Wellfield and Hinton Well completed in the Simsboro and Carrizo Formations to include evaluations of geophysical logs, well cuttings and performing pumping tests on completed wells.

Peter Lyman, P.E.

Experience:

-9 years

Professional Qualifications:

-Professional Engineer, State of Texas #130536

Area of Expertise:

-Well Design and Construction Oversight

-Contractor Management

-Groundwater Availability

CAREER SUMMARY

Peter Lyman has eight years of experience working in the groundwater supply consulting industry, providing design, construction management, inspection services, and project management support to public and private sector customers. Peter's technical areas of expertise include projects related to water well and pump rehabilitation to restore or increase well pumping rates, decrease sand production, and assess well casing structural failures; evaluating well TV surveys; review pump and pump setting submittals; evaluation of well, pump and motor performance tests of large-capacity water wells; Additional experience includes water well design, development and preparation of specifications for small to large-capacity public supply wells, construction oversight of drilling, review of hydrogeological and aquifer data and geophysical logs, collecting water samples for laboratory testing of water quality parameters, field measurement of gas content from public supply wells and ground storage tanks and assisting in development of groundwater availability studies that have primarily focused on the Chicot, Evangeline, Jasper and Catahoula aquifers (Gulf Coast aquifer system).

EDUCATION

Texas A&M University, College Station, TX **2013**
B.S., Biological & Agricultural Engineering

University of Houston, Houston, TX **2017**
M.S., Environmental Engineering

ADDITIONAL TRAINING

Construction Inspector Training & Project Management Basics,
City of Houston, Public Works and Engineering, 2014

PROFESSIONAL EXPERIENCE

2022–
Project Engineer, Advanced Groundwater Solutions

2017–2022
Sr. Consultant, Environmental Engineer, WSP USA

2013–2017
Environmental Engineer, WSP USA (formerly LBG-Guyton Associates)

RELAVENT PROJECT EXPERIENCE

Rehabilitation of Existing Groundwater Wells, Various Locations, Houston, Texas (2013-2022): Received an Outstanding rating for the project consultant final performance review. Engineer of Record responsible for preparation of well rehabilitation specifications. Inspector responsible for providing construction management and inspection services during these contracts. Evaluate camera surveys, recommend rehabilitation alternatives, formulate pump recommendations, and review pump submittals for wells. Prepare change orders, work orders, reports and coordinate between Owner, Contractor and Subcontractors. Prepare progress meeting documents and attend progress meetings with Client and contractor staff. Collect data during well and pump performance testing for wells following rehabilitation. Client: City of Houston. Project Value: $2,530,393.0

City of Aubrey Dane Street Well, Aubrey, Texas (2019-2022): Engineer responsible for preparation and sealing of well construction specifications for one moderate-capacity public supply well to be drilled to about 1,300 feet in the Twin Mountains portion of the Trinity Aquifer to provide about 500 gpm. Prepared submittals to the Texas Commission on Environmental Quality for conditional approval for construction and temporary approval for use. Client: City of Aubrey.

Stewart & Stevenson New Water Well, Odessa, Texas (2020-2022): Engineer responsible for preparation and sealing of well construction specifications for one small-capacity public supply well to be drilled to about 115 feet in the Alluvium aquifer. Prepared TCEQ submittal for conditional approval for construction. Client: Stewart & Stevenson.

City of Houston Groundwater Facilities Assessment, Houston, TX (2020-2021): Performed critical infrastructure assessment at 64 well site locations consisting of visual inspections and notations regarding the physical and performance condition of the well assets. The assessment inputs supported development of risk-prioritized, business-case based Immediate, Near-term (5-years), Medium-term (10-years), and Long-term (50-years) asset management plans for the City's groundwater facilities. These asset management plans are intended to be used as a basis for establishing future annual capital improvement plan (CIP) budgets. Client: BGE

Groundwater Sampling at ENSTOR, Katy, TX (2020-2021): Performed groundwater and gas sampling of multiple monitor and local drinking water supply wells screening sands in the Chicot, Evangeline and Jasper aquifers. Prepared a report evaluating the ENSTOR aquifer and reservoir monitoring data to determine if the gas

storage facility had impacted shallow groundwater aquifers utilized for public supply and other groundwater supplies. Client: ENSTOR

City of Spring Valley Village New Production Well, Houston, TX (2019-2021): Engineer of Record and Project Manager responsible for preparation of plans and specifications for a large capacity public supply well to be drilled to about 1,300 feet in the Evangeline aquifer to provide 1,800 gpm. Assisted the City with TWDB SWIFT project compliance parameters. Prepared TCEQ packages for conditional approval for construction and approval to use. Advised the City on permitting requirements related to Harris Galveston Subsidence District. Client: City of Spring Valley Village.

New/Replacement of Water Well and Well Collection Line at District 203, Houston, Texas (2018-2021): Inspector responsible during well drilling, construction, logging and site work. The project included the drilling and construction of a new well at the remote location. Prepare progress meeting documents and attend progress meetings with Client and contractor staff. Client: City of Houston. Project Value: $2,745,580.00

Brazoria County Municipal Utility District (MUD) 21, 25, 39, 40, 55, 56, Chappell Hill, Charleston MUD, City of Angleton, City of Arcola, City of Baytown, City of Bellaire, City of Crane, City of Dayton, City of Dickinson, City of Hempstead, City of Katy, City of Montgomery, City of Orange, City of Spring Valley Village, City of Weimar, City of Wells, Del Lago Estates, Dobbin, Dowdell PUD, East Montgomery County MUD 7 and 10, Far Hills, Fort Bend MUDs 81, 132, 143, 157, 169, 182,206 and 213, Fulshear, Hardin WCID, Harris County FWSD, MUD, PUD, UD or WC&ID 1, 2, 11, 13, 14, 49, 51, 64, 71, 81, 96, 106, 109, 119, 136, 153, 157, 165, 167, 168, 171, 180, 281, 284, 290, 319, 358, 364, 387, 389, 402, 418, 434, 437, 438, 449, 495, 530, 531, 536 and 542, League City, Meadows at Cypress Creek, Memorial Hermann, Memorial MUD, Montgomery County MUDs 15, 19, 89, 94, 105, 111, 137, 139 and 157, City of Nixon, North Hardin WSC, North Harris County Regional Water Authority, Northwest Harris County MUD 5, 16, Prairie View A & M, Schlumberger, Sedona Lakes MUD, Shasla PUD, Sheridan Estates, South Shore, Spring Creek UD, Spring West MUD, Waller County MUD 2, West Columbia, West Harris County MUD 11, West Park MUD, Wickson Creek SUD, Windfern Forest UD and The Woodlands, Texas (2013-2018); Well data review and evaluations for numerous cities, municipal utility districts, water suppliers, engineers, developers and selected industries in the Houston metropolitan area. Assisted in hydrogeologic, groundwater availability and development, potential pollution hazard for planned public supply well sites and small to large property tracts. Prepared well, pump, and motor design data, reviewed well and pump specifications, geophysical logs, sand sieve analyses, well construction recommendations, pumping test and/or

pump and motor data and performed field inspection of well drilling, logging, construction and/or pumping test operations for numerous large-capacity public supply wells completed in the Chicot, Evangeline or Upper Jasper Aquifer. Evaluate well and/or pump rehabilitation work and projects to restore or increase the well pumping rate, decrease sand production or repair well casing or screen structural failures. Collected and analyzed water samples and measured natural gas content and concentrations of water from public supply wells and ground storage tanks to assess gas content of groundwater supply for selected public water utilities screening the Evangeline Aquifer or Jasper Aquifer in north and west Harris County and south Montgomery County.

City of Elmendorf Wells, Elmendorf, Texas (2018-2020): Engineer responsible for preparation and sealing of well construction specifications for four moderate-capacity public supply wells to be drilled to about 600 feet in the Wilcox Aquifer to provide about 1,400 gpm. Provided consultant services for the well drilling, construction, logging and site work. Project included the drilling and construction of a new well field and equipping the wells with pumping equipment. Responsible for formulating pump and motor recommendations and review of pump and motor submittals for wells. Prepare submittals to the Texas Commission on Environmental Quality for Approval to Use. Client: City of Elmendorf. Project Value: $1,380,292.00

Lewis Creek Plant Water Wells 3 & 4, Willis, Texas (2015-2018): Engineer who assisted with pilot hole and well data review and responsible for field inspections during drilling, reaming, cementing and pumping test activities of water wells completed in the Jasper Aquifer with total depths of approximately 800 feet. Client: Entergy.

New/Replacement of Water Well and Well Collection Line Sims Bayou, Houston, TX, USA (2016-2017): Inspector. Review of well specifications and design drawings for one large-capacity public supply well to be drilled to about 1,400 feet in the Evangeline Aquifer to provide about 2,800 gpm. Provided construction phase services for the City of Houston to review product submittals and field inspection during major construction activities. Project included the drilling and construction of a new well at a remote location, equipping the well with pumping equipment, installation of above and below ground discharge piping and transmission line, installation of the motor control center, transformer, SCADA antenna and pervious paver parking area. Client: City of Houston. Project Value: $1,889,900.00