# RED RIVER GROUNDWATER CONSERVATION DISTRICT

## PERMIT HEARING AND BOARD MEETING

Join by computer, tablet or smartphone at the following link:
https://global.gotomeeting.com/join/552727909

**or**

Join by phone 646-749-3122 with access code: 552-727-909

THURSDAY
JANUARY 21, 2020

NOTICE OF PUBLIC MEETING
OF THE
BOARD OF DIRECTORS OF THE
**RED RIVER GROUNDWATER CONSERVATION DISTRICT**
**Thursday, January 21, 2021 at 10:00 a.m.**

**IN-PERSON MEETING LOCATION:**
**Greater Texoma Utility Authority Board Room**
**5100 Airport Drive**
**Denison, Texas 75020**

**REMOTE ACCESS ALSO AVAILABLE AT:**
Join by computer, tablet or smartphone at the following link:
https://global.gotomeeting.com/join/552727909

**or**

Join by phone 646-749-3122 with access code: 552-727-909

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a quorum of the Board of Directors of the Red River Groundwater Conservation District ("District") will hold public hearings and a Board meeting in-person and via telephone and video conference call beginning at 10:00 a.m. on Thursday, January 21, 2021. Please note for in-person attendance that the Board meeting location can only accommodate a limited number of attendees in order to comply with the Governor's proclamation related to in-person gatherings, and that remote access may be required in the event the capacity limitations are reached. Public comment can be provided whether participating in-person or remotely

**Permit Hearing**

The Permit Hearing will begin at 10:00 a.m.

Notice is hereby given that the Board of Directors of the Red River Groundwater Conservation District ("District") will conduct a permit hearing on the following Production Permit Applications:

**Agenda:**

1. Call to Order; establish quorum; declare hearing open to the public; introduction of Board.

2. Review the Production Permit Applications of:

**Applicant:** Buena Vista Turf Farm; 330 Oaks Trail, Ste 100, Garland, TX 75043
**Location of Well:** 1664 CR 2225, Ivanhoe, TX 75447; Latitude: 33.715455ºN Longitude: 96.119567ºW; about 325 feet west on CR 2225 from the intersection of CR 2220 and CR 2225 and about 75 feet south of CR 2225

**Purpose of Use:** Agriculture (Sod production)
**Requested Amount of Use:** 35,214,000 gallons per year (Total: 70,000,000 gallon per year; Historic Use: 34,786,000)
**Production Capacity of Well:** 150 gallons per minute
**Aquifer:** River Alluvium

**Applicant:** David Walter; PO Box 84, Gordonville, TX 76245
**Location of Well:** 766 Deer Creek, Sadler, TX 76264; Latitude: 33.766106ºN Longitude: 96.835811ºW; about 350 feet northeast of the end of Deer Creek Drive
**Purpose of Use:** Pond(s)/Surface Impoundment(s), Livestock, and Wildlife Management
**Requested Amount of Use:** 5,710,000 gallons per year
**Production Capacity of Well:** 180 gallons per minute
**Aquifer:** Woodbine Aquifer

**Applicant:** Porter Green; 7000 Parkwood Blvd, Suite E200, Frisco, TX 75034
**Location of Wells:** 471 Hanna Drive, Denison, TX 75020; Well RR-4282: Latitude: 33.84762ºN Longitude: 96.63435ºW; about 750 feet north on Hanna Drive from the intersection of Hanna Drive and Alexander Drive and about 50 feet west of Hanna Drive; Well RR-4686: Latitude: 33.8465ºN Longitude: 96.63605ºW; about 325 feet north on Hanna Drive from the intersection of Hanna Drive and Alexander Drive and about 550 feet west of Hanna Drive
**Purpose of Use:** Pond(s)/Surface Impoundment(s)
**Requested Amount of Use:** 1,240,000 gallons per year
**Production Capacity of Wells:** Well RR-4282: 16 gallons per minute; Well RR-4686: 30 gallons per minute
**Aquifer:** Trinity (Antlers) Aquifer

3. Public Comment on the Production Permit Applications (verbal comments limited to three (3) minutes each).

4. Consider and act upon the Production Permit Applications, including designation of parties and/or granting or denying the Production Permit Applications in whole or in part, as applicable.

5. Adjourn or continue permit hearing.

## Public Meeting on Proposed Desired Future Conditions

The Public Meeting will begin upon adjournment of the above noticed Permit Hearing.

Notice is hereby given that the Board of Directors of the Red River Groundwater Conservation District ("District") will hold a public meeting, accept public comment, and will discuss and consider the proposed Desired Future Conditions for the District.

**Agenda:**

1. Call to Order; establish quorum; declare meeting open to the public; introduction of Board.

2. Review of Desired Future Conditions applicable to the District.

3. Public Comment on District Desired Future Conditions (verbal comments limited to three (3) minutes each).

4. Consider and act upon moving forward with the proposed Desired Future Conditions applicable to the District, including preparing the summary report and coordinating with Groundwater Management Area 8 as required by the Chapter 36 of the Texas Water Code.

## Board Meeting

The regular Board Meeting will begin upon adjournment of the above noticed Public Hearing.

Notice is hereby given that the Board of Directors of the Red River Groundwater Conservation District ("District") may discuss, consider, and take all necessary action, including expenditure of funds, regarding each of the agenda items below:

**Agenda:**

1. Pledge of Allegiance and Invocation.

2. Call to order, establish quorum; declare meeting open to the public.

3. Public Comment.

4. Consider and act upon approval of Minutes of December 17, 2020, Board Meeting.

5. Budget and Finance.
   a. Review and approval of monthly invoices.
   b. Receive monthly financial information.
   c. Receive Quarterly Investment Report.
   d. Receive Quarterly Report on Management Plan.

6. Discussion and possible action on District's Drought Contingency Plan.

7. Update and possible action on E-Merchant services for payment of invoices.

8. Discussion and possible action on the District's Hydrogeology Firm.
   a. Statement of Qualifications and Selection
   b. Proposal and Contract

9. Update and possible action regarding the process for the development of Desired Future Conditions (DFCs).

10. Consider and act upon compliance and enforcement activities for violations of District Rules.
    a. Porter Green

11. General Manager's report: The General Manager will update the Board on operational, educational and other activities of the District.
    a. Well Registration Summary
    b. Update on Injection/Disposal Well Monitoring Program
        i. Protest of XTO application to amend permit
    c. Water Level Monitoring Device
    d. Update on TAGD Amicus Brief
    e. Update on Texas Water Development Board draft rules and District comments
    f. Database update

12. Open forum / discussion of new business for future meeting agendas.

13. Adjourn.

---

[1]*The Board may vote and/or act upon each of the items listed in this agenda.*

[2]*At any time during the meeting or work session and in compliance with the Texas Open Meetings Act, Chapter 551, Government Code, Vernon's Texas Codes, Annotated, the Red River Groundwater Conservation District Board may meet in executive session on any of the above agenda items or other lawful items for consultation concerning attorney-client matters (§551.071); deliberation regarding real property (§551.072); deliberation regarding prospective gifts (§551.073); personnel matters (§551.074); and deliberation regarding security devices (§551.076). Any subject discussed in executive session may be subject to action during an open meeting.*

[3] *Persons with disabilities who plan to attend this meeting, and who may need assistance, are requested to contact Velma Starks at (800) 256-0935 two (2) working days prior to the meeting, so that appropriate arrangements can be made.*

[4]*For questions regarding this notice, please contact Velma Starks at (800) 256-0935, at rrgcd@redrivergcd.org or at 5100 Airport Drive, Denison, TX 75020.*

ATTACHMENT 4

**MINUTES OF THE BOARD OF DIRECTORS' BOARD MEETING**
**RED RIVER GROUNDWATER CONSERVATION DISTRICT**

**Thursday, December 17, 2020**

**IN-PERSON MEETING LOCATION:**
**Greater Texoma Utility Authority Board Room**
**5100 Airport Drive**
**Denison, Texas 75020**

**REMOTE ACCESS ALSO AVAILABLE AT:**
Join by computer, tablet or smartphone at the following link:
https://global.gotomeeting.com/join/363514437

**or**

Join by phone 872-240-3311 with access code: 363-514-437

Notice is hereby given that, in accordance with Governor Abbott's March 16, 2020, action to temporarily suspend certain provisions of the Texas Open Meetings Act, a quorum of the Board of Directors of the Red River Groundwater Conservation District ("District") will hold public hearings and a Board meeting in-person and via telephone and video conference call beginning at 10:00 a.m. on Thursday, December 17, 2020. Please note for in-person attendance that the Board meeting location can only accommodate a limited number of attendees in order to comply with the Governor's proclamation related to in-person gatherings, and that remote access may be required in the event the capacity limitations are reached. Public comment can be provided whether participating in-person or remotely

| | |
|---|---|
| Members Present: | Chuck Dodd, David Gattis, Mark Gibson, Harold Latham, Mark Newhouse, Billy Stephens and Mark Patterson |
| Members Absent: | |
| Staff: | Drew Satterwhite, Allen Burkes, Paul Sigle, Wayne Parkman, Debi Atkins, Theda Anderson, Nichole Sims and Carolyn Bennett |
| Visitors: | Kristen Fancher, Fancher Legal<br>James Beach, WSP<br>David Frazier, UTRWD |

,

---

**Permit Hearing**

1. Call to Order; establish quorum; declare hearing open to the public; introduction of Board.

Board President Mark Patterson called the hearing to order at 10:03 a.m., established that a quorum was present, and declared the meeting open to the public.

2. Review the Production Permit Applications of:

**Applicant:** Upper Trinity Regional Water District; 900 N. Kealy Street, Lewisville, Texas 75057
**Location of Well:** 14680 FM 1550, Ladonia, TX 75449; Latitude: 33.480172ºN Longitude: 95.905344ºW; about 330 feet south of the intersection of Farm Market 1550 and County Road 3610 and 90 feet east of County Road 3610
**Purpose of Use:** Construction Water for Lake Ralph Hall Project
**Requested Amount of Use:** 59,700,000 gallons per year
**Production Capacity of Well:** 350 gallons per minute
**Aquifer:** Trinity (Paluxy) Aquifer

**Applicant:** Upper Trinity Regional Water District; 900 N. Kealy Street, Lewisville, Texas 75057
**Location of Well:** County Road 3645, Ladonia, TX 75449; Latitude: 33.441794ºN Longitude: 95.906575ºW; about 1,600 feet south of the intersection of County Road 3650 and County Road 3645 and 175 feet west of County Road 3645
**Purpose of Use:** Construction Water for Lake Ralph Hall Project
**Requested Amount of Use:** 59,700,000 gallons per year
**Production Capacity of Well:** 350 gallons per minute
**Aquifer:** Trinity (Paluxy) Aquifer

General Manager Drew Satterwhite reviewed the two production permit applications for Upper Trinity Regional Water District with the Board.

3. Public Comment on the Production Permit Applications (verbal comments limited to three (3) minutes each).

   There were no public comments.

4. Consider and act upon the Production Permit Applications, including designation of parties and/or granting or denying the Production Permit Applications in whole or in part, as applicable.

   Board Member Mark Newhouse made the motion to approve the two permits for Upper Trinity Regional Water District. Board Member Billy Stephens seconded the motion, and it passed unanimously.

5. Adjourn or continue permit hearing.

   President Mark Patterson declared the permit hearing adjourned at 10:16

## Board Meeting

1. Pledge of Allegiance and Invocation.

   Board President Mark Patterson led the group in the Pledge of Allegiance. Board Member Chuck Dodd offered the invocation for the group.

2. Call to order, establish quorum; declare meeting open to the public.

   President Mark Patterson called the meeting to order at 10:17, established a quorum was present, and declared the meeting open to the public.

3. Public Comment.

   There were no public comments.

4. Consider and act upon approval of Minutes of November 19, 2020, Board Meeting.

   Board Member David Gattis made a motion to approve the minutes of the November 16, 2020 meeting. The motion was seconded by Board Member Harold Latham. The motion passed unanimously.

5. Budget and Finance.
   a. Review and approval of monthly invoices.

      General Manager Drew Satterwhite reviewed the monthly invoices with the Board. Board Member David Gattis made a motion to approve the monthly invoices. Board Member Mark Newhouse seconded the motion. The motion passed unanimously.

   b. Receive monthly financial information

      General Manager Drew Satterwhite reviewed the District's monthly financial information with the Board.

6. Receive Quarterly Report on Management Plan.

   General Manager Drew Satterwhite reviewed the Quarterly Report on the Management Plan with the Board.

7. Receive Annual Report on Management Plan.

   Groundwater Technical Lead Paul Sigle reviewed the Annual Report on the Management Plan with the Board.

8. Discussion and possible action on the review of Accounts Receivables as it relates to individual accounts owing the District.

   General Manager Drew Satterwhite discussed the current accounts with the District that are delinquent, which are currently being shown monthly on the District's balance sheet. It was the consensus of the Board to place an item on the next agenda to discuss delinquent accounts.

9. Consider and act upon Engagement Letter for Audit Services for Fiscal Year Ending December 31, 2020.

   General Manager Drew Satterwhite discussed the engagement letter with McClanahan and Holmes for audit services for the fiscal year ending December 31, 2020 with the Board. Motion was made by Board Member Billy Stephens to approve the engagement letter for audit services with McClanahan and Holmes for the District for the fiscal year ending December 31, 2020. Board Member Mark Newhouse seconded the motion. The motion passed unanimously.

10. Consider and act upon purchasing Acoustic Water Level Measuring Device.

    General Manager Drew Satterwhite discussed purchasing an acoustic water level measuring device for the District. The District's Management Plan requires measurement of water levels. District staff has experience with this equipment after borrowing one and using it to take water level readings. Staff was impressed with the results of measuring water levels using this device which utilizes an acoustic signal for measuring. Staff recommended purchasing one acoustic water level measuring device with the North Texas GCD and split the cost 50/50. The warranty period for the equipment is for one year after purchase. Cost of the measuring device is $2,301, which will be split with the North Texas GCD.

    Board Member David Gattis made a motion to approve the purchase of an acoustic water level measuring device. Board Member Mark Newhouse seconded the motion. The motion passed unanimously.

11. Discussion and possible action on Buena Vista Turf Grass' Historical Use Permit.

    General Manager Drew Satterwhite requested this item be discussed during Executive Session.

12. Update and possible action regarding the process for the development of Desired Future Conditions (DFC).

    General Manager Drew Satterwhite stated no changes have occurred since the last meeting.

13. Consider and act upon compliance and enforcement activities for violations of District Rules.

    a. Porter Green

    General Manager Drew Satterwhite updated the Board on the issues with Porter Green. Board requested staff reach out to the neighbor who made the original complaint and see if the areas have dried that were of concern. Field staff has confirmed the wells are off and pond appears to have been drained. Staff took pictures that depict that the area is being divided into two ponds and the ponds are being sealed. Owner has been made aware that a permit is required before operating the wells. Staff provided an application for the permit to Porter Green for completion.

14. General Manager's report: The General Manager will update the Board on operational, educational and other activities of the District.

a. Well Registration Summary

General Manager Drew Satterwhite reviewed the well registration summary with the Board.

Pursuant to Texas Open Meetings Act, Chapter 551.071, Government Code, Vernon's Texas Codes, Annotated, the Board convened into Executive Session at 11:02 a.m. for discussion concerning attorney-client matters (§551.071) regarding agenda items 11 and 14.b.

The Board reconvened into Regular Session at 11:56

Board President Mark Patterson stated no action was taken on any items discussed during Executive Session.

11. Discussion and possible action on Buena Vista Turf Grass' Historical Use Permit.

Motion was made by Board Member David Gattis to approve contribution to the amicus brief in an amount not to exceed $2,000.00. Board Member Mark Newhouse seconded the motion.

Board Member Mark Gibson was not present at this time as he had to excuse himself from the meeting. Motion passed.

14. b. Update on Injection/Disposal Well Monitoring Program

Motion was made by Board Member Mark Newhouse to request radioactive tests by XTO. Board Member David Gattis seconded the motion. Board Member Mark Gibson was not present for the vote as he had to excuse himself from the meeting. Motion passed.

15. Open forum / discussion of new business for future meeting agendas.

The next meeting will be Thursday January 21, 2021.

16. Adjourn.

Board President Mark Patterson declared the meeting adjourned at 11:57 a.m.

---

Recording Secretary

Secretary-Treasurer

ATTACHMENT 5 a.

**RESOLUTION NO. 2021-01-21-01**

**A RESOLUTION BY THE BOARD OF DIRECTORS OF THE RED RIVER GROUNDWATER CONSERVATION DISTRICT AUTHORIZING PAYMENT OF ACCRUED LIABILITIES FOR THE MONTH OF December**

The following liabilities are hereby presented for payment:

| **Administrative Services** | **Amount** |
|---|---|
| GTUA - December | 24,231.70 |
| **Contract Services** | |
| IT Nexus - October-December | 1,800.00 |
| IT Nexus - January 2021 | 600.00 |
| WSP - November | 240.00 |
| WSP- December - January Hydro-Geo Services | 2,208.00 |
| **Direct Costs** | |
| Central Square - E-billing fees for #121 and #122 | 1.60 |
| NexTraq - December GPS tracking | 39.95 |
| NexTraq - January GPS tracking | 39.95 |
| **GMA8-Fees** | |
| NTGCD - GMA-8 fees from December | 780.07 |
| **Legal** | |
| Fancher Legal - General Counsel thorugh December | 3,346.90 |
| **Drillers Deposit** | |
| Axis Drilling - Driller Deposit Refund | 400.00 |
| City of Tioga - Driller Deposit Refund | 100.00 |
| **GRAND TOTAL:** | $ **33,788.17** |

NOW THEREFORE BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE RED RIVER GROUNDWATER CONSERVATION DISTRICT THAT the Secretary-Treasurer is hereby authorized to make payments in the amounts listed above.

On motion of _____ and seconded by:

_____, the foregoing Resolution was passed and approved on this, the 21st. day of January 2021

by the following vote:

AYE:
NAY:

At a meeting of the Board of Directors of the Red River Groundwater Conservation District.

_____
President

ATTEST:

_____
Secretary/Treasurer

ATTACHMENT 5 b.

# RED RIVER GROUNDWATER
# Profit & Loss Budget vs. Actual
### December 31, 2020

| | Current Actual | Current Budget | YTD Actual | Total Budget | % of Budget Remaining |
|---|---|---|---|---|---|
| **Income** | | | | | |
| **46002 GW PRODUCTION** | 0.00 | 0.00 | 258,049.82 | 315,000.00 | 18.08% |
| **46005 LATE FEES** | 0.00 | 0.00 | 2,119.12 | 0.00 | 0.00% |
| **46006 VIOLATION FEES** | 0.00 | 0.00 | 1,900.00 | 0.00 | 0.00% |
| **46015 REGISTRATION FEES** | 1,300.00 | 667.00 | 11,100.00 | 8,000.00 | -38.75% |
| **46020 PERMITTING FEES** | 3,000.00 | 0.00 | 3,500.00 | 0.00 | 0.00% |
| **46100 INTEREST INCOME** | 0.00 | 0.00 | 965.80 | 2,700.00 | 64.23% |
| **Total Income** | 4,300.00 | 667.00 | 277,634.74 | 325,700.00 | 14.76% |
| **Gross Profit** | 4,300.00 | 667.00 | 277,634.74 | 325,700.00 | |
| **Expense** | | | | | |
| **77010 ADMINISTRATIVE COST** | 13,449.00 | 9,166.67 | 107,104.75 | 110,000.00 | 2.63% |
| **77020 ADVERTISING** | 0.00 | 700.00 | 238.21 | 700.00 | 65.97% |
| **77027 AUDITING** | 0.00 | 0.00 | 4,850.00 | 4,893.00 | 0.88% |
| **77031 BANKING FEES** | 0.00 | 0.00 | 24.00 | 100.00 | 76.00% |
| **77032 CONTRACT SERVICES** | 2,808.00 | 2,650.00 | 33,661.01 | 31,800.00 | -5.85% |
| **77035 FIELD TECH** | 6,387.50 | 6,666.67 | 70,245.50 | 80,000.00 | 12.19% |
| **77040 DIRECT COST** | 378.95 | 500.00 | 4,292.75 | 6,000.00 | 28.45% |
| **77045 FIELD PERMITTING SPECIAL** | 3,381.00 | 2,916.67 | 28,884.00 | 35,000.00 | 17.47% |
| **77450 DUES & SUBSCRIPTIONS** | 0.00 | 162.50 | 1,798.00 | 1,950.00 | 7.79% |
| **77480 EQUIPMENT** | 0.00 | 166.67 | 940.27 | 2,000.00 | 52.99% |
| **77500 FEES-GMA8** | 780.07 | 458.34 | 5,424.51 | 5,500.00 | 1.37% |
| **77810 INSURANCE AND BONDING** | 321.00 | 302.00 | 4,060.50 | 3,624.00 | -12.04% |
| **77855 INTERNET FEES** | 0.00 | 375.00 | 3,510.76 | 4,500.00 | 21.98% |
| **77970 LEGAL** | 3,346.90 | 2,916.67 | 30,923.76 | 35,000.00 | 11.65% |
| **78010 MEETINGS AND CONFEREN** | 181.62 | 433.34 | 1,673.08 | 5,200.00 | 67.83% |
| **78310 RENT** | 200.00 | 200.00 | 2,400.00 | 2,400.00 | 0.00% |
| **78600 SOFTWARE MAINTENANCE** | 0.00 | 1,250.00 | 2,616.20 | 15,000.00 | 82.56% |
| **78750 TELEPHONE** | 224.77 | 208.34 | 2,511.77 | 2,500.00 | -0.47% |
| **78770 - TRANSPORTATION** | 70.41 | 291.67 | 2,062.43 | 3,500.00 | 41.07% |
| **Total Expense** | 31,529.22 | 29,364.54 | 307,221.50 | 349,667.00 | 12.14% |
| **Net Income** | **-27,229.22** | **-28,697.54** | **-29,586.76** | **-23,967.00** | |

# RED RIVER GROUNDWATER
# Balance Sheet
## As of December 31, 2020

| | |
|---|---|
| **ASSETS** | |
| **Current Assets** | |
| **Checking/Savings** | |
| **10001 CASH-First United** | 254,875.47 |
| **10025 A/R CONSUMPTION** | -4,136.67 |
| **10026 A/R Texas Rain Holding Co** | 2,600.00 |
| **10230 A/R Violation Fees** | 500.00 |
| **10101 ALLOWANCE FOR UNCOLLECT** | -1,530.00 |
| **10010 INVESTMENTS** | 260,000.00 |
| **10230 PP EXPENSES** | 2,212.00 |
| **TOTAL ASSETS** | **514,520.80** |
| **LIABILITIES & EQUITY** | |
| **Liabilities** | |
| **Current Liabilities** | |
| **Accounts Payable** | |
| **23100 ACCOUNTS PAYABLE** | 30,568.27 |
| **23150 DRILLERS DEPOSIT LIAB** | 14,400.00 |
| **Total Other Current Liabilities** | 44,968.27 |
| **Total Current Liabilities** | 44,968.27 |
| **Total Liabilities** | 44,968.27 |
| **Equity** | |
| **35100 RETAINED EARNINGS** | 499,139.29 |
| **Net Income** | -29,586.76 |
| **Total Equity** | 469,552.53 |
| **TOTAL LIABILITIES & EQUITY** | **514,520.80** |

ATTACHMENT 5 c.

Red River Groundwater Conservation District
Quarterly Investment Report
For the Quarter Ended
December 31, 2020

The investment portfolio of the Red River Groundwater Conservation District is in compliance with the Public Funds Investment Act and the Investment Policy and Strategies.

Presented by Red River Groundwater Conservation District Investment Officers:

Drew Satterwhite
General Manager

Debi Atkins
Finance Officer

Investment Holdings
12/31/2020

| Description | Ratings | Coupon/ Discount | Maturity Date | Settlement Date | Face Amount/Par Value | Book Value | Market Price | Market Value | Life (Day) | Yield |
|---|---|---|---|---|---|---|---|---|---|---|
| First United (DDA) | | 0.00% | 1/1/2021 | 9/30/2020 | $ 254,875.47 | $ 254,875.47 | 1.00 | $ 254,875.47 | 1 | 0.00% |
| East West | | 1.60% | 2/15/2021 | 2/14/2020 | $ 100,000.00 | $ 100,000.00 | 100.00 | $ 100,000.00 | 46 | 1.61% |
| East West | | 0.43% | 6/29/2021 | 6/29/2020 | $ 160,000.00 | $ 160,000.00 | 100.00 | $ 160,000.00 | 180 | 0.43% |
| | | | | | $ 514,875.47 | $ 514,875.47 | | $ 514,875.47 | 65 | |
| | | | | | | | | | (1) | |

(1) Weighted average life - For purposes of calculating weighted average life, bank accounts, pools and money market funds are assumed to have an one day maturity.

Book/Market Value Comparison

| Description | Coupon/ Discount | Maturity Date | September 30, 2020 Face Amount/ Par Value | September 30, 2020 Book/Market Value | Purchases/ Adjustments | Sales/Adjust/ Call Maturity | December 31, 2020 Face Amount/ Par Value | December 31, 2020 Book/Market Value |
|---|---|---|---|---|---|---|---|---|
| First United (DDA) | 0.00% | 10/1/2020 | $ 215,091.71 | $ 215,091.71 | 109,699.53 | 69,915.77 | 254,875.47 | $ 254,875.47 |
| East West | 1.60% | 2/15/2021 | 100,000.00 | 100,000.00 | | | 100,000.00 | 100,000.00 |
| East West | 0.43% | 6/29/2021 | 160,000.00 | 160,000.00 | | | 160,000.00 | 160,000.00 |
| | | | $ 416,179.50 | $ 416,179.50 | $ 109,699.53 | $ 69,915.77 | $ 514,875.47 | $ 514,875.47 |

ATTACHMENT 5 d.

# RED RIVER

## GROUNDWATER CONSERVATION DISTRICT

FANNIN COUNTY AND GRAYSON COUNTY

## General Manager's Quarterly Report
## Date: December 31, 2020
## Red River GCD Management Plan

This quarterly briefing is being provided pursuant to the adopted Management Plan for the quarter ending December 31, 2020.

**Well Registration Program:**

Current number of wells registered in the District: 946

Aquifers in which the wells have been completed: Trinity and Woodbine

**Well Inspection/Audit Program:**

**2020**
**Well Inspections**

| Month | Fannin | Grayson | Total |
|---|---|---|---|
| January | 0 | 6 | **6** |
| February | 5 | 16 | **21** |
| March | 2 | 13 | **15** |
| April | 5 | 10 | **15** |
| May | 5 | 3 | **8** |
| June | 2 | 7 | **9** |
| July | 3 | 22 | **25** |
| August | 1 | 8 | **9** |
| September | 1 | 4 | **5** |
| October | 1 | 7 | **8** |
| November | 1 | 9 | **10** |
| December | 2 | 3 | **5** |
| Total | **28** | **108** | **136** |

ATTACHMENT 6

# RED RIVER GROUNDWATER CONSERVATION DISTRICT
# AGENDA COMMUNICATION

**DATE:** January 11, 2021

**SUBJECT:** AGENDA ITEM NO. 6

**DISCUSSION AND POSSIBLE ACTION ON DISTRICT'S DROUGHT CONTINGENCY PLAN**

**ISSUE**

The District needs to adopt a Drought Contingency Plan.

**BACKGROUND**

Section 6.2 of the District's Rules call for the District to adopt a Drought Contingency Plan. This proposed plan is consistent with the District rules and uses/references the Texas Water Development Board's publishing of the U.S. Drought Monitor. The plan lays out the process for how the District's Board would declare drought and ultimately notify permit holders.

**CONSIDERATIONS**

The proposed plan provides the District's Board with flexibility to implement a drought stage on a county-by-county basis. The plan also provides flexibility for the Board to use sound judgement when weighing whether a drought might be long or short term.

If the District were to declare a drought, permittees are then allowed a 15% increase in their permitted volumes for that year.

The plan's recommended water reduction goals are all voluntary.

**STAFF RECOMMENDATIONS**

The staff recommends the Board provide input on this plan and adopt with any changes as you see fit.

**ATTACHMENTS**

Proposed Drought Contingency Plan.

**PREPARED AND SUBMITTED BY:**

Drew Satterwhite, P.E., General Manager

# RED RIVER
## GROUNDWATER CONSERVATION DISTRICT

P.O. Box 1214, Sherman, TX 75091
5100 Airport Drive, Denison, TX 75020
Office: 1 (800) 256-0935 | Fax: (903) 786-8211
rrgcd@redrivergcd.org | http://www.redrivergcd.org/

***Drought Contingency Plan***

*Adopted _____*



## *I. Purpose*

The Red River Groundwater Conservation District (the District) adopts this Drought Contingency Plan ("plan") for the purpose to conserve, preserve, protect, and recharge the groundwater resources of Fannin and Grayson Counties, and to prevent waste and degradation of quality of those groundwater resources. The Board of Directors adopts this plan in order to implement Sections 36.113 and 36.1131 of the Texas Water Code, and Sections 3.10(a), 3.16(b), and 6.2 of the District's Rules.

## *II. Applicability*

Provisions of this plan shall apply to all registered wells and all persons or organizations, public or private, owning or operating wells within Fannin or Grayson Counties, regardless of purpose of use, size, capacity, date drilled, ownership, or the exemption status of a well.

## *III. Enforcement*

This Drought Contingency Plan will rely primarily on voluntary compliance. The District encourages the voluntary reduction measures outlined in this plan to achieve a desired level of conservation and reduced impact to the aquifers. However, this section does not exclude the District from exercising authority of its Enforcement Policy and Civil Penalty Schedule in the District's Rules regarding wasteful use of water.

## *IV. Public Water Supply Entities*

The District recognizes that Public Water Supply Entities develop and utilize drought contingency plans that accomplish the intent of this Drought Contingency Plan. The District will support and provide assistance when requested from a Public Water Supply Entity, using groundwater, to implement their plans and use their discretion as to how much desired reduction is to be accomplished during a drought. The District asks to be notified by each Public Water Supply Entity in the event that a drought stage has been triggered or canceled.

# V. *Initiation and Determination of Drought Stages*

The various drought stages will be initiated and terminated by the District's Board of Directors (the Board), utilizing the Texas Water Development Board's (TWDB) publication of the U.S. Drought Monitor. Each drought stage will last a minimum of 30 days and renew automatically unless changed by Board action.

The drought stages will be implemented and terminated by resolution of the Board of Directors and will be implemented on a county-by-county basis.

Public notification of the initiation or termination of drought stages shall be by means of any of the following: notification on the District's website, in a newspaper(s) of general circulation, radio announcement, mail, fax, or email to owners/operators of permitted wells. The District's website will display the most current drought stage.

The TWDB's publication of the U.S. Drought Monitor can be found here.

The weekly map is based on measurements of climatic, hydrologic and soil conditions, as well as reported impacts and observations from more than 350 contributors around the country. Eleven climatologists from the partner organizations take turns serving as the lead author producing the map each week. The authors examine all the data and use their best judgment to reconcile any variances in what different sources report. The U.S. Drought Monitor is a composite index that includes many indicators. The drought stages of this plan will coincide with the various stages of drought which are as follows:

| | | Ranges | | | | |
|---|---|---|---|---|---|---|
| Category | Description | Palmer Drought Severity Index (PDSI) | CPC Soil Moisture Model (Percentiles) | USGS Weekly Streamflow (Percentiles) | Standardized Precipitation Index (SPI) | Objective Drought Indicator Blends (Percentiles) |
| D0 | Abnormally Dry | -1.0 to -1.9 | 21 to 30 | 21 to 30 | -0.5 to -0.7 | 21 to 30 |
| D1 | Moderate Drought | -2.0 to -2.9 | 11 to 20 | 11 to 20 | -0.8 to -1.2 | 11 to 20 |
| D2 | Severe Drought | -3.0 to -3.9 | 6 to 10 | 6 to 10 | -1.3 to -1.5 | 6 to 10 |
| D3 | Extreme Drought | -4.0 to -4.9 | 3 to 5 | 3 to 5 | -1.6 to -1.9 | 3 to 5 |
| D4 | Exceptional Drought | -5.0 or less | 0 to 2 | 0 to 2 | -2.0 or less | 0 to 2 |

# VI. *Drought Stages*

***Stage 1 - Moderate Drought***

*Voluntary Water Reduction Goal - 5%*. Encourage water conservation methods through public awareness of methods to reduce overall usage by 5% through the following practices:

- Re-use and re-circulate water whenever possible.

- Check for and repair all leaks.
- Outdoor lawn and landscape watering should be done during times of low evaporation loss and use timers or smart irrigation controllers to avoid overwatering and waste.
- Washing vehicles at a car wash usually uses less water than washing at home.
- Washing sidewalks, driveways, parking areas, streets, tennis courts, or any outdoor surfaces could be considered waste.
- Other water conservation practices.

***Stage 2 - Severe Drought***

*Water Reduction Goal - 10%*. Continue to encourage the water conservation methods with a goal to reduce overall usage by 10% through the following practices:

- Re-use and re-circulate water whenever possible.
- Check for and repair all leaks.
- Outdoor lawn and landscape watering should be done between the hours of 8:00 PM to 10:00 AM.
- Limit watering of lawns and landscapes to once every 5 to 7 days.
- Wash vehicles only at a car wash when needed.
- Keep decorative fountains, landscape ponds, and swimming pools covered whenever possible to reduce evaporation.
- Do not use water to wash sidewalks, driveways, parking areas, streets, tennis courts, or any outdoor surfaces except for human or animal health and safety reasons, or fire hazard prevention.
- Providing groundwater to ponds, tanks, lakes, reservoirs, swimming pools, or other surface impoundments for holding water that have a total capacity of more than 100,000 gallons is discouraged.
- Water livestock in leak-proof troughs (livestock tanks) when practical.

***Stage 3 - Extreme Drought***

*Voluntary Water Reduction Goal* - 20%. Continue to encourage the practice of water conservation methods and reduce overall usage by 20% through the following practices:

- Re-use and re-circulate water whenever possible.
- Check for and repair all leaks.
- Outdoor lawn and landscape watering should be done between the hours of 8:00 PM to 8:00 AM.
- Limit watering of lawns and landscapes to once every 5 to 7 days.
- Wash vehicles only at a car wash when needed.

- Keep decorative fountains, landscape ponds, and swimming pools covered whenever possible to reduce evaporation.
- Do not use water to wash sidewalks, driveways, parking areas, streets, tennis courts, or any outdoor surfaces except for human or animal health and safety reasons, or fire hazard prevention.
- Providing groundwater to ponds, tanks, lakes, reservoirs, swimming pools, or other surface impoundments for holding water that have a total capacity of more than 100,000 gallons is discouraged.
- Water for dust control is discouraged.
- Watering livestock in leak-proof troughs is recommended.

***Stage 4 - Exceptional Drought***

Voluntary Water Reduction Goal - 30%. Continue to encourage the practice of water conservation methods and reduce overall usage by 30%:

- Re-use and re-circulate water whenever possible.
- Check for and repair all leaks.
- Limit watering of lawns and landscapes to once every 14 days.
- No vehicle washing
- Do not use water to wash sidewalks, driveways, parking areas, streets, tennis courts, or any outdoor surfaces except when required for human or animal health and safety reasons, or fire hazard prevention.
- Providing groundwater to ponds, tanks, lakes, reservoirs, swimming pools, or other surface impoundments for holding water regardless of capacity is prohibited.
- Water for dust control only when required by law.
- Watering livestock in leak-proof troughs is highly recommended.

ATTACHMENT 7

# RED RIVER GROUNDWATER CONSERVATION DISTRICT
# AGENDA COMMUNICATION

**DATE:** January 11, 2021

**SUBJECT:** AGENDA ITEM NO. 7

## UPDATE AND POSSIBLE ACTION ON E-MERCHANT SERVICES

### ISSUE
Discussion and possible action on who will pay transaction fees for the District's online fee payments software.

### BACKGROUND
Last month, December 2020, the District rolled out our new database that will include switching our accounting/billing software to QuickBooks. Unlike our old software, QuickBooks will allow for constituents to pay their fees by credit card. In November, the Board elected to cover transaction fees and pay $20 per month fee.

After this decision by the Board, the staff ran into issues setting this E-Merchant service up as Quickbooks would not approve our tax-exemption status without an IRS letter stating our tax-exemption status. Subsequently, we looked at other options through QuickBooks and settled on using Chase Bank through webpay.com. The fees are different and summarized below.

- Quickbooks
  - ACH = flat $3.00 per transaction
  - CC = 3.5% + $0.30 per transaction
- Chase Bank
  - ACH =0.8% + $0.30 per transaction
  - CC= 2.9% + $0.30 per transaction

### CONSIDERATIONS
The Staff believes this is the best solution that we have seen available.

The District staff is unsure of how many will elect to use the credit card option due to the fact that it is not currently possible with our existing accounting software.

It is also important to note, that the constituents will still be able to pay with a check and avoid transaction fees.

### STAFF RECOMMENDATIONS
The staff requests that the Board authorize the use of Chase Bank for E-Merchant services.

### ATTACHMENTS
Fee Schedule

**PREPARED AND SUBMITTED BY:**

Drew Satterwhite, P.E., General Manager

Invoiced Payments
powered by CHASE

Getting a payment processor is easy with Invoiced Payments. Powered by Chase, Invoiced Payments offers competitive rates for handling credit card, debit card, and ACH transactions. Complete the form below to get started.

Invoiced Payments requires a paid subscription to Invoiced. Please purchase a subscription (https://app.invoiced.com/activate) in order to sign up for payment processing.

## Fees

| Payment Method | Fee |
|---|---|
| Credit and debit cards | 2.9% + $0.30 |
| ACH | 0.8% + $0.30, max $5 |
| **Other Fees** | |
| Chargeback | $15.00 |
| NSF Return | $15.00 |

ATTACHMENT 8 a.

# RED RIVER GROUNDWATER CONSERVATION DISTRICT
# AGENDA COMMUNICATION

**DATE:** January 11, 2021

**SUBJECT:** AGENDA ITEM NO. 8 a and b

**DISCUSSION AND POSSIBLE ACTION ON THE DISTRICT'S HYDROGEOLOGY FIRM**

**ISSUE**

James Beach, the District's primary Hydrogeologist is no longer with WSP and has started a new firm.

**BACKGROUND**

Since 2014, the District has used James Beach as our Hydrogeologist. The District was initially engaged with LBG Guyton until they were purchased by WSP, both of which James was an employee. Effective January 4, 2021, James has opened a new firm which is Advanced Groundwater Solutions, LLC and is no longer employed by WSP.

James has been the primary hydrogeologist for the District at both LBG Guyton and WSP.

**CONSIDERATIONS**

Advanced Groundwater Solutions, LLC has sent us a Statement of Qualifications (SOQ), Proposal, and Contract.

Kristen Fancher, District Legal Counsel, will be reviewing the proposed contract and may have recommended edits should the District decide to engage Advanced Groundwater Solutions, LLC.

**STAFF RECOMMENDATIONS**

The staff will be prepared to discuss recommendations at the meeting.

**ATTACHMENTS**

SOQ, Proposal & Contract

**PREPARED AND SUBMITTED BY:**

Drew Satterwhite, P.E.
General Manager

**Basic Statement of Qualifications for**

# Advanced Groundwater Solutions, LLC (AGS)

Advanced Groundwater Solutions, LLC (AGS) specializes in professional groundwater and hydrogeologic consulting. AGS was formed in January 2021 by James Beach, PG and John Nelson, PG, who have worked together professionally for 21 years at their previous firms, LBG-Guyton Associates and WSP. LBG-Guyton was acquired by WSP in 2017, and after three years with a fast growing international engineering firm, James and John formed AGS as a way of providing specialized service to clients in the groundwater and water industry.

James and John have been trusted advisors to their clients since 1989. With advanced degrees and 60 years of combined and complimentary experience, they offer clients broad groundwater expertise. Their clients have included water supply entities, groundwater conservation districts, l municipalities, industrial and manufacturing companies, river authorities, utility districts, engineering firms, attorneys, and many other entities.

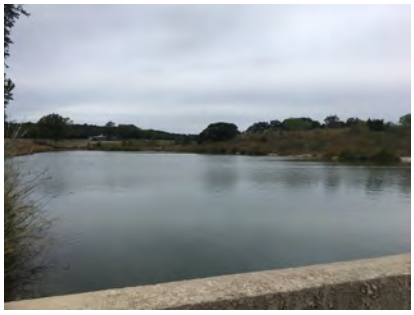
## Services

### Services to Groundwater Conservation Districts

- Developing rules and management plans
- Reviewing hydrogeologic reports
- Assessing well spacing and special conditions
- Developing monitoring plans and assessing aquifer conditions
- Modeling, quantitative hydrogeology, Desired Future Conditions
- Permit review and impact analysis
- TWDB GAM use, refinement, and development
- Public and stakeholder interaction and education
- Expert witness for contested case hearings

### Hydrogeologic Assessments

- Assimilation of public and commercial hydrogeologic data and logs
- Geophysical and geologic evaluations
- Developing conceptual models for potential groundwater sources
- Evaluating sustainability of groundwater supplies
- Brackish groundwater resource studies
- Assessment of groundwater/surface water interaction
- Field measurements, groundwater sampling, stream flow gauging and tracer tests



### Groundwater Availability Studies

- Assimilation of historical aquifer demands, usage and monitoring data
- Assessing aquifer characteristics and recharge
- Evaluating impacts to aquifer and streams

- Groundwater recharge estimation
- Brackish groundwater studies, development, and modeling
- Evaluation of water level decline in wells and wellfields

## Groundwater Modeling

- TWDB GAM use and development
- Implementation of field programs to develop data for models
- Construction and validation of groundwater availability models
- Evaluation and modeling of long-term water supplies and wellfields
- Stakeholder education and interaction
- Quantitative assessments for permitting

## Groundwater Supply Development and Management

- Assimilation of data to determine feasibility of new sources
- Test drilling programs
- Design, execution, and evaluation of pumping tests
- Well and pump equipment design
- Well specifications and construction oversight
- Assessment of water quality
- Permitting support, regulatory assistance
- Well and pump rehabilitation specifications and construction observation
- Well performance testing and maintenance
- Well field optimization and monitoring
- Aquifer recharge and aquifer storage and recovery (ASR)

## Contact Information

Austin: (512) 796-8636 james.beach@advancedgw.com

Houston: (281) 813-9064 john.nelson@advancedgw.com

Coming soon www.advancedgw.com

James Beach is a Professional Geoscientist in Texas with 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 (P/L), business development and client management, corporate and project risk management, and employee development and management.

As a shareholder of Leggette, Brashears & Graham, Inc. (dba LBG-Guyton Associates in Texas) he was selected by fifteen fellow shareholders to serve on the board of directors for eight years from 2009-2017 until the firm was successfully sold to WSP USA Inc. From 2012-2017, James served as the Texas business leader for LBG, overseeing 15-20 employees, and was responsible for all aspects of business operations in Texas. While at WSP USA, Mr. Beach served as Area Manager of Texas Water and Environment Group, and was an Assistant Vice President. Project responsibilities included developing and/or reviewing scopes of work and budget estimates, as well as ensuring proper legal, compliance, and corporate review of contracts and insurance requirements.

Mr. Beach has always maintained significant involvement with clients, projects, and technical work, and has developed trusted advisor status with many clients and in the industry. James stays active in water related professional organizations to support industry advancement and maintain visibility among clients and colleagues. He is currently serving as a Board member for the Texas Water Conservation Association and is a member of the Groundwater panel as well. Mr. Beach has consulted for municipal, industrial, private and government clients, and has served as technical consultant for state regulatory agencies and groundwater conservation districts.

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. He has experience in litigation support ranging from groundwater rights/permitting (in different cases supporting regulators, permittees, or third parties), groundwater use and valuation disputes, environmental damage claims, oil/gas permitting, and other hydrologic issues.

James has significant experience in application of numerical models to evaluate water resources as well as contaminant flow and transport in the subsurface. He has experience characterizing, evaluating, and modeling flow and contaminant movement in unsaturated and saturated subsurface environments including deep vadose zone systems. He has evaluated deep-well injection, natural and enhanced bioremediation, landfill covers, slurry/sheet pile walls, and injection/recovery systems. He has worked at sites with contamination from free and dissolved phases of light and dense nonaqeous liquids (LNAPL and DNAPL), radionuclides, inorganic species and metals. Environmental projects include technical consulting for commercial, industrial and government clients to meet regulatory mandates as well as assisting regulatory agencies in technical issues of evaluating compliance at permitted facilities.

## EDUCATION/TRAINING/CERTIFICATIONS

M.S. in Hydrology, New Mexico Institute of Mining and Technology, 1989
B.S. in Hydrology, Tarleton State University, 1987

Professional Geoscientist #2965, State of Texas
National Ground Water Association
Texas Water Conservation Association
Texas Groundwater Association
Texas Alliance of Groundwater Districts

29 CFR 1910 40-Hour Health and Safety Training

## SUMMARY OF PROFESSIONAL EXPERIENCE

Jan 5, 2021 – Present: Advanced Groundwater Solutions LLC, Founding Principal, Austin, Texas
2017 – Jan 4, 2021: VP and Water and Environment Texas Area Manager, WSP USA, Austin, Texas
2012 -2017: Sr. Vice President, Shareholder and Board Member, LBG-Guyton Associates, Austin, Texas
2009 - 2011: Vice President and Shareholder, LBG-Guyton Associates, Austin, Texas
2002 - 2008: Senior Associate with LBG-Guyton Associates, Austin, Texas
1999 - 2001: Senior Hydrologist with LBG-Guyton Associates, Austin, Texas
1992 - 1999: Groundwater Hydrologist, INTERA, Austin, Texas
1989 - 1992: Groundwater Hydrologist with McCulley, Frick & Gillman, Inc., Austin, Texas
1984: Assistant Well Driller with Magill Well Service, Eden, Texas

## PROJECT EXPERIENCE

***Consulting Hydrogeologist – multiple Groundwater Conservation Districts***

Over the past 20 years, James has served as consulting groundwater hydrologist in an ongoing capacity or on a project basis for many districts, including Red River, Prairielands, Middle Trinity, Clearwater, Lone Star, North Texas, Bandera, Trinity Glen Rose, Headwaters, Hill Country, Lipan-Kickapoo, Reeves, Brazos Valley, Harris-Galveston Subsidence, and others. Support has included development of management plans; designing groundwater monitoring networks; assessing DFCs/MAGs for joint groundwater planning; groundwater availability model runs; assessing impacts of potential rules; review of studies regarding impact from fracking; assessing strategies in state water plan and future groundwater pumping; assessing ASR and brackish groundwater, recharge, stream-aquifer interaction, water budgets, and long-term sustainability; developing rules and policies; development of well spacing rules and interactive tools to assess well spacing; evaluating permits and impacts of proposed production.

***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.

***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.

***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.

***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 modeling GUI. 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 the modeling GUI. 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.

***Assessment of Brackish Groundwater for Desalination in Texas***
Managed project for the Texas Water Development Board to assess the potential for desalination of brackish groundwater in Texas' major and minor aquifers. The study included evaluation of water-quality and geophysical data for over 30 aquifer systems throughout the state and development of hydrogeologic and water-quality maps that can be used to assess potential brackish water projects for planning purposes. The evaluation also included preliminary cost estimation formulas for source water production (wells and well fields) and engineering considerations for different aquifers.

***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.

***Assessment and Development of Clear Water Wellfield – Midland County Freshwater Supply District***
Completed a preliminary hydrogeologic assessment of Pecos Valley and Dockum Aquifers on the property, test hole program design, assessment of test hole data, pumping tests and water quality, developed groundwater model to assess long-term groundwater availability.

***Midland County Water Plan – Midland County***
Assessed county demands from several water user groups, completed a hydrogeologic assessment of current and potential groundwater availability, and assessment of multiple aquifers and properties to meet long-term supply.

***Groundwater Availability Modeling, City of Sweetwater, Nolan County, Texas***
PM and modeler for evaluation of groundwater availability in the Dockum in Nolan County, Texas over a 50-year modeling period. Data were gathered on local structure, water levels, aquifer parameters, and current withdrawals to support model calibration and predictive runs for supply to a proposed power plant.

***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.

***Industrial Groundwater Availability Study, Andrews and Gaines Counties, Texas***
PM on annual groundwater availability study from the Ogallala Aquifer in Andrews and Gaines Counties, Texas within the water rights areas of a water supply corporation. The annual study update involves gathering and evaluating water level and pumping information from wellfields in the two counties. This data is compared to predictive model results completed in the first phase of the project, and model was recalibrated as necessary on an annual basis to incorporate the effects of new wells within and outside the water rights areas.

***Recharge and Recovery of Reclaimed Wastewater, City of Austin, Texas***
PM and modeler for preliminary assessment of managed aquifer recharge for reclaimed wastewater. Project included assessment 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. Evaluated the optimum size of infiltration basins and production wells to minimize cost and maximize recovery.

***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.

***Assessment of Aquifer Storage and Recovery – City of College Station, Texas***
Completed a preliminary hydrogeologic assessment of ASR for the city, including assessing hydraulic properties, water quality, operational efficiencies, wellfield layout, and impacts of natural gradients. A multi-well model allowed evaluation of a conceptual ASR system injecting 6 MGD.

***Aquifer Characterization and Wellfield Assessment - City of Borger***
Project included assessment of existing data, geophysical assessment, hydrogeologic field support during testhole drilling, sample collection, hydrogeologic assessment, wellfield layout, and groundwater model development.

***Characterization and Modeling of ASR System – San Antonio Water System***
Updated and recalibrated SAWS ASR groundwater model to evaluate 10 years of injection/extraction, movement and mixing of native and injected waters, water quality, percentage of system recovery and loss, total aquifer storage capabilities, losses to competitive pumping, maximum production and injection rates. The model predicted movement of injected water, impact from nearby production, and water quality of blended water upon extraction.

***Horizontal Well Assessment, Planning and Permitting – West Texas***
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).

***Development Gulf Coast Groundwater Model of Catahoula Aquifer***
Worked with the Lone Star GCD to develop a MODFLOW groundwater models to simulate groundwater flow and pumping impacts in the Catahoula Aquifer. The model was based on hydrogeologic characterization using geophysical logs and limited number of deep production wells.

***Presidio County, Texas***

Evaluated structural and hydrogeologic data for the area surrounding the Shafter Mining District for groundwater model. Provided quantitative hydrogeologic opinions for mining company to explain groundwater flow and potential impacts from dewatering.

***Update and Recalibration of Groundwater Model for Reno, Nevada***
Converted a complex, non-standard model to MODFLOW. The model implemented domestic and municipal pumping; distribution system leakage; recharge from mountain-fronts, precipitation, and irrigation; evapotranspiration; rivers and streams; and discharge from springs and man-made pits. The model will be used to complete wellhead protection assessment and evaluate long-term effects of multiple production scenarios. Data was developed within ArcGIS and interchanged with groundwater model.

***Confidential Client – Reeves County***
PM to assess productivity of Capitan Reef Complex aquifer. Reviewed existing stratigraphic and hydrogeological information on wells near the Site, and developed a groundwater model to assess groundwater production capacity, and long-term groundwater availability.

***Expanded Brackish Desalination Well Field – Wilson County***
Worked with hydrogeologic team to assess brackish groundwater availability. Used a modified TWDB GAM, simulated groundwater production, DFC impact, permitting issues and aquifer impacts from expanded SAWS brackish wellfield in Wilson County. Evaluated wellfield locations, impact on existing brackish wellfield, and other design issues.

***Trinity Glen Rose Groundwater Conservation District***
Served as consulting hydrogeologist for over 14 years, completing multiple studies related to groundwater recharge, update of stratigraphic maps, groundwater modeling to assess permit issues and DFCs, and other groundwater issues.

***Evaluation of Hydrochemical and Isotopic Data in Groundwater Management Areas 11, 12 and 13***
PM for TWDB study to assess water quality of the Carrizo-Wilcox Aquifer in Texas. The team compiled well data, geophysical logs, completed geochemical transect wells, determined stratigraphic formation tops and constructed strike and dip transects through three separate areas. The transects were the foundation for the geochemical modeling evaluation to determine change in geochemical signatures as water migrated along the transect.

***Desired Future Conditions Explanatory Report for GMA 9***
Provided hydrogeologic and groundwater technical consulting to help prepare technical content for the report including: general aquifer descriptions and maps of major and minor aquifers within the GMA, technical sections and maps for the portions of aquifers and counties designated non-relevant. Lead public presentations and discussions regarding groundwater modeling, hydrogeologic issues, and impact of DFCs on the nine factors including: aquifer uses and conditions, hydrologic conditions and DFC feasibility.

***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.

***Evaluation of New Groundwater Sources, City of Crane, Texas***
Evaluation of the availability of groundwater in the Edwards-Trinity Plateau, Pecos Valley Alluvium, and Dockum aquifers for the City of Crane to identify potentially viable supplies at a reasonable cost. Data were gathered on local hydrogeology, well capacity, water levels, aquifer parameters, water quality and current withdrawals to support preliminary recommendations for further assessment.

***Aquifer Storage and Recovery of Reclaimed Wastewater – City of Austin***
Preliminary assessment 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.

***150-Mile Radius Groundwater Supply Ranking – Central-West Texas***

Worked with confidential client to evaluate and rank potential groundwater projects to meet future water needs. Ranked projects based on estimated well field capacity, volume of groundwater, infrastructure costs, permitting issues, sustainability, water quality, and other factors.

***Groundwater Resource Planning/Assessment – City of San Angelo***
Mr. Beach has worked with the City of San Angelo for over 15 years on projects related to groundwater availability, brackish groundwater studies, potential groundwater projects, Hickory wellfield modeling and regulatory support, and other water resource evaluations.

***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.

***Longhorn Pipeline, Austin, Texas***
Developed and implemented trench testing protocol for Austin-area over environmentally sensitive karst geology. Estimated travel time of overland flow to water bodies, wells, intakes and sensitive features for permitting documents. Developed field supervision protocol for hydrogeologic investigations for pipeline replacement through environmentally sensitive area. Helped develop equipment staging concepts and response time estimates in Hays and Travis County.

***Magellan Longhorn Pipeline***
Helped develop White Paper for Magellan titled "Trench Integrity and Construction Methodology of the Magellan Longhorn Pipeline Mile Post 169.88 to 188.8" to document trench design and the materials and methodologies that were used to prevent material impacts within the Edwards Aquifer Recharge Zone from potential pipeline releases.

***Groundwater Availability and Modeling Evaluation of Trinity Aquifer, Bexar and Comal Counties, Texas***
Developed a MODFLOW groundwater availability model to evaluate the viability of producing Trinity ground water in a portion of the aquifer greatly influenced by surface-water recharge. The model structure was based on site-specific borehole data, and calibrated to a multi-well long-term pump test and was consistent with the TWDB Trinity Aquifer GAM model within the modeled area. The model was used to assess effects of long-term pumping and multiple production scenarios.

***Evaluation of Groundwater Availability for the Gulf Coast Aquifer, Texas***
Utilized existing hydrogeologic evaluations, databases, and ground-water models in east Texas and the Coastal Bend area to develop availability estimates, sustainable yields, and long-term impacts from current and proposed ground-water usage.

***Lower Guadalupe Basin Groundwater Availability Evaluation***
Evaluated groundwater resources for a Lower Guadalupe water supply project. An average of approximately 14,200 ac-ft/year of groundwater was required to supplement the surface-water supply. The study included evaluation of the groundwater availability and quality from the Gulf Coast, Carrizo-Wilcox, Queen City and Sparta aquifers throughout the basin, as well as wellfield evaluation and cost assessment. TWDB groundwater availability models were used to assess groundwater availability, wellfield impact, permitting strategies, and environmental issues.

***Edwards Aquifer Cibolo Transfer Evaluation***
Used the San Antonio Edwards Aquifer MODFLOW GAM to assess the impact of Edwards Aquifer Authority "Cibolo transfers" on springflow from the aquifer. The approach included looking at the effect of transferring pumpage to up-thrown and down-thrown sections of the aquifer, seasonal trends, and the size of the transfers. The specialized MODFLOW Management Module was used to simulate pumpage reductions based on Critical Period/Demand Management regulations.

***Edwards Aquifer Bifurcated Rights Assessment***
Completed modeling using the San Antonio Edwards Aquifer MODFLOW GAM to assess the impact of Edwards Aquifer Authority's proposed bifurcated permitting strategies. Modeling included the use of specialized MODFLOW Management Module to simulate two-tiered pumpage reductions based on proposed trigger levels.

***Hydrologic Modeling of Edwards Aquifer Watershed***
Served as project manager to develop hydrologic models (using HSPF) simulate nine watersheds that contribute recharge to the Edwards Aquifer. The models incorporated available meteorological, hydrological, and geological information to develop estimates of runoff and recharge in the basins for a 50-year period. Water Availability Model (WAM) information was utilized to assess impacts from diversions and flood retardation structures was incorporated. The models are useful for assessing proposed recharge management strategies such as brush control, recharge structures, and precipitation enhancement. In addition, the models can be extended to assess water availability and quality in the basins.

***Groundwater Availability Evaluation of Ogallala Aquifer, Andrews and Gaines Counties, Texas***
Developed a MODFLOW groundwater availability model to predict the viability of producing large amounts of Ogallala groundwater over a 25-year period from two proposed well fields for power generation cooling water. The regional model was calibrated and verified with "pre-development" water levels and with water levels collected over a 50-year period. It accounted for past and future irrigation and municipal usage, incorporated heterogeneity in hydraulic properties, and paleo-channels that greatly influenced the groundwater availability. All model data was developed within ArcView GIS and was completely compatible and interchangeable with the modeling GUI.

***Lignite Mines, Texas***
Performed numerous aquifer tests and analysis, well installations, groundwater sampling, surface water sampling and monitoring. Developed datasets, parameter distributions, and MODFLOW models for mine dewatering/depressurization modeling in central and east Texas lignite mines. Completed baseline groundwater and surface water sampling; drilled and constructed overburden and under burden wells for sampling; developed dewatering/depressurization models.

***Longhorn Pipeline, Central Texas***
Supported the permitting process for the 19-mile pipeline replacement that crossed the Edwards Aquifer recharge and contributing zones. Performed watershed delineation, statistical analysis of streamflow, rainfall-runoff analysis, surface-water flow and transport analysis and risk assessment, overland flow calculations, assessment of detention ponds, and rainfall intensity-duration-frequency analysis. Evaluated shallow geology in 19-mile trench to assess potential for karst recharge to the aquifer. Developed watershed parameters needed to estimate runoff and travel time estimates from the pipeline to surface waterways and karst recharge features, and identified emergency response sites along tributaries. Performed trench percolation tests in karst areas to assess the nature and extent of contamination caused by potential pipeline releases.

***Gas Storage and Transfer Station, Kansas***
Part of a team that developed and implemented a sampling plan to evaluate the source of elevated chloride concentrations in the shallow aquifer system. The evaluation successfully delineated naturally occurring chloride contamination from that portion of a plume that was caused by onsite brine storage ponds.

***Williams Energy Services, Kansas***
Designing and implementing a strategic technical approach to address specific regulatory requirements for developing a monitored natural attenuation (MNA) risk-based methodology for an operating facility.

***Petroleum Refinery, Ohio***
Key player on team to develop and implement a plan to evaluate ROST™, soil sampling, and partitioning interwell tracer tests as a means of effectively and economically characterizing site. Involved in design, field implementation, and analysis of all three techniques.

***Mine Ash Disposal Facility, East Texas***
Completed geophysical and hydrogeologic assessment to characterize lithification of ash deposits to determine best approach for removal prior to pit construction through the area.

***Rare Earths Mine, West Texas***

Completed groundwater assessment of four potential sources of for mine construction and milling supply of up to 6,000 acre-feet/yr.

***Silver Mine, West Texas***
Assessment of impact from shaft dewatering on surrounding wells and springs.

***Surface Lignite Mine, Rockdale, Texas***
Developed and implemented an aquifer testing program to support dewatering evaluations. The fieldwork included well installation and development, as well as aquifer testing. Quantitative evaluation of aquifer test data was also completed.

***Chemical Waste Landfill, Sandia National Laboratories, Albuquerque, New Mexico***
Aided in the development and implementation of a state-of-the-art vadose zone tracer test to characterize the quantity and location of dense nonaqueous phase liquids in the unsaturated zone below abandoned waste units.

***Rendering Plant, San Angelo, Texas***
Performed field investigation to determine extent of contamination at a site contaminated with diesel fuel after years of surface spills. Investigation entailed collection of soil samples, installation of monitoring wells, well development, groundwater sampling, and hydraulic testing. Also included preparation of a remedial action plan.

***Uncompahgre River, Colorado***
Analyses and interpretation of seasonal water quality data from an extensive mountain stream network feeding the river to delineate the source of and possible remedial strategies for heavy metal loading from abandoned mine portals, which was the cause of diminished local fish populations.

***Rare Earths Processing Facility, West Chicago, Illinois***
Worked with regulatory authorities to scrutinize proposed soil and groundwater reclamation proposals from the responsible party. This process entailed development of intricate database programs to characterize and verify existing contamination as well as proposed excavation plans. In addition, a complete statistical analysis was completed to determine background groundwater concentrations and applicable groundwater protection standards that satisfied multiple regulatory authorities and requirements.

***Comanche Peak Steam Electric Station, Glen Rose, Texas***
Quarterly sampling and evaluation of groundwater data from Class I RCRA landfills. Also aided in the preparation of a work plan for clean closure of one landfill that was in direct hydraulic connection with the cooling lake; this plan was accepted and the landfill was later closed.

***Kenai Peninsula, Alaska***
Developed a three-dimensional groundwater flow model of a complex faulted glacial geological system below a petroleum refinery that was contaminated with light nonaqeous-phase liquids. The calibrated groundwater model was used to evaluate the effectiveness of various control and containment scenarios, including implementation of extraction/injection wells and sheet-pile walls. Estimated the total quantity of LNAPL in the aquifer based on the measured thickness in contaminated wells.

***Refinery Complex, Texas Gulf Coast***
Led technical team to develop appropriate site conceptual model and a three-dimensional flow and transport model (2.1 million grid blocks) to statistically evaluate alleged groundwater contamination by petroleum hydrocarbons in a heterogeneous aquifer. State-of-the-art geostatistical and stochastic modeling tools were utilized to complete the analysis; visualization/animation techniques were used to effectively illustrate model results.

***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.

***Columbus Air Force Base, Mississippi***

Calibrated and verified a two-dimensional transient flow and transport model (Bioplume II) to evaluate natural attenuation of dissolved phase jet fuel components (benzene, dichlorobenzene, naphthalene, p-xylene) and tritium in a shallow alluvial aquifer. Site characterization data and historical plume monitoring data was used to develop a reliable site model to predict down gradient concentrations at the site. Aerobic and anaerobic biodegradation as well as nondestructive natural attenuation mechanisms were incorporated to evaluate the fate of the plume.

***A/M Area Disposal Sites, Savannah River Site, South Carolina***
Developed a three-dimensional transient model to evaluate the potential movement of dissolved phase solvents (TCE, PCE, TCA, etc) in the saturated zone in the forty years since disposal started. This model was used to evaluate the effectiveness of the current pump-and-treat recovery system and evaluate future movement of the dissolved phase plumes.

***F&H Area, Savannah River Site, South Carolina***
Managed the development of numerical models to evaluate capture and containment effectiveness. Developed appropriate monitoring strategy to verify hydraulic containment, developed a strategy for rehabilitating injection wells, and aided in developing a geochemical plan for pump-and-treat containment and recirculation system.

***DOE WIPP Facility, Carlsbad, New Mexico***
Applied the SWIFT-II flow and transport code to evaluate the effectiveness of the proposed upper-shaft short-term seal design. Applied a unique and efficient approach to incorporate the cylindrical system of seal components into a two-dimensional model and implemented a new linear boundary condition to mimic flow from the lower boundary. The model was used to identify those components that were most critical to preventing fluid flow from the upper-shaft region to the repository level.

***Aluminum Processing Facility, Missouri***
Used site characterization data to conceptualize and develop a coupled soil and groundwater model to evaluate the fate and transport of a PCB compound. Model evaluations included estimating groundwater contamination downgradient from the site in an aquifer discharging to a major river. Developed parameters to estimate risk to human health and the environment at the river due to the PCB release.

***Sanitary Landfill, Savannah River Site, South Carolina***
Developed an aerial flow model and a vertical cross-section contaminant transport model to support risk assessment calculations and support an alternative concentration limit (ACL) demonstration for the facility. The areal flow model was used to evaluate the effectiveness of capping in decrease point-of-compliance (POC) concentrations and the transport model was used to estimate POC and point-of-exposure (POE) concentrations.

***Hazardous Waste Disposal Facility, Kern County, California***
Applied a variably-saturated flow model (UNSAT2) to evaluate and recommend the proper distance between neutron probe access tubes that were used to monitor leakage from the waste management units to the extensive vadose zone below the facility.

***Deep Well Injection Facility, Southeast Texas***
Developed a SWIFT-II transport model to demonstrate no migration under EPA regulations.

***Bunker Hill Superfund Site, Smelterville Flats Area, Idaho***
Using MODFLOW, developed a saturated groundwater flow model to evaluate/design fluid residence times and travel paths through a constructed wetland. The groundwater was contaminated with heavy metals and the constructed wetlands were designed to maintain a reducing environment for metals precipitation. The USGS code MODPATH was used to perform particle tracking through the wetlands area.

***DOE WIPP Facility, Carlsbad, New Mexico***
Applied the SWIFT-II flow and transport model to investigate the transient pressure response of slanted well bores with the very low conductivity halite zones of the Salado Formation. This evaluation was performed to determine the effects of well bore slant on the results of permeability testing interpretations.

***COL Application for Proposed New Nuclear Power Plants***

Mr. Beach assisted the Subject Matter Experts (SMEs) in the development of a quantitative groundwater model for the Combined Operating License (COL) application, Final Safety Analysis Report (FSAR) for a two-new reactor site. The groundwater codes used in the assessment were MODFLOW, MODPATH, and RESRAD. Mr. Beach is also serving as a technical advisor and participant in discussions with the SMEs and the Nuclear Regulatory Agency (NRC) for the hydrogeological models.

***Lead Smelting and Battery Manufacturing Facility, Columbus, Georgia***
Used SWIFT-II to develop a flow and transport model for the site in order to design an effective/efficient groundwater extraction system for a dissolved phase solvent plume.

***Mine Disposal Facility, Minnesota***
Developed a numerical flow model using MODFLOW to determine the effectiveness of slurry walls or sheet pile to divert groundwater flow around a semi-wetland area that contained waste disposal units. The model was also used to evaluate the effectiveness of capping the waste disposal units to minimize leachate production.

***Illinois Department of Nuclear Safety, Springfield, ILL***
Assisted in the preparation of environmental analyses for each decommissioning phase of a closed thorium and rare earths facility for the Illinois Department of Nuclear Safety. Each environmental assessment included: (1) an assessment of the radiological and nonradiological impacts to the public health from the activities proposed by the applicant; and (2) an assessment of impacts on any waterway and groundwater resulting from previous activities and activities proposed by the applicant. The assessment also included the consideration of remedial alternatives proposed by the applicant and consideration of the long-term impacts of the decontamination and reclamation activities proposed by the applicant.

## LITIGATION SUPPORT

***2019 – Two confidential cases underway.***
Both cases involve groundwater permitting issues.

***Private Landowner, West Texas (2018)***
Characterized aquifer conditions and groundwater use by operators. Case settled in favor of client with substantial settlement.

***District Court, Water Division No. 1, State of Colorado (2017)***
Evaluation of Groundwater Return Flows for Mayer Farm (Case No. 09CW091)

***Permit Hearing, Railroad Commission of Texas (2017)***
Provided technical analysis and testimony regarding hydrogeologic conditions, groundwater flow, and onsite/offsite monitoring plans related to permitting of enhanced oil recovery project in Texas Gulf Coast region.

***Contested Case Permit Hearings, Bandera Texas (2016)***
Testifying expert in contested case hearing before groundwater conservation district and State Office of Administrative Hearings regarding impact of proposed well permits on existing wells and long-term impacts.

***Groundwater Rights, Bastrop Texas (2016)***
Testifying expert in contested case hearing before groundwater conservation district and State Office of Administrative Hearings. Testified on the impact of proposed well permits on production capacity of client's existing wells and long-term impacts on ability to provide water as required by CCN. Also involved in development of mitigation plan and negotiations for settlement between parties.

***Groundwater Rights, Bastrop Texas (2015)***
Testifying expert in contested case hearing before groundwater conservation district and State Office of Administrative Hearings.

***Groundwater Rights and Export Permit Application, Fort Stockton Texas (2013)***
Served as hydrogeologic expert in a contested case hearing for landowner before Middle Pecos GCD regarding proposed production permits. Developed groundwater availability model used for testimony in the case.

***Technical Support for Railroad Commission of Texas Permitting***
Provided technical analysis and regulatory interaction regarding Area of Review variance request. Analysis involved evaluation of hydrogeology, assessment of USDW, and groundwater conditions. Commission granted a variance to AoR requirements.

***Industrial Complex - Albuquerque, New Mexico***
Supported the defendant's legal team in evaluating the plaintiff's expert opinions regarding source of contamination and extent of contamination for various organic contaminants. Assessed plaintiff's groundwater flow and transport model, which was used as the basis for many of the plaintiff's conclusions. Critiqued weaknesses of the three-dimensional flow and transport model and completed additional simulations using plaintiff's model to assess the sensitivity of model results to aquifer parameters (such as biodegradation and sorption). Visualization and animation techniques were utilized to summarize model results.

***Ogallala Aquifer Groundwater Permit Hearings, Roberts County, Texas –***
Supported a legal team in their assessment of impacts from proposed groundwater permit applications to the Panhandle Groundwater Conservation District. A groundwater model was used to simulate the impact of pumping on surrounding properties and to evaluate the rate of water level decline with respect to District guidelines.

***Refinery Complex, Texas Gulf Coast***
Led technical team to develop appropriate site conceptual model and a three-dimensional flow and transport model to statistically evaluate alleged groundwater contamination by petroleum hydrocarbons in a heterogeneous aquifer. State-of-the-art geostatistical and stochastic modeling tools were utilized to complete the analysis; visualization/animation techniques were used to effectively illustrate model results.

***Injection Well Facility, Texas***
Evaluated hydrogeology and contaminant information obtained from previous site investigations to develop an appropriate conceptual model of groundwater flow at the site. Interviews of operators, aerial photography, flow and transport modeling, quantitative subsurface volumetric analysis, and visualization techniques were all used to reconstruct activities and events that were probable contaminant contributors. The results were used to apportion responsibility and remediation costs among potentially responsible parties.

***Manufacturing Facility, Canada***
Worked with technical team to develop a three-dimensional flow and transport model to evaluate groundwater contaminant transport of chlorinated solvents in a complex system. Visualization and animation techniques were utilized to distill and present model results. Results were part of a successful strategy to negotiate a pre-trial settlement.

***Manufacturing Facility, Texas***
Evaluated available site data (boring logs, water levels, contaminant concentrations, river levels, etc.) to develop an appropriate conceptual representation of flow and transport from the facility to down gradient properties. Results were part of a successful strategy to illustrate the weakness of the plaintiff's allegations during court proceedings.

***Landfill, Texas***
Evaluated the potential for groundwater contamination from landfill leakage. Scoping-level evaluations indicated that potential plaintiffs were far enough downgradient that the potential for impact from the landfill was very low. The evaluation included assessment of natural attenuation mechanisms (biodegradation, dispersion, dilution, etc.) of PCE and TCE.

***Industrial Complex, Texas***
Led in the development of a three-dimensional flow and transport model to evaluate groundwater contamination by chlorinated solvents that were disposed of over a 30-year period.

***Surface-Water Rights, Texas***
Served as a technical expert to assess surface-water dispute. As part of the investigation, surface-water flows in the disputed waterway were measured and losses due to evaporation and aquifer interaction were evaluated. Results of the field investigation helped set the stage for a pre-trial resolution between parties.

## PUBLICATIONS AND PRESENTATIONS

Beach, J. A., 2019. Invited panel discussion stream-aquifer interaction. Texas Groundwater Summit hosted by the Texas Alliance of Groundwater Districts, August 2019.

Beach, J. A., 2017. Invited panel discussion on DFC implementation and monitoring. Texas Groundwater Summit hosted by the Texas Alliance of Groundwater Districts, August 31, 2017.

Beach, J. A., D. Bardesley, and T. Davidson. Siting, Design and Construction of High Capacity Horizontal Well for Industrial Use in the Ogallala Aquifer. Texas Water Conservation Association, October 2017.

Beach, J. A., 2017. Finding the Balance Between Highest Practicable Groundwater Production and Conservation in Groundwater Availability in Texas as part of Session: Rule of Capture and Sustainable to Consensus Yield. Geological Society of America, South-Central Section, San Antonio Texas, March 13, 2017.

Beach, J. A., 2016. Understanding the Geology of Aquifers for Aquifer Storage and Recovery. 16th Annual Bell County Water Symposium, November 16, 2016.

Beach, J. A., 2016. Desired Future Conditions – Will Process Changes Increase Accountability? Presented at Texas Water Law Institute – 2016 Water Law Fundamentals, November 4, 2016

Beach, J. A., 2016. Panelist for Session: Moving Groundwater in Texas. Texas Groundwater Summit hosted by the Texas Alliance of Groundwater Districts, August 23, 2016.

Beach, J. A., 2015. Texas' Billion Dollar Desired Future Condition (DFC) Balance – Conservation versus Highest Practicable Production. Presented at Texas Aquifers Conference, June 26, 2015.

Beach, J. A., 2014. Brackish Groundwater and Desired Future Conditions (DFCs) – Intersection of Science and Policy. Texas Groundwater Summit hosted by the Texas Alliance of Groundwater Districts, August 27, 2014.

Beach, J. A., Groundwater Science. Presented to the Texas Alliance of Groundwater Districts at the Texas Groundwater Summit, August 26, 2014.

Beach, J. A., K. Morrison, and S. Reinert, 2014. Digging Deeper for a Reliable Water Supply. Water Efficiency: The Journal for Water Resource Management. November/December 2014.

Beach, J. A., 2014. Aquifer Storage and Recovery. Presented at Water Awareness Summit in Rio Grande Valley, December 5, 2014.

Beach, J. A., 2014. Panel Moderator: Investment Perspectives and Presenter: Developing Brackish Water Aquifers to Create a Fresh Water Source. Lone Star State Water Summit, June 24, 2014.

Beach, J. A., 2014. Texas Growth and Drought – Revisiting Conjunctive Use and the Value of Wet Water. Presented at Texas Aquifers Conference, June 2, 2014.

Beach, J. A., 2014. Panelist for Session: Brackish Groundwater and Desalination. Presented at 15th Annual Changing Face of Water Rights Course hosted by Texas Bar CLE, February 27, 2014.

Beach, J. A., The Changing Face of Texas Water Rights. Invited Presentation to the Texas Bar CLE, February 26, 2014.

Beach, J. A., 2013. Developing Brackish Water Aquifers to Create a Fresh Water Source. Lone Star State Water Summit, November 15, 2013.

Beach, J. A., 2013. Regional Livability Symposium: Water – Key to Our Future. Envision Central Texas. February 15, 2013.

Beach, J. A., 2012. Groundwater 101 as part of ABCs of GCDs. Texas Groundwater Summit hosted by the Texas Alliance of Groundwater Districts, August 28, 2012.

Beach, J. A., 2012. Growth and Groundwater in Texas: What Are We Learning. Texas Water Conservation Association, June 15, 2012.

Beach, J. A., 2010. Modeling that Leads to Decision Limitations: How Do You Attack It? Presented at 11th Annual Changing Face of Water Rights Course hosted by Texas Bar CLE, March 25, 2010.

Beach, J. A., 2006. Groundwater in Texas: It's Availability and Management: GAMs, GMAs, DFCs, and MAGs. Presented at Water Rights and Sales and Transfers in Texas. December 15, 2006

Beach, J. A., C. W. Kreitler, and W. B. Klemt, 2002. Brackish Water Resources of the Gulf Coast Aquifers in Texas. To be presented at Gulf Coast Association of Geological Societies Symposium, Austin Texas, October 2002.

Beach, J.A., and A. Standen, 2000. Ground-Water Availability Model of the Lipan Aquifer. Presented at the Southwest Focus Ground Water Conference sponsored by the National Ground Water Association in May 17-18, 2000; Austin, Texas.

Beach, J.A., and G. Ruskauff, 2000. Practical Aspects of Conceptualization and Modeling of Heterogeneous Deltaic Deposits. Presented at the Society of Sedimentary Geology (SEPM)/ International Association of Sedimentologists (IAS) Conference on Environmental Sedimentology: Hydrogeology of Sedimentary Aquifers, September 24-27, 2000; Santa Fe, New Mexico.

Beach, J. A. and C. Kreitler, 1999. Availability of Ground Water from the Ogallala Aquifer in Gaines and Andrews County. Confidential Client.

Fryar, D.G., J.A. Beach, V.A. Kelley, M.K. Knowles, 1997. Long-Term Brine Migration Through an Engineered Shaft Seal System, Proceedings of the ASCE Fourth Congress on Computing in Civil Engineering, 1997

Beach, J.A., 1996. Modeling Natural Attenuation of Organic Contaminants Using the Bioplume II Transport Model. Invited Presentation to Regional EPA Conference, Albuquerque, New Mexico, September 1996.

Beach, J.A., D. G. Fryar, H.S. Rifai, K. Appling and T.B. Stauffer, 1996. Simulation of Natural Attenuation of Organic Tracers at the MADE Site Using the Bioplume II Transport Model. In: Calibration and Reliability in Groundwater Modeling, Proceedings of the ModelCARE'96 Conference held at Golden, Colorado, September, IAHS Publication No. 237.

Close, Bence V., Bryan L. McCulley, and J.A. Beach, 1990. Assessment of Ground-Water and Vadose Zone Monitoring System Requirements in an Arid Environment, In: Proceedings of the Thirteenth Annual Madison Waste Conference, September.

Beach, J.A., D.B. Stephens, and A.L. Gutjahr, 1989. Incorporation of Spatial Variability in Mill Tailings Hydraulic Properties into Numerical Models: Implications for Uncertainty in Seepage Prediction and Groundwater Protection, In: Proceedings of the Ninth Annual AGU Front Range Branch Hydrology Days, April.

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 Texas and Nevada. Leggette, Brashears & Graham, Inc. (LBG) purchased William F. Guyton Associates in 1993 and he served as a Senior Hydrogeologist, Associate and Hydrogeologist and Senior Associate and Hydrogeologist with LBG (dba LBG-Guyton Associates in Texas) with progressively more project development and management and client responsibilities. LBG was acquired by WSP USA Inc. in 2017 and John continued project management as a Supervising Hydrogeologist and Senior Supervising Hydrogeologist for a wide variety of engineering, private, municipal, industrial and government clients. 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.

John has completed hundreds of projects in several aquifers and areas in Texas plus sites in Nevada, Arizona, Michigan, Missouri and 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 Northern Trinity and Woodbine in north-central Texas, Carrizo-Wilcox, Simsboro, Sparta, Yegua-Jackson, Queen City, and the Ogallala Aquifers of Texas.

John's areas of experience include: hydrogeologic, aquifer and groundwater resource availability and development studies during the planning phase for a water well or multiple water wells for small to very large land tracts and developments; preparation of well, pump and motor data and specifications for the construction and rehabilitation of small capacity to large capacity public supply and industrial wells; evaluation of water well, hydrogeologic, aquifer and water quality data and well and test hole geophysical logs; evaluation and field inspection of test hole, pilot hole and water well drilling, geophysical logging, groundwater sampling, well construction and well testing operations; performing and evaluation of well, pump and motor performance tests of small capacity to large capacity water wells; consultation for well and pump rehabilitation projects to restore or increase the well pumping rate, replace the pumping equipment or improve a well's dependability, decrease sand production, remedy structural failures of the well casing, liner or screen, or reduce selected inorganic chemical, metal or radionuclide concentrations to acceptable levels for public supply; analyzing aquifer and hydrogeologic data and logs for local and regional groundwater flow models; and evaluating data for water-level and water-quality monitoring programs.

John stays active in groundwater, water well and geology related professional organizations to continue his professional education and development and maintain visibility among clients and colleagues in the groundwater industry. He is a member of the National Ground Water Association, Texas Ground Water Association, Association of Environmental and Engineering Geologists and Houston Geological Society.

## EDUCATION/TRAINING/CERTIFICATIONS/MEMBERSHIPS

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 Geoscientist #4027, State of Texas
Registered Professional Geologist, #0453, State of Mississippi
National Ground Water Association
Texas Groundwater Association
Association of Environmental and Engineering Geologists
Houston Geological Society

## SUMMARY OF PROFESSIONAL EXPERIENCE

January 2021 - Present: Advanced Groundwater Solutions, LLC, Founding Principal, Houston, Texas
2020 - Jan 5, 2021: Senior Supervising Hydrogeologist, WSP USA, Houston, Texas
2018 – 2019: Supervising Hydrogeologist, WSP USA, Houston, Texas
2013 -2017: Senior Associate and Hydrogeologist, LBG-Guyton Associates, Houston, Texas
2003 – 2012: Associate and Hydrogeologist, LBG-Guyton Associates, Houston, Texas
1993 – 2002: Senior Hydrogeologist, LBG-Guyton Associates, Houston, Texas
1989 - 1992: Groundwater Hydrologist with William F. Guyton Associates, Houston, Texas

## PROJECT EXPERIENCE

***Harris County, Fort Bend 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 Sherman Public Supply Wells – Grayson County, Texas***
Performed field testing and assisted with review of well video surveys and preparation of specifications for well rehabilitation of two wells, including installation of internal liner and gravel pack to reduce sand production in the City of Sherman's Tuck Trinity Well 1 and the Luella 4 Woodbine Well. Review of well and pump rehabilitation information for multiple deep production wells completed in the Trinity aquifer or Woodbine aquifer.

***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.

***Cinco Ranch (Cinco MUD 1 and Cinco Southwest MUD 1) - Fort Bend County, Texas***
Responsible for performing potential pollution hazards studies and site evaluations for planned public supply well sites. Preparation of well, pump, and motor parameters data and well specifications for 13 large capacity public supply wells and one large-capacity irrigation and lake supply well. Review and evaluation of well siting data, well specifications, geophysical logs, sand sieve analyses, well construction recommendations, pumping test, water quality and/or pump and motor data for 14 large capacity, public supply wells completed in the Evangeline Aquifer, one large capacity well completed in the Jasper Aquifer and one irrigation and lake supply well completed in the lower Chicot Aquifer. Field inspection of well drilling, logging, construction and/or pumping test operations. Evaluate well and pump performance tests of public supply wells. Planning work, specifications preparation and evaluating well and pump rehabilitation work for multiple public supply wells. Review and evaluation of water well, groundwater pumpage, water quality, water level and aquifer hydrogeologic data for the Chicot and Evangeline Aquifers.

***Public Supply and Industrial Water Wells - Liberty County, Texas***
Responsible for reviewing and evaluating of well specifications, geophysical logs, sand sieve analyses, well construction recommendations and/or pumping test and pump and motor parameters data. Work performed for public supply wells completed in the Evangeline Aquifer that serve the City of Cleveland, City of Dayton, CWA Luce Bayou facility, Forestar, Tarkington Special Utility District and TransCanada Moss Hill Station.

***Orange County WCID 1 - Orange County, Texas***
Responsible for reviewing and evaluating test hole geophysical logs, sand sieve analyses, well construction recommendations and pumping test and pump and motor parameters data for Orange County WCID 1 Well 6 and review hydrogeologic data for Wells 4, 5 and 6, which are completed in the lower Chicot Aquifer. Well siting evaluations and studies for multiple sites with preliminary well, pump and motor parameter information for a possible future production well or wells. Assisted the Engineer with preparation of water well and pump equipment specifications for Orange County WCID 1 Well 7 and reviewing and evaluating test hole geophysical logs, sand sieve analyses, well construction recommendations and pumping test, pump and motor parameters and water quality data for Well 7.

***Public Supply Wells - Orange County, Texas***
Assisted Engineer with preparation of water well and pump equipment parameters and specifications. Review and evaluation of test hole geophysical logs, sand sieve analyses, well construction recommendations and pumping test, pump and motor parameters and water quality data for Hardin County WCID 1 Pinewood Estates Replacement Well and North Hardin WSC Replacement Well 2.

***Regional Water Supply Study and Public Supply Wells - Brazos County, Texas***
Assist with regional water supply study and evaluation of current and possible future groundwater development in Simsboro Aquifer and other minor aquifers in Brazos County and Grimes County. Measured water levels in wells. Assisted with review of well and pump performance, water-level and groundwater pumpage data and evaluation of possible increase in the pumping rates of wells completed in the Sparta, Carrizo-Wilcox and Simsboro Aquifers that serve Texas A&M University. Assisted in study of possible groundwater development from Yegua, Sparta and/or Queen City Aquifers to provide water for the Texas A&M Golf Course and Brayton Fire Training Field and limited field inspection of well construction operations. Review and evaluation of well specifications, geophysical logs, sand sieve analyses, well construction recommendations, pumping test and permanent pump and motor design data for City of Bryan Well 18, City of College Station Well 7 and Well 8 completed in the Simsboro Aquifer. Review geophysical logs, sand sieve analyses, pilot hole water sample analyses and well construction recommendations for Dansby Power Plant Replacement Water WelL. Assist Engineer in assessment of the water

well construction, historical static water level and well pumping rate data and evaluation of water well rehabilitation work and permanent pump and well motor equipment options to increase the City of College Station Well 1 and Well 2 pumping rates.

***Public Supply Wells - Colorado County, Texas***
Assist City of Columbus and City Engineer with review of hydrogeologic data and logs for possible new well sites and preparation of well, pump, and motor design data and well specifications for Spring Street Well 8 and Well 9 completed in the Evangeline Aquifer. Review and evaluation of geophysical logs, sand sieve analyses, water sampling, well construction recommendations and pumping test and pump and motor design data for City of Columbus Well 8 and Well 9. Review of well and testing data and logs for other City wells.

Review and evaluation of Glidden Fresh Water Supply District (FWSD) 1 water well, test hole and water quality data, logs and maps. Assist Engineer with preparation of well, pump, and motor design data and well specifications for Glidden FWSD1 Well 3 and review and evaluation of test hole and pilot hole data, geophysical logs and water sample analyses for Well 3.

***Public Supply and Industrial Wells, Stream Flow Measurements and Groundwater Model - Northern Nevada***
Sierra Pacific Power Company, Reno, Nevada - Review and evaluation of well siting data, well specifications, geophysical logs, sand sieve analyses, well construction recommendations, pumping tst and/or pump and motor data for 10 moderate-capacity to large-capacity, public supply wells completed in the Reno area. Field inspection of well drilling, logging, construction and/or pumping test operations for 7 public supply wells in the Reno area and a water-supply well for the Tracy electrical generating station located east of Reno. Perform well and pump performance tests of 13 public supply wells. Perform water-level measurements in public supply and domestic wells in the Reno area. Assist with stream flow measurements for the Truckee River and several creeks and irrigation ditches. Assist in performing feasibility studies of artificial recharge using wells and spreading basins and evaluated pilot recharge testing using modified production wells. Assist in development and data update of Truckee Meadows MODFLOW groundwater flow model.

***Hydrogeology Studies and Field Work for Mining Projects - Northern Nevada***
Evaluation of hydrogeologic data and estimation of changes in groundwater storage and water levels resulting from water management and mine pumping operations in the East Wall and South Wall of the Barrick Goldstrike Mine including area in the vicinity of the underground Meikle Mine. Review of hydrogeologic, faulting, drilling, construction, pumping equipment, pumping, water-level, maps and/or cross-sections for dewatering wells, test wells and monitoring wells with one or more well screens in different geologic formations at various depths within and near the mine. Assist in the development of MODFLOW groundwater flow model for East Wall mine expansion area. Evaluate hydrogeologic data in Boulder Valley including reservoir infiltration recharge well injection, groundwater storage, water-level and spring flow data and perform field reconnaissance mapping of geologic contact between volcanic rocks and unconsolidated alluvium in the north section of Boulder Valley.

***Hydrogeology Study for Limestone Quarry - Northern Michigan***
Assisted in evaluating hydrogeologic, water-level and flow data to assess risk of catastrophic inflow of water due to possible deepening of the Charlevoix limestone quarry owned by the Medusa Cement Company. Performed field reconnaissance and measured geologic joints and conductivities of groundwater and surface water within and near the limestone quarry. Performed fracture and lineament analyses from CIR and black and white aerial photography.

***Hydrogeology Study, Test Well and Industrial Water Supply Well – Ste. Genevieve County Missouri***
Review available geologic and hydrogeologic reports and data to assess the potential groundwater supply for a large limestone quarry and cement manufacturing facility owned by Holcim. Assisted with preparation of design data and well specifications for two observation wells, a test well and a production well and review and evaluation of test hole geophysical logs and water sample data and well construction recommendations and pumping test and water sample analyses data for two small-diameter observation wells, a large-diameter test well and large-diameter production well completed in the Ozark Aquifer.

ATTACHMENT 8 b.

**Advanced Groundwater Solutions, LLC**
Austin: (512) 796-8636
Houston: (281) 813-9064

**VIA ELECTRONIC MAIL**

January 7, 2021

Mr. Drew Satterwhite
General Manager
Red River Groundwater Conservation District
5100 Airport Drive
Denison, TX 75020
d.satterwhite@redrivergcd.org

**Re: Proposal for Professional Groundwater Consulting Services**

Dear Mr. Satterwhite:

As you requested, Advanced Groundwater Solutions, LLC (AGS) has developed a proposal regarding potential work with Red River Groundwater Conservation District (RRGCD, the District) for consulting services in 2021. Below is a description of potential scope items and a fee schedule to complete this project. As needed, and always at your direction, we will complete tasks and projects related to the scope of services identified below.

## SCOPE OF SERVICES

AGS will be available to perform the tasks described below.

- 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;
- Review of Hydrogeologic Reports associated with permits
- Discussion, review, recommendations of District Rules, Management Plan, Monitoring Program, Annual Report, or other technical tasks
- Assist with work on GMA-related joint planning efforts (including analysis on proposed DFCs and DFC related documents)
- Quantitative hydrogeologic assessments such as using groundwater availability models (GAMs)
- 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 consultants (technical and legal)
- Provide additional scientific and technical reports and advice as requested by Board of Directors and/or District General Manager
- Other general consulting tasks as requested.

## PROJECT SCHEDULE

AGS is prepared to initiate work immediately upon receipt of written authorization to proceed from RRGCD.

## TERMS AND CONDITIONS

The services provided pursuant to this proposal shall be governed by the terms and conditions set forth in our standard contract as attached.

## PROJECT COSTS

AGS proposes to perform the work on a time and materials plus expenses basis. A copy of our Fee Schedule is attached. At this time, it is difficult to predict the number of meetings and level of effort required to complete the general scope identified herein. Therefore, we recommend that we work closely with you each month to identify AGS involvement in meetings, studies, and other scoped items and seek your verbal approval for work effort, travel, and expenses as needed.

We appreciate the opportunity to work with you and the District on these important issues. Please do not hesitate to contact me at (512) 796-8636 or John Nelson at (281) 813-9064 if you have any questions.

Sincerely,

James A. Beach, PG
Principal

Enclosures

**Advanced Groundwater Solutions, LLC**
Austin: (512) 796-8636
Houston: (281) 813-9064

**The contents of this proposal have been reviewed and the client's designee below authorizes AGS to initiate work on the proposed scope, in accordance with the project budget and schedule proposed herein. The terms and conditions described herein shall apply to all work performed on this project.**

**Accepted and agreed to by:**

**Signature:** _____

**Name:** _____

**Title:** _____

**Date:** _____

# Professional Services Contract

This agreement for the performance of services is entered into this _____ day of_____, 202_, by and between Advanced Groundwater Solutions, LLC (AGS) and_____ (Client). Subject to the contract terms and conditions below, AGS's standard fee schedule that is attached and the proposal or scope of work that is attached. In the event of a conflict between the standard contract terms and conditions or fee schedule and any attached proposal or scope of work, the terms of the proposal or scope of work shall govern.

**CLIENT**

**Name:** _____
**Company:** _____
**Address:** _____
**City/State/Zip:** _____
**Phone**

**CLIENT CONTACT(S)**

**Reporting:** _____
**Site/Other:** _____

**BILLING INFORMATION**

**Name:** _____
**Company:** _____
**Address:** _____
**City/State/Zip:** _____

**Project Location:** **Street:** _____ **City:** _____ **State:** _____ **Zip:** _____
**Proposal/Scope Date, Client Project No.:** _____ **#Pages Attached:** _____

**Brief Statement of Services:** _____

**Anticipated Start Date:** _____ **Anticipated Completion Date:** _____
**Preliminary Cost Estimate:** $_____

**AGS Office Location:** _____ **Project Manager:** _____
**Principal in Charge:** _____
**Retainer:** $_____

Client hereby engages AGS to perform the services described and referred to herein and agrees to pay AGS for such services, and acknowledges that the terms of this agreement are subject to AGS's standard contract terms and conditions and all attached and referenced material and documents. Unless otherwise provided in the attached proposal or scope: (1) inclusion of anticipated "start" and "completion" dates shall not be construed to impose a "time is of the essence" requirement; and (2) any preliminary cost estimate shall not be construed as a "fixed-fee" or "not-to-exceed" amount, unless stated in writing in the approved proposal or scope of work. In consideration of the foregoing, AGS agrees to perform the services described and referenced herein.

**CLIENT**

**By: (signature)** _____
**(printed)** _____
**Title:** _____
**Date:** _____
**Witness:** _____

**ADVANCED GROUNDWATER SOLUTIONS, LLC**

**By: (signature)** _____
**(printed)** _____
**Title:** _____
**Date:** _____
**Witness:** _____

# STANDARD TERMS AND CONDITIONS

**FEE PAYMENT**

1) AGS will submit invoices to Client monthly following any month of significant activity, and a final invoice upon completion of services. Invoices will show charges based on the current AGS Fee Schedule or other agreed-upon basis, and will include a list of charges by approved task for work performed.

2) Payment is due upon receipt of invoice. On accounts past due by forty-five (45) days, Client will pay a finance charge of 1.25 percent per month dating from the invoice date.

3) In the event Client requires expert-witness testimony, Client will pay AGS all past due balances before AGS will proceed to prepare for or offer testimony.

4) Client will pay the balance stated on the invoice unless Client notifies AGS of the particular item that is alleged to be incorrect within fifteen (15) days from the invoice date. Client will remit the balance of undisputed items in a timely manner while a disputed item is being reviewed.

5) In the event Client fails to pay AGS within forty-five (45) days following invoice date, AGS may consider the default a breach of the consulting agreement and all duties of AGS may be suspended or terminated, and work product may be withheld, without liability of any kind to AGS.

**OWNERSHIP OF DOCUMENTS AND CONFIDENTIALITY**

1) Project report(s), project deliverable(s), and written work products prepared by AGS and provided to the Client during the project shall remain the property of the Client.

2) Field data and notes, laboratory test or technical data, calculations, estimates, and other documents prepared in the course of consulting service shall remain the property of AGS, but may be requested by the Client during the project.

3) Client agrees that all reports and other work that AGS furnishes to Client or Client's agents which are not paid for under the scope of work, will be returned to AGS upon demand and will not be used for any purpose whatsoever.

4) Documents provided to AGS by the Client will be returned to the Client, upon request at the completion of work at Client's cost.

5) Reuse of AGS report(s), project deliverable(s) or other written materials by the Client or others, on extensions or modifications of the project or on other sites, without written permission from AGS or suitable adaptation by AGS for the intended purpose, shall be at the Client's or user's sole risk, without liability on the part of AGS, and Client agrees to indemnify and hold AGS harmless from all claims, damages and expenses, including attorney's fees.

4) AGS shall maintain Client's project data, report(s) and project deliverable(s) in strictest confidence, and will release such project data, report(s), project deliverable(s) or technical information to others only upon express written permission from the Client.

**DISPUTES**

1) Client will pay all reasonable collection expenses or litigation fees, including attorney fees, that AGS incurs in collecting any delinquent amount Client owes.

2) If the Client institutes a suit against AGS which is dismissed or for which judgment is rendered for AGS, Client will pay AGS for all costs of defense including attorney fees, expert witness fees and court costs.

**INSURANCE AND INDEMNIFICATION**

1) AGS will carry Workers Compensation, General Liability, Automobile Liability, Excess Umbrella-Form Liability and Professional Liability insurance policies in amounts which AGS considers adequate. Certificates of insurance will be provided to the Client upon request. Within the terms and conditions of the insurance, AGS agrees to indemnify Client against loss caused by actions of AGS, its employees or its subcontractors. AGS will not be responsible for liability beyond the limits and conditions reflected herein and in the Certificate of the Insurance. At Client's request, AGS will seek additional insurance coverage or limits for specific projects, and will bill the Client for the additional premium cost. AGS will require that its field subcontractors are insured to the same levels required of AGS by the Client.

2) AGS's professional liability will be limited to the value of the consulting services performed.

3) AGS will not be responsible for any loss or liability related to negligence of the Client or others employed by Client, or from negligence by any person for whose conduct AGS is not legally responsible.

4) Neither the Client nor AGS, their respective officers, directors, partners, employees, contractors or sub-consultants shall be liable to the other or shall make any claim for any incidental, indirect or consequential damages arising out of or connected in any way to the Project or to this Agreement. This mutual waiver of consequential damages shall include, but is not limited to, loss of use, loss of profit, loss of business, loss of income, loss of reputation and any other consequential damages that either party may have incurred from any cause of action including negligence, strict liability, breach of contract and breach of strict or implied warranty. Both the Client and AGS shall require similar waivers of consequential damages protecting all the entities or persons named herein in all contracts and subcontracts with others involved in this project.

**TEST BORINGS, OTHER EXPLORATIONS AND LAB SERVICES**

1) To drill test borings or perform other explorations, AGS may engage a contractor experienced in this work. The Contractor's invoices plus a fifteen (15) percent service charge will be added to AGS's invoice. On occasion, AGS engages the specialized services of a testing firm or laboratory, individual consultants or other companies to participate in a project. When considered necessary, these firms or other consultants will be used with Client's approval. The cost of such services plus a fifteen (15) percent service charge will be included in our invoice. Such specialists will be wholly responsible for their work product(s).

2) Alternatively, at Client's request, AGS will recommend contractor(s) or specialist(s) for Client to enter into direct contract(s) with. In that event, invoices for these outside services will be issued to Client for direct payment to the contractor(s). AGS review and approval of each invoice will be provided on request. Under either alternative, AGS does not guarantee and is not responsible for the performance of the contractor(s) or the accuracy of their reports or results.

**GEOPHYSICAL, GEOCHEMICAL AND TESTING INSTRUMENTATION SERVICES OR EQUIPMENT**

AGS is equipped to provide or can rent or lease specialized geophysical, geochemical or other testing instrumentation services or equipment according to the project needs. Fees for these equipment services will be based on use charges at standard rates published by AGS or the equipment rental or lease costs plus AGS fees for consulting services.

**CUSTODY OF MATERIALS**

1) In the course of work, AGS may take custody of and transport soil and/or water samples from Client's site. Upon the completion of evaluation and/or testing of such samples, AGS reserves the right to return the samples to Client at Client's expense, and Client agrees to accept such samples and the responsibility for their proper and legal disposal.

2) At no time, under any circumstances, will AGS personnel represent AGS or themselves as generators of waste, hazardous or otherwise, which may have to be removed from or disposed of on a site, and AGS personnel will not sign hazardous waste manifests on behalf of Client.

**RIGHT OF ENTRY**

Client will furnish right-of-entry on the site for AGS to conduct the work. AGS will take reasonable precautions to minimize damage to the land from use of its equipment, but has not included the cost for restoration of damage that may result from AGS site operations in the AGS fee. If AGS is required to restore the land to its former condition, this will be arranged and the restoration cost plus fifteen (15) percent will be added to the associated AGS fee.

**DAMAGE TO SUBSURFACE STRUCTURES**

Reasonable care will be exercised in locating subsurface structures in the vicinity of proposed subsurface explorations performed by AGS or an AGS subcontractor. This will include contact with the local agency coordinating subsurface utility information (i.e., "Call Before You Dig" service) and a review of plans provided by Client for the site to be investigated. AGS shall rely upon any information provided by Client or Client's agent or representative. If the locations of underground structures are not known accurately or cannot be confirmed, then there will be a degree of risk to Client associated with conducting the work. In the absence of confirmed underground structure locations, Client agrees to accept the risk of damage and possible costs associated with repair and restoration of damage resulting from exploration work by AGS or an AGS subcontractor.

**PETROLEUM PRODUCTS AND HAZARDOUS MATERIALS**

1) Petroleum products, hazardous materials, or asbestos may exist at a site where there is no reason to believe they should be present. If, at any time, evidence of the existence or possible existence of such substances is discovered, AGS reserves the right to renegotiate any consulting agreement, the fees for AGS services and our continued involvement in the project. AGS will notify Client as soon as possible should unanticipated hazardous materials or suspected hazardous materials be discovered.

2) The discovery of hazardous materials or suspected hazardous materials may make it necessary for AGS to take immediate measures to protect human health and safety and/or the environment. Client agrees to compensate AGS for the cost of any and all measures that, in our

professional onsite judgment are justified to preserve and protect the health and safety of AGS personnel, Client's employees and/or the public, and/or the environment. In addition, Client waives any claims against AGS and, to the full extent permitted by law, agrees to indemnify, defend and hold AGS harmless from any and all claims, damages and liability, including but not limited to cost of defense, in any way connected with petroleum products, hazardous materials or asbestos.

**STANDARD OF CARE**

In accepting the AGS proposal for consulting services, Client acknowledges the inherent risks associated with any subsurface investigation. In performing professional services, AGS will use that degree of care and skill ordinarily exercised under similar circumstances by members of the profession practicing in the same or similar localities. AGS makes no express or implied warranty beyond our commitment to conform to this high standard of professional practice.

January 2021

# ADVANCED GROUNDWATER SOLUTIONS, LLC

## 2021 FEE SCHEDULE FOR CONSULTING SERVICES

| | |
|---|---|
| **Principal Hydrogeologist** | **$200 to $250/hour** |
| **Principal Engineer** | **$200 to $250/hour** |
| **Senior Associate/Hydrogeologist**<br>**Senior Associate/Engineer** | **$150 to $200/hour** |
| **Senior Consultant/Hydrogeologist**<br>**Senior Consultant/Engineer** | **$150 to $200/hour** |
| **Associate/Hydrogeologist**<br>**Associate/Engineer** | **$125 to $175/hour** |
| **Senior Hydrogeologist**<br>**Senior Environmental Engineer or Scientist**<br>**Senior Modeler** | **$120 to $160/hour** |
| **Hydrogeologist II,**<br>**Environmental Engineer II**<br>**Environmental Scientist II** | **$80 to $120/hour** |
| **Hydrogeologist I,**<br>**Environmental Engineer I**<br>**Environmental Scientist I** | **$70 to $100 /hour** |
| **Senior Technician** | **$75 to $100/hour** |
| **Technician** | **$70 to $90/hour** |
| **GIS or CAD Engineer/Operator** | **$80 to $100/hour** |
| **Administrator/Clerical** | **$75 to $80/hour** |

Our company requires reimbursement for actual expenses that are incurred.
The use of personal vehicle for project travel or field work will be billed at the IRS approved rate per mile.
An administrative charge of 5 percent is affixed to actual expenses and 15 percent for subcontractors.

Invoices are payable upon receipt; accounts unpaid more than 45 days after the billing date are subject to 1.25 percent interest per month (15-percent annual rate) from the invoice date.

January 2021

ATTACHMENT 11 a.

# RED RIVER GROUNDWATER CONSERVATION DISTRICT
## Well Registration Summary
(as of 12/31/2020)

| Well Type | Fannin | Grayson | Total RRGCD | New Registrations December 2020 |
|---|---|---|---|---|
| Domestic | 185 | 325 | 510 | 8 |
| Public Water | 59 | 194 | 253 | 0 |
| Livestock | 16 | 26 | 42 | 1 |
| Agriculture | 16 | 24 | 40 | 1 |
| Commercial | 12 | 17 | 29 | 0 |
| Oil / Gas | 0 | 20 | 20 | 0 |
| Surface Impoundments | 8 | 13 | 21 | 0 |
| Golf Course | 0 | 15 | 15 | 0 |
| Irrigation | 0 | 10 | 10 | 0 |
| Monitoring | 1 | 5 | 6 | 0 |
| Industrial | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 |
| **TOTALS** | **297** | **649** | **946** | **10** |

**NOTE: Plugged wells have been excluded**

ADJOURN