

**RED RIVER  
GROUNDWATER  
CONSERVATION  
DISTRICT**

**PERMIT HEARING AND BOARD MEETING**

Greater Texoma Utility Authority Board Room  
5100 Airport Drive  
Denison, Texas 75020

THURSDAY  
APRIL 20, 2023  
10:00 AM

NOTICE OF PUBLIC MEETING  
OF THE  
BOARD OF DIRECTORS OF THE  
**RED RIVER GROUNDWATER CONSERVATION DISTRICT**  
Thursday, April 20, 2023, at 10:00 a.m.

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

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**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 Application:

**Agenda:**

1. Call to Order; establish quorum; declare hearing open to the public; introduction of Board.
2. Review the Production Permit Application of:

**New Production Permit**

- a. **Applicant:** Eric Dunn; 498 Ferguson Rd, Whitesboro, TX 76273  
**Location of Well:** 1636 Rock Creek Rd, Gordonville, TX 76245; Latitude: 33.838140°N  
Longitude: 96.891992°W; about 1.8 miles north of FM 901 and 0.25 mile east of Rock Creek Rd  
in Grayson County.  
**Purpose of Use:** Livestock (Cattle/Horses); Irrigation (Hay)  
**Requested Amount of Use:** 2,000,000 gallons per year  
**Production Capacity of Well:** 180 gallons per minute  
**Aquifer:** Woodbine
3. Public Comment on the Production Permit Application (verbal comments limited to three (3) minutes each).
4. Consider and act upon the Production Permit Application, including designation of parties and/or granting or denying the Production Permit Application in whole or in part, as applicable.
5. Adjourn or continue permit hearing

## **Board Meeting**

The regular Board Meeting will begin at 10:00 a.m.

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 January 19, 2023, Board Meeting.
5. Consider and act upon the 2022 Audit.
6. Budget and Finance.
  - a. Review and approval of monthly invoices.
  - b. Receive monthly financial information.
  - c. Receive Quarterly Investment Report
7. Receive Quarterly Report on Management Plan.
8. Update and possible action regarding the process for the development of Desired Future Conditions (DFC).
9. Consider and act upon all matters incident and related to an Interlocal Agreement regarding Groundwater Management Area 8 Funding for Northern Trinity and Woodbine Aquifers Groundwater Availability Model Update.
10. Consider and act upon compliance and enforcement activities for violations of District Rules.
  - a. Quality Water Well LLC
  - b. Bessie Dolezalek
11. Discussion and possible action related to 88th Texas Legislative Session and Issues.
12. 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
13. Open forum / discussion of new business for future meeting agendas.

14. Adjourn.

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

<sup>2</sup>*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.*

<sup>3</sup>*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.*

<sup>4</sup>*For questions regarding this notice, please contact Velma Starks at (800) 256-0935, at [rrgcd@redrivergcd.org](mailto: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, January 19, 2023**

**MEETING LOCATION:  
GREATER TEXOMA UTILITY AUTHORITY  
BOARD ROOM  
5100 AIRPORT DRIVE  
DENISON TX 75020**

Members Present: Chuck Dodd (arrived 10:27 a.m.), David Gattis, Harold Latham, Mark Patterson, and Billy Stephens.

Members Absent: Mark Newhouse and Mark Gibson

Staff: Paul Sigle, Nichole Sims Murphy, Wayne Parkman, Allen Burks, Kenneth Elliott and Velma Starks

Visitors: Kristen Fancher, Fancher Legal  
Tammy, A.L. Moser Drilling

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**Permit Hearing**

**Agenda:**

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

Board President Mark Patterson called the Permit Hearing to order at 10:03 a.m., established quorum declared hearing open to the public and introduced the Board.

2. Review the Production Permit Application of:

**New Production Permits**

- a. **Applicant:** Whitesboro 350 Partners, LLC; 8541 5<sup>th</sup> Street, Frisco, TX 75034  
**Location of Well:** Well #1: 752 South Road, Whitesboro, TX 76273; Latitude: 33.640665°N Longitude: 96.884795°W; about 1 mile north and 0.25 mile east of the Gunter Road and South Road intersection; Well #2: 536 South Road, Whitesboro, TX 76273; Latitude: 33.644300°N Longitude: 96.888900°W; About 1,700 feet east of the intersection with HWY 377 and South Road and about 500 feet west of South Road.  
**Purpose of Use:** Agriculture (Hemp Production)  
**Requested Amount of Use:** 120,000,000 gallons per year  
**Production Capacity of Well:** Well #1: 190 gallons per minute; Well #2: 250 gallons per minute  
**Aquifer:** Woodbine

General Manager Paul Sigle reviewed the permit with the Board. Discussion was held. Board Member David Gattis made the motion to approve the permit. Board Member Billy Stephens seconded the motion. Motion passed unanimously.

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

No public comments.

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

Permit was approved after it was reviewed.

5. Adjourn or continue permit hearing

Board President Mark Patterson adjourned the permit hearing at 10:12 a.m.

### **Board Meeting**

1. Pledge of Allegiance and Invocation.

Board President Mark Patterson led the group in the Pledge of Allegiance and offered the invocation for the group.

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

Board President Mark Patterson called the meeting to order at 10:12 a.m., established a quorum was present, and declared the meeting open to the public.

3. Public Comment.

No Public Comment

4. Consider and act upon approval of Minutes of December 15, 2022, Board Meeting.

Board Member Billy Stephens made a motion to approve the minutes of the December 15, 2022, meeting. The motion was seconded by Board Member Harold Latham. Motion passed unanimously.

5. Budget and Finance.

- a. Review and approval of monthly invoices.

General Manager Paul Sigle reviewed the invoices with the Board. Board Member David Gattis made the motion to approve the monthly invoices. Board Member Harold Latham seconded the motion. Motion passed unanimously.

- b. Receive monthly financial information.

] General Manager Paul Sigle reviewed the District's monthly financial information with the Board. Discussion was held.



c. Receive Quarterly Investment Report.

General Manager Paul Sigle reviewed the Quarterly Investment Report with the Board. The Board suggested investing in stair-step every six months.

6. Receive Quarterly Report on Management Plan.

General Manager Paul Sigle reviewed the Quarterly Report on Management Plan with the Board. Brief Discussion was held. The Board suggested that the District send a letter after the inspection has been done telling the well owner the inspection results.

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

General Manager Paul Sigle informed the Board that the GMA 8 Selection Committee Scope of Services for INTRA was under \$600,000. The GMA 8 meeting will be held possibly March 7th.

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

No issues.

9. Discussion and possible action related to 88th Texas Legislative Session and Issues.

General Manager Paul Sigle informed the Board that the House Committee may present issues that will affect GCDs to various degrees.

10. 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 Paul Sigle reviewed the well registration summary with the Board. Three new wells were registered in December.

b. Update on Injection/Disposal Well Monitoring Program

No report

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

The 3<sup>rd</sup> Thursday of February is February 16. If no meeting is held, the next tentatively scheduled meeting will be March 16.

12. Adjourn.

Board President Mark Patterson declared the meeting adjourned at 10:37 a.m.



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Recording Secretary

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Secretary-Treasurer

ATTACHMENT 5



RED RIVER GROUNDWATER  
CONSERVATION DISTRICT  
AGENDA COMMUNICATION

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**DATE:** April 14, 2023

**SUBJECT:** AGENDA ITEM NO. 5

**CONSIDER AND ACT UPON THE 2021 AUDIT**

**ISSUE**

2021 Audit

**BACKGROUND**

The Board engaged the services of McClanahan and Holmes, LLP to provide the independent audit of the District's accounting records for the 2021 fiscal year. The auditors will be presenting their findings at the April meeting.

**CONSIDERATIONS**

If there are questions or concerns about the audit, the Board will have the opportunity to further discuss them with the auditor.

The 2022 Audit will be provided at the Board meeting.

**RECOMMENDED BY:**

Paul M. Sigle, General Manager

ATTACHMENT 6 a.

RESOLUTION NO. 2023-04-01

A RESOLUTION BY THE BOARD OF DIRECTORS OF THE RED RIVER GROUNDWATER CONSERVATION DISTRICT AUTHORIZING PAYMENT OF ACCRUED LIABILITIES FOR THE MONTHS JANUARY, FEBRUARY & MARCH

The following liabilities are hereby presented for payment:

	<u>Amount</u>
<b><u>Advertising</u></b>	
Texas Alliance Groundwater District - 2023 Texas Groundwater Summit Door Prize Sponsorship	2,000.00
<b><u>Administrative Services</u></b>	
GTUA - January 2023	14,081.71
GTUA - February 2023	13,141.69
GTUA - March 2023	13,681.95
<b><u>Contract Services</u></b>	
Advanced Groundwater Solutions - Hydrologic assessment & Report serv. through 12/31/22	1,175.25
<b><u>Direct Costs</u></b>	
NexTraq - Account correction by vendor they applied NTGCD payment to RRGCD acct.	34.95
NexTraq - GPS tracking for February 2023	34.95
NexTraq - GPS tracking for March 2023	34.95
NexTraq - GPS tracking for April 2023	34.95
USPS - Post Office Box renewal for 2023	398.00
<b><u>GMA-8 Fees</u></b>	
NTGCD - December 2023 GMA8 expenses	18.17
<b><u>Injection Monitoring</u></b>	
Statewide Plat Service - January & February monthly charges	100.00
<b><u>Insurance</u></b>	
Bayless-Hall & Blanton - March 2023 BOD bond renewal	315.00
<b><u>Legal</u></b>	
Fancher Law - BOD general legal services through March 2023	3,698.95
<b><u>Refunds</u></b>	
David Bergen - Driller Deposit Refund Unger well RR-5573	100.00
<b><u>Transportation</u></b>	
NTGCD - Used NTGCD truck for RRGCD flow testing	140.83
<b>GRAND TOTAL:</b>	<b><u><u>46,991.35</u></u></b>

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 20th. day of April 2023

by the following vote:

AYE:

NAY:

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

\_\_\_\_\_

President

ATTEST:

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Secretary/Treasurer

RED RIVER  
GROUNDWATER  
CONSERVATION  
DISTRICT

BOARD MEETING

Meeting for the July 2014 Board Meeting  
to be held on July 23, 2014  
at 10:00 AM in the Board Room

ATTACHMENT 6 b.

Agenda for the July 2014 Board Meeting  
including the following items:

1. Approval of the minutes of the June 2014 Board Meeting

2. Report of the  
Chairman



# RED RIVER GROUNDWATER

## Balance Sheet

As of March 31, 2023

### ASSETS

#### Current Assets

##### Checking/Savings

10001 CASH-First United	191,652.03
10010 CASH-LEGEND	138,500.00
10025 A/R CONSUMPTION	-7,964.63
10026 A/R Texas Rain Holding Co	2,990.00
10230 A/R Violation Fees	500.00
10101 ALLOWANCE FOR UNCOLLECT	-1,530.00
10010 INVESTMENTS	500,000.00
10230 PP EXPENSES	1,635.00

**TOTAL ASSETS** 825,782.40

### LIABILITIES & EQUITY

#### Liabilities

##### Current Liabilities

##### Accounts Payable

23100 ACCOUNTS PAYABLE	5,664.00
23150 DRILLERS DEPOSIT LIAB	16,495.00

**Total Other Current Liabilities** 22,159.00

**Total Current Liabilities** 22,159.00

**Total Liabilities** 22,159.00

#### Equity

35100 RETAINED EARNINGS 849,390.66

Net Income -45,767.26

**Total Equity** 803,623.40

**TOTAL LIABILITIES & EQUITY** 825,782.40

**RED RIVER GROUNDWATER**  
**Profit & Loss Budget vs. Actual**  
**March 31, 2023**

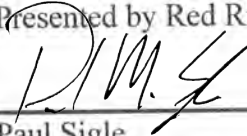
	<u>Current Actual</u>	<u>Current Budget</u>	<u>YTD Actual</u>	<u>Total Budget</u>	<u>% of Budget Remaining</u>
<b>Income</b>					
46002 GW PRODUCTION	0.00	81,750.00	0.00	327,000.00	100.00%
46005 LATE FEES	939.87	0.00	939.87	0.00	0.00%
46006 VIOLATION FEES	0.00	0.00	0.00	0.00	0.00%
46015 REGISTRATION FEES	400.00	525.00	3,000.00	6,300.00	52.38%
46020 PERMITTING FEES	0.00	500.00	0.00	6,000.00	0.00%
46100 INTEREST INCOME	0.00	666.00	0.00	8,000.00	100.00%
<b>Total Income</b>	<u>1,339.87</u>	<u>83,441.00</u>	<u>3,939.87</u>	<u>347,300.00</u>	<u>98.87%</u>
<b>Gross Profit</b>	1,339.87	83,441.00	3,939.87	347,300.00	
<b>Expense</b>					
77010 ADMINISTRATIVE COST	4,472.99	8,750.00	17,190.99	105,000.00	83.63%
77020 ADVERTISING	0.00	83.00	4.00	1,000.00	99.60%
77027 AUDITING	0.00	0.00	0.00	5,300.00	100.00%
77031 BANKING FEES	79.06	92.00	199.92	1,100.00	81.83%
77032 CONTRACT SERVICES	0.00	3,500.00	1,175.25	42,000.00	97.20%
77035 FIELD TECH	5,000.00	7,916.00	13,199.00	95,000.00	86.11%
77040 DIRECT COST	174.91	400.00	1,339.73	4,800.00	72.09%
77045 FIELD PERMITTING SPECIAL	2,561.50	2,916.00	6,251.00	35,000.00	82.14%
77450 DUES & SUBSCRIPTIONS	2,000.00	333.00	2,000.00	4,000.00	50.00%
77480 EQUIPMENT	756.91	167.00	756.91	2,000.00	62.15%
77500 FEES-GMA8	0.00	83.00	0.00	1,000.00	100.00%
77810 INSURANCE AND BONDING	315.00	360.00	630.00	4,315.00	85.40%
77850 GENERIC SOFTWARE SVC	0.00	208.00	0.00	2,500.00	100.00%
77970 LEGAL	3,698.95	2,500.00	3,698.95	30,000.00	87.67%
78010 MEETINGS AND CONFEREN	154.17	433.00	1,116.60	5,200.00	78.53%
78310 RENT	200.00	200.00	600.00	2,400.00	75.00%
78600 SOFTWARE MAINTENANCE	0.00	1,250.00	99.99	15,000.00	99.33%
78750 TELEPHONE	375.43	225.00	891.14	2,700.00	66.99%
78770 - TRANSPORTATION	120.99	417.00	553.65	5,000.00	88.93%
<b>Total Expense</b>	<u>19,909.91</u>	<u>29,833.00</u>	<u>49,707.13</u>	<u>363,315.00</u>	<u>86.32%</u>
<b>Net Income</b>	<u><b>-18,570.04</b></u>	<u><b>53,608.00</b></u>	<u><b>-45,767.26</b></u>	<u><b>-16,015.00</b></u>	

ATTACHMENT 6 c

Red River Groundwater Conservation District  
Quarterly Investment Report  
For the Quarter Ended  
March 31, 2023

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:

  
Paul Sigle  
General Manager

  
Debi Atkins  
Finance Officer

Book/Market Value Comparison

Description	Coupon/ Discount	Maturity Date	December 31, 2022			March 31, 2023		
			Face Amount/ Par Value	Book/Market Value	Purchases/ Adjustments	Sales/Adjust/ Call Maturity	Face Amount/ Par Value	Book/Market Value
First United (DDA)	0.00%	4/1/2022	\$ 657,222.51	\$ 657,222.51	91,370.02	556,940.50	191,652.03	\$ 191,652.03
Legend Bank (CDARS)	1.44%	5/11/2023	138,500.00	138,500.00			138,500.00	\$ 138,500.00
East West (CD)	5.00%	8/24/2023			250,000.00		250,000.00	\$ 250,000.00
East West (CD)	5.00%	2/26/2024			250,000.00		250,000.00	\$ 250,000.00
			\$ 790,949.06	\$ 790,949.06	\$ 591,370.02	\$ 556,940.50	\$ 830,152.03	\$ 830,152.03

Investment Holdings  
3/31/2023

Description	Ratings	Coupon/ Discount	Maturity Date	Settlement Date	Face Amount/Par Value	Book Value	Market Price	Market Value	Life (Day)	Yield <sup>(1)</sup>
First United (DDA)		0.00%	4/1/2023	3/31/2023	\$ 191,652.03	\$ 191,652.03	1.00	\$ 191,652.03	1	0.00%
Legend Bank (CDARS)		1.44%	5/11/2023	5/12/2022	\$ 138,500.00	\$ 138,500.00	1.00	\$ 138,500.00	41	1.45%
East West (CD)		5.00%	8/24/2023	2/24/2023	\$ 250,000.00	\$ 250,000.00	1.00	\$ 250,000.00	146	5.13%
East West (CD)		5.00%	2/26/2024	2/24/2023	\$ 250,000.00	\$ 250,000.00	1.00	\$ 250,000.00	332	5.13%
Weighted Ave Maturity in yrs					\$ 830,152.03	\$ 830,152.03			520	0.41
									(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.



ATTACHMENT 7





**RED RIVER  
GROUNDWATER CONSERVATION DISTRICT**



FANNIN COUNTY AND GRAYSON COUNTY

**General Manager's Quarterly Report  
Date: March 31, 2023  
Red River GCD Management Plan**

This quarterly briefing is being provided pursuant to the adopted Management Plan for the quarter ending March 31, 2023.

**Well Registration Program:**

Current number of wells registered in the District: **1135**

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

**Well Inspection/Audit Program:**

**2023  
Well Inspections**

<b>Month</b>	<b>Fannin</b>	<b>Grayson</b>	<b>Total</b>
January	0	18	<b>18</b>
February	9	20	<b>29</b>
March	6	22	<b>28</b>
April			
May			
June			
July			
August			
September			
October			
November			
December			
<b>Total</b>	<b>15</b>	<b>60</b>	<b>75</b>

**Number of Exempt wells inspected (as of March 31, 2023)**

<b>County</b>	<b>Number of Wells Inspected (2023)</b>	<b>Total Number of Completed Wells*</b>	<b>%</b>
<b>Fannin</b>	10	269	4%
<b>Grayson</b>	14	501	3%
<b>Total</b>	<b>24</b>	<b>770</b>	<b>3%</b>

**Number of Non-Exempt wells inspected (as of March 31, 2023)**

<b>County</b>	<b>Number of Wells Inspected (2023)</b>	<b>Total Number of Completed Wells*</b>	<b>%</b>
<b>Fannin</b>	5	85	6%
<b>Grayson</b>	46	226	20%
<b>Total</b>	<b>51</b>	<b>311</b>	<b>16%</b>

\*Plugged wells have been excluded

\*Total number of completed wells is estimated.

- Assumptions
  - Wells that have completion dates are assumed to be complete.
  - Wells with application dates through 4/5/2020 are assumed to be complete.
  - Wells that have been inspected are assumed to be complete.

ATTACHMENT 9

**INTERLOCAL AGREEMENT REGARDING  
GROUNDWATER MANAGEMENT AREA 8 FUNDING FOR UPDATE TO  
GROUNDWATER AVAILABILITY MODEL**

**THIS INTERLOCAL AGREEMENT REGARDING GROUNDWATER MANAGEMENT AREA 8 FUNDING FOR UPDATE TO GROUNDWATER AVAILABILITY MODEL** (the “*Agreement*”) is entered into between the Central Texas Groundwater Conservation District, Clearwater Underground Water Conservation District, Middle Trinity Groundwater Conservation District, North Texas Groundwater Conservation District, Northern Trinity Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, Prairielands Groundwater Conservation District, Red River Groundwater Conservation District, Saratoga Underground Water Conservation District, Southern Trinity Groundwater Conservation District, and the Upper Trinity Groundwater Conservation District (collectively, the “*GMA 8 Districts*” or “*Parties*” and individually a “*GMA 8 District*” or “*Party*”), pursuant to the provisions of the Interlocal Cooperation Act, Chapter 791, Texas Government Code.

**WHEREAS**, each Party is a political subdivision of the State of Texas created under the authority of Article XVI, Section 59, of the Texas Constitution, and operates pursuant to the provisions of Chapter 36 of the Texas Water Code, and each Party’s respective enabling act; and

**WHEREAS**, each Party’s boundaries are wholly or partially within Groundwater Management Area 8 (“*GMA 8*”), as delineated by the Texas Water Development Board (the “*TWDB*”) pursuant to Section 356.21 of TWDB Rules, Title 31 Texas Administrative Code § 356.21, as amended; and

**WHEREAS**, the GMA 8 Districts selected a consultant to update the Groundwater Availability Model for the Northern Trinity and Woodbine Aquifers (“*GAM*”) for use in developing Desired Future Conditions for the relevant aquifers within GMA 8; and

**WHEREAS**, each Party has the authority provided in Chapter 791, Texas Government Code, its respective enabling act, Chapter 36 of the Texas Water Code, including, but not limited to, Sections 36.1086, 36.205, and 36.207 of the Texas Water Code, as amended, to enter into any and all such contracts as necessary to achieve the intent and purposes set forth herein; and

**WHEREAS**, the Parties desire to contract with each other in support of updating the GAM;  
and

**WHEREAS**, the governing body of each GMA 8 District has authorized this Agreement.

**NOW, THEREFORE**, in consideration of the foregoing premises and the mutual promises, obligations, and agreements of the Parties contained in this Agreement, the Parties agree as follows:

## I. SCOPE AND FUNDING

1.1 **Scope of Services.** The GMA 8 Districts have selected INTERA Incorporated and R.W. Harden & Associates (“*Consultant*”) in accordance with the Professional Services Procurement Act, Chapter 2254, Texas Government Code (“*Act*”), to perform the professional services necessary to update the GAM (the “*Project*”). The scope of work to be provided by Consultant is set forth in Exhibit A, attached hereto and incorporated herein for all purposes.

1.2 **Funding of Consultant Services.**

(a) The GMA 8 Districts have negotiated a contract price pursuant to the Act for Consultant to perform the services of the Project in the amount of five-hundred and ninety-one thousand and one hundred dollars (\$591,100.00) (“*Contract Price*”), as set forth in Exhibit A. The North Texas Groundwater Conservation District (“*NTGCD*”) has been appointed by the groundwater conservation districts in GMA 8 as the administrative district for GMA 8, and NTGCD shall serve as the entity that will contract with Consultant to perform the services of the Project under Section 1.1 of this Agreement; provided, however that each GMA 8 District has the same obligations and interest under the Consultant contract and right to the data and information prepared by Consultant for the Project by virtue of funding the work performed. The contract between NTGCD and Consultant is entered into on behalf of all of the GMA 8 Districts in the interest of efficiency, and shall at a minimum include terms related to Force Majeure, remedies for breach, and any applicable representations and warranties to ensure timely delivery of the work product set forth in Exhibit A.

(b) The GMA 8 Districts agree to each fund a portion of the Contract Price for the performance of Consultant services pursuant to the schedule set forth in Exhibit B, attached hereto and incorporated herein for all purposes. Any additional costs beyond the Contract Price must be agreed to in writing by all GMA 8 Districts prior to the cost being incurred. Nothing in this section or the Agreement shall be construed to require a Party to fund any additional cost beyond each Party’s portion of the Contract Price to which that Party does not agree to fund. Similarly, nothing in this section or this Agreement shall be construed as limiting a Party hereto, individually or in conjunction with any other Party/Parties comprising the GMA 8 Districts, from separately funding any other services beyond the Contract Price.

(c) In the event an entity that is not a GMA 8 District approved by the GMA 8 Districts desires to contribute funding to the Contract Price and/or approved additional costs, such contribution shall thereby reduce each Party’s share of the funding on a pro rata basis.

1.3 **Payment of Consultant Services Costs.**

(a) Upon receipt of an invoice from Consultant, NTGCD shall send an email to each GMA 8 District with the following: (a) a copy of the Consultant invoice; and (ii) a separate invoice from NTGCD reflecting the amount due from each GMA 8 District. Payment is

due from each GMA 8 District by check mailed to NTGCD not later than thirty (30) days from the date of the NTGCD invoice. NTGCD shall tender one payment to Consultant on behalf of the GMA 8 Districts, and has the discretion whether to do so prior to or after receipt of payment from some or all of the GMA 8 Districts. The GMA 8 Districts agree to provide payment to NTGCD as set forth herein under all circumstances, unless the GMA 8 Districts agree to halt or refuse payment on a particular Consultant invoice due to a dispute over services performed.

- (b) In the event a GMA 8 District is unable to timely render payment in accordance with Section 1.3(a) for any reason whatsoever (the “**Breaching District**”), such inability to pay does not relieve the GMA 8 District of the funding obligations hereunder, but shall require the other GMA 8 Districts to equally absorb the pro rata share of the Breaching District’s amounts owed to NTGCD. The GMA 8 Districts reserve the right to exercise all of the legal rights and remedies available under law and equity against any GMA 8 District that breaches this Agreement.
- (c) Any funding received from a third party under Section 1.2(c) towards payment of a Consultant invoice or total previously paid by the GMA 8 Districts shall serve as a credit on any future payments owed by the GMA 8 Districts. Any such credit shall be reflected on the following NTGCD invoices delivered to the GMA 8 Districts under Subsection (a) of this section.

## II. GENERAL PROVISIONS

- 2.1 **Recitals**. The above recitals in this Agreement are true and correct and are incorporated into this Agreement for all purposes.
- 2.2 **Cooperation**. During the Term of this Agreement, the Parties agree to cooperate at all times in good faith to effectuate the purposes and intent of this Agreement.
- 2.3 **Compliance with Laws**. All activities of the Parties under this Agreement shall be in compliance with all applicable Federal, State, and Local rules, laws, and regulations.
- 2.4 **Authority**. This Agreement is made in part under the authority conferred in Chapter 791, Texas Government Code and Sections 36.1086, 36.205, and 36.207 of the Texas Water Code, as amended. Each Party represents and warrants that it has the full right, power and authority to execute this Agreement.
- 2.5 **Severability**. The provisions of this Agreement are severable and, if any provision of this Agreement is held to be invalid for any reason by a court or agency of competent jurisdiction, the remainder of this Agreement will not be affected, and this Agreement will be construed as if the invalid portion had never been contained herein.
- 2.6 **Assignment**. The assignment of this Agreement by any Party is prohibited without the prior written consent of all of the other Parties. All of the respective covenants, undertakings, and successors or assigns of that Party.

- 2.7 **Source of Payment; Pledge to Secure Payment.** The Parties represent and covenant that payments to be made by it under this Agreement shall constitute funds from the current fiscal year's revenues, as appropriated by each Party's Board of Directors through each Party's annual budget adopted in accordance with the applicable procedures of each Party.
- 2.8 **Third Party Beneficiaries.** Except as expressly provided for herein with regard to Consultant, nothing in this Agreement, express or implied, is intended to confer upon any person or entity, other than the Parties, any rights, benefits, or remedies under or by reason of this Agreement.
- 2.9 **Entire Agreement.** This Agreement contains the entire agreement of the Parties regarding the subject matter hereof and supersedes all prior or contemporaneous understandings or representations, whether oral or written, regarding the subject matter.
- 2.10 **Interpretation and Reliance.** No presumption will apply in favor of any Party in the interpretation of this Agreement or in the resolution of any ambiguity of any provisions hereof. Headings and captions used in this Agreement are for reference purposes only, and shall have no bearing on the interpretation of this Agreement.
- 2.11 **Relationship of Parties.** This Agreement is based upon the active participation of the Parties. Neither the execution nor the delivery of this Agreement shall create or constitute a partnership, joint venture, or any other form of business organization or arrangement between the Parties, except for the contractual arrangements specifically set forth in this Agreement. No Party shall have any power to assume or create any obligation on behalf of the other Party.
- 2.12 **Amendments.** Any amendment of this Agreement must be in writing and will be effective if it is signed by the authorized representatives of each the Parties.
- 2.13 **Applicable Law; Venue.** This Agreement will be construed in accordance with Texas laws. Venue for any action arising hereunder will be in a court of competent jurisdiction.
- 2.14 **Notices.** Any notices given under this Agreement will be effective if (i) forwarded to a Party by hand-delivery; (ii) transmitted to a Party by confirmed telecopy or electronic mail; or (iii) deposited with the U.S. Postal Service, postage prepaid, certified, to the official business address of a Party.
- 2.15 **Counterparts; Effect of Partial Execution.** This Agreement may be executed simultaneously in multiple counterparts, each of which will be deemed an original, but all of which will constitute the same instrument.
- 2.16 **No Waiver.** The failure of a Party or the Parties to require strict performance of any provision, term, or condition of this Agreement or to exercise any right or remedy shall not constitute or be construed as a waiver of the provision, term, or condition breached or any other provision, term or condition of this Agreement.



2.17 **Effective Date.** The effective date of this Agreement shall be the last date of execution of the Parties in the signature pages below.

*(Signature Pages Follow)*

*(Signature page of Central Texas Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**CENTRAL TEXAS GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Clearwater Underground Water Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**CLEARWATER UNDERGROUND WATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Middle Trinity Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**MIDDLE TRINITY GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of North Texas Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**NORTH TEXAS GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Northern Trinity Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**NORTHERN TRINITY GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Post Oak Savannah Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_



*(Signature page of Prairielands Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**PRAIRIELANDS GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Red River Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**RED RIVER GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Saratoga Underground Water Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**SARATOGA UNDERGROUND WATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Southern Trinity Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**SOUTHERN TRINITY GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

*(Signature page of Upper Trinity Groundwater Conservation District to Interlocal Agreement Regarding Groundwater Management Area 8 Funding for Development of Desired Future Conditions Joint Planning)*

**UPPER TRINITY GROUNDWATER CONSERVATION DISTRICT:**

By: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Exhibit A**

**Scope of Services**



January 5, 2023

Paul Sigle  
General Manager  
North Texas Groundwater Conservation District  
5100 Airport Drive  
Denison, Texas 75020

**RE: Scope of Work and Cost Estimate for Updating the Groundwater Availability Model for the Trinity and Woodbine Aquifers in Groundwater Management Area 8**

Dear Mr. Sigle,

On behalf of INTERA and R.W. Harden & Associates, thank you for the opportunity to submit this scope of work and cost estimate for updating the groundwater availability model (GAM) for the Trinity and Woodbine aquifers in Groundwater Management Area 8 (GMA 8). We enjoyed the opportunity to meet with you and the other members of the Selection Committee for GMA 8 and are very pleased to have this opportunity to work with you and the group on this project.

Below you will find our proposed scope of work and cost estimate. This scope is very consistent with the technical approach we presented in our Statement of Qualifications to the Committee.

**Background**

The joint-planning process is an adaptive management framework that recognizes the management of resources within a GMA can evolve with increased understanding, aquifer conditions, and the collection of additional data to inform management decisions. The GCDs that comprise GMA 8 have determined that the current NTWGAM developed in 2014 should be updated with newly available hydrogeologic data and the calibration period should be extended through 2020. GAMs play a critical role for GCDs because they are central to developing modeled available groundwater (MAG) which is a regional analysis. These models also serve as operational tools for local GCD management.

INTERA has led the construction of 13 GAMs and has helped over 30 GCDs and eight GMAs use these and other models to support the planning and management of groundwater resources. Through our interactions with stakeholders and TWDB staff, we are keenly aware of the importance of balancing model complexity and usability. Our modelers have developed specific tools for construction and calibration of models using MODFLOW 6. INTERA's Jeremy White, PhD is an expert on calibration and calibration workflows built on a foundation of scripting and open-source software tools, so that the numerous decisions and assumptions made during the modeling workflow are transparently and openly documented. During the NTWGAM re-calibration phase, we are proposing to use the Python package pyEMU to programmatically undertake parameter estimation, and the iterative ensemble smoother PESTPP-IES, which greatly reduces the computational demand of nonlinear, high-dimensional parameter estimation. INTERA recently presented a webinar on these techniques for the TWDB GAM group. Ultimately, the updated NTWGAM must meet the needs of the GMA and the member GCDs while also

meeting the standards and requirements for approval by the TWDB. INTERA's experience developing more TWDB-approved GAMs than any other firm in Texas will ensure these needs and requirements are met.

### **Scope of Work**

The first task will be to convert the NTWGAM from MODFLOW-NWT to MODFLOW 6. This is a critical first step in the scope of work because it needs to be demonstrated that MODFLOW 6 can reliably reproduce the results of the 2014 NTWGAM. If the solutions between MODFLOW-NWT and MODFLOW 6 are not baselined, we run the risk of propagating errors in the updated model unrelated to the purposefully implemented modifications to the underlying model. The first subtask of Task A will be migrating the existing NTWGAM packages to MODFLOW 6 format. INTERA has converted many models to MODFLOW 6 over the last two years. We have developed scripts to support this process with error checking logic. To test the conversion and to identify any systematic differences between the codes, we will run the 2014 NTWGAM calibration simulation and the current GMA 8 MAG run. The end of this process represents a significant milestone, and we will meet with GMA 8 to provide a detailed analysis of the comparison of the two simulation codes.

Once we have demonstrated the successful conversion of the current NTWGAM to MODFLOW 6, we will meet with GMA 8 to discuss the objectives of the updated model with emphasis on correcting known errors, adding additional data collected by the GCDs, and improving functionality for groundwater management. For efficiency, this meeting can be combined with the model conversion meeting at the end of Task A. We will have already met with TWDB to discuss their interests in the update of the NTWGAM. Because of the importance of TWDB accepting the updated model, we will request that technical staff from TWDB attend any key model update meetings with GMA 8. Some of the already known key objectives of the model update are to extend the calibration period from 2012 through 2020, incorporate new data on structure and aquifer properties, and use the improved numerical capabilities of MODFLOW 6 to improve model efficiency, accuracy, and applicability to management at the district and GMA level.

To update the NTWGAM, we will establish an efficient workflow for model construction and calibration that minimizes construction errors and results in a purpose-built model. The applied workflow dictates how a groundwater model is constructed and deployed in a specific resource management context. This workflow deserves specific attention because it ultimately controls the quality and utility of the model. The INTERA Team brings experience applying reproducible modeling workflows built on a foundation of scripting and open-source software tools, so that all decisions and assumptions made during the modeling workflow are transparently and openly documented. The scripting-driven workflow brings significant advancements to improve efficiency, transparency, and ultimately quality, to all facets of the modeling process.

After we have met with GMA 8 and TWDB, and agreement has been reached on the particulars of the model update, we will start developing the updated model packages. The first subtask will be model discretization which includes horizontal grid size as well as layering. MODFLOW 6 enables revision of the model to an unstructured format, allowing variable grid dimensions as well as pinching and compositing layers that may exist in the current NTWGAM. The current model is difficult to use because of the large number of grid cells and the presence of a pass-through layer that connects the shallow outcrop portions of the aquifer from the deeper portions of the aquifer. We will explore simplifying this formulation for ease of use. We will also meet with GMA 8 and develop a rationale for relaxing the ¼-mile grid spacing in portions of the model grid where it is not required. Another place where model layering may be improved



is in the handling of the Northern Segment of the Edwards (Balcones Fault Zone [BFZ]) Aquifer. The TWDB is developing an updated Edwards (BFZ) Aquifer GAM, and the integration of layering and properties between this model and the updated NTWGAM will facilitate groundwater management for southern GCDs within GMA 8 through the more accurate evaluation of pumping impacts from the southernmost counties in the aquifer system. Many of the GMA 8 member GCDs have also characterized faulting that is currently not implemented in the 2014 NTWGAM. We will work closely with these GCDs to ensure that this faulting is accurately represented in the updated NTWGAM.

Several transient stress packages will require extension from 2012 through 2020, including pumping, recharge, stream routing, and evapotranspiration (ET). Stream routing will be implemented in a manner consistent with the 2014 NTWGAM. The USGS Soil-Water-Balance (SWB) model (Westenbroek and others, 2010; Westenbroek and others, 2018) can be used for estimating recharge on a grid similar to that used for groundwater availability models. The SWB model code was successfully demonstrated to the TWDB when applied by Mr. Keester during an analysis of changes in soil moisture in four watersheds in the Upper Colorado River Basin (Furnans and others, 2019) and in developing estimates of the temporal and spatial distribution of recharge for aquifers in central and west Texas (Sen and others, 2022). In addition, the USGS applied the SWB model code to develop estimates of recharge to the Gulf Coast Aquifer System as part of the ongoing development of the GULF-2023 model.

The SWB code uses a combination of gridded and tabular data to calculate potential groundwater recharge separately for each grid cell within a model domain. The SWB code evaluates the sources and sinks of water within each grid cell at and near land surface and then calculates recharge as difference between the change in soil moisture and the sources and sinks. Sources for recharge include precipitation and inflow (surface runoff from an adjacent grid cell) while sinks include evapotranspiration, outflow (surface runoff to an adjacent grid cell), and interception (rainfall trapped and used by vegetation and evaporated or transpired from plant surfaces).

Over the past several years, GCDs within GMA 8 have worked with the TWDB TexMesonet group to establish several stations for collecting climate and soil moisture data. These data can now be applied during development of a SWB model to constrain the parameters used for calculating daily evapotranspiration, soil moisture, and potential infiltration. We propose following the approach developed for the TWDB to create a similar ensemble SWB model for GMA 8 including calibration to TexMesonet data using PESTPP-IES (White and others, 2020) and results processing for watersheds and aquifer outcrops. Drawing upon our previous experience with the code and data we will also apply lessons learned to improve efficiency in model development and application.

Results from the SWB model will be used in conjunction with analyses of recharge and evapotranspiration documented for the current NTWGAM (Kelley and others, 2014). The proposed SWB model will serve to increase our understanding of the sources of aquifer inflow and outflow in the outcrop area. Development of the SWB model will allow GMA 8 to apply TexMesonet data to further inform the conceptual model of potential recharge to the Edwards, Woodbine, and Trinity aquifers.

Pumping will be updated from 2012 through 2020, using techniques for collection and allocation within the model domain consistent with the current NTWGAM with two exceptions. First, as part of collecting data from GCDs in GMA 8, we will obtain available data and analyses of groundwater use to compare to the water use data available through the TWDB. We will discuss major differences with both the GCDs and the TWDB to resolve any discrepancies in the new calibration period pumping data. Secondly, we will

ensure that the transition in pumping between the last historical period of the current NTWGAM (2012) and 2013 is consistent with climatological changes or known water use trends.

The GCDs within GMA 8 have been collecting a significant amount of data on aquifer properties, including hydraulic conductivity, transmissivity and storativity. For the 2014 NTWGAM, hydraulic conductivity was scaled to the model scale through development of a geohydrostratigraphic model that correlated aquifer test derived values of hydraulic conductivity with formation, lithology, and depositional environments. Using the geohydrostratigraphic approach for the NTWGAM update, aquifer parameters could be assigned to the model grid based on known geological factors and the model being constrained by the available aquifer test data. We will compare new aquifer test parameters based on aquifer tests to the calibrated values at a given grid cell. Next, we will develop an averaging scheme that allows integration of the new data into the existing model parameter fields. Prior to calibration, we will develop a comparison of the frequency distribution of aquifer properties from the current NTWGAM and the updated initial parameter field to ensure that constraints on parameter perturbation during calibration are still consistent with those originally used. This will allow consistency with the 2014 NTWGAM while honoring new values that are significantly different than those used in the current model.

We will update calibration targets for the extended calibration period from 2012 through 2020. These targets will include water levels, stream baseflow estimates, and spring flows. Water levels will be collected from TWDB's Groundwater Database and from monitoring data from GCDs. We will request information from each GCD on their DFC compliance monitoring network. Because of the importance of model fit at compliance monitoring wells, we will investigate weighting options for compliance network water levels in the calibration task (Task C). Because surface water interaction is becoming a more important management objective, we will query GCDs on key spring flows that are managed to and make sure they are being appropriately included in the updated NTWGAM. Once the model packages are updated, we will meet with GMA 8 to present implementation of the new packages from 2012 through 2020. TWDB staff will also attend this meeting. After addressing any comments, re-calibration of the model will begin.

At the end of Task A, we will have demonstrated that the converted MODFLOW 6 NTWGAM meets the original calibration criteria documented in the report, Kelley and others 2014. In Task C, we will extend the calibration period from 2012 to 2020. Because the updated model will be incorporating additional data on properties, structure, and discretization, we will calibrate the updated model from 1890 through 2020. The key calibration metrics for the updated NTWGAM will be similar to the current model and will include water levels (heads), estimates of baseflow to streams, and springflow. The current NTWGAM calibration was also guided by a conceptual flow balance which will be used as a constraint in updating the model. As part of a pre-calibration activities, we will review model bias (misfit) with observed water levels and rates of water level change to focus calibration on improving historical water level misfit in the existing NTWGAM. We will achieve this through the calibration metric weighting discussed below.

We propose to use this approach in parameter estimation as well as in model construction. This extension is facilitated by use of the Python package pyEMU to programmatically undertake parameter estimation, and the iterative ensemble smoother PESTPP-IES, which greatly reduces the computational demand of nonlinear, high-dimensional parameter estimation. PESTPP-IES was developed by INTERA's Dr. Jeremy White and was recently used in the calibration of the GULF 2023 GAM for the northern Gulf Coast Aquifer and has been accepted by the TWDB for use on the Cross-Timbers Aquifer GAM, currently under development by INTERA. During parameter estimation, PESTPP-IES also performs an uncertainty analysis,

effectively combining the calibration and uncertainty analysis workflows. As was done in the 2014 NTWGAM, calibration metrics will be weighted to reproduce the aspects of the historical dataset that are most aligned with the model objectives during the calibration process. Likewise, parameters adjusted during calibration, such as aquifer hydraulic conductivity, will have prior distributions defined to constrain parameter perturbation and prevent non-sensical parameterization while honoring field measurements. We will provide regular monthly updates to GMA 8 and the TWDB on progress during calibration. The updated and recalibrated NTWGAM model files will be provided to GMA 8 and TWDB for review before advancing to Task D – Predictive Simulations.

After the NTWGAM is successfully re-calibrated, we will perform a series of three predictive simulations, as defined by GMA 8. In 2014 and 2015, INTERA performed similar predictive simulations as part of developing the revised 2014 NTWGAM and under a separate contract with GMA 8. The three simulations to be performed as part of Task D are:

- Run 1 - Determine the amount of production that can occur in order to achieve the current GMA 8 DFC
- Run 2 - Determine what the GMA 8 DFCs would be assuming the current MAG values
- Run 3 - Determine the sustainable amount of production from the Trinity and Woodbine Aquifers

Run 1 will use the updated NTWGAM to produce a simulation with the right balance of pumping per aquifer and county to match the current DFC. To perform this simulation, we will keep pumping locations consistent with the current MAG run and optimally adjust pumping to close the misfit on DFCs per county per aquifer. We will use PEST to perform the optimization. Run 2 will use the updated NTWGAM to produce a simulation that predicts pumping (MAG equivalent) using the constraint of the current county/aquifer DFCs which are expressed in terms of drawdown. For this simulation, we will use PEST to optimize pumping on a county/aquifer basis that recreates the average county/aquifer drawdown equal to the current DFC. Again, pumping will be aggregated from model cells where pumping occurs in the current MAG run. This simulation is less unique than Run 1 and we will adopt a normalized methodology to modify county aquifer pumping. Run 3 will require discussion with GMA 8 member GCDs to define sustainable production in the context of GMA 8. The USGS defines sustainable groundwater development as the development and use of groundwater in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences (Alley and others). In 2014, INTERA simulated a run termed the “conservation run” which examined the amount of pumping that could occur per aquifer per county from 2025 to 2070 that would bring water levels back to 2010 levels (140,000 AFY in Trinity and 18,700 AFY Woodbine). After completing the model runs, we will present results to GMA 8 and document the simulations in a technical memorandum with all model files.

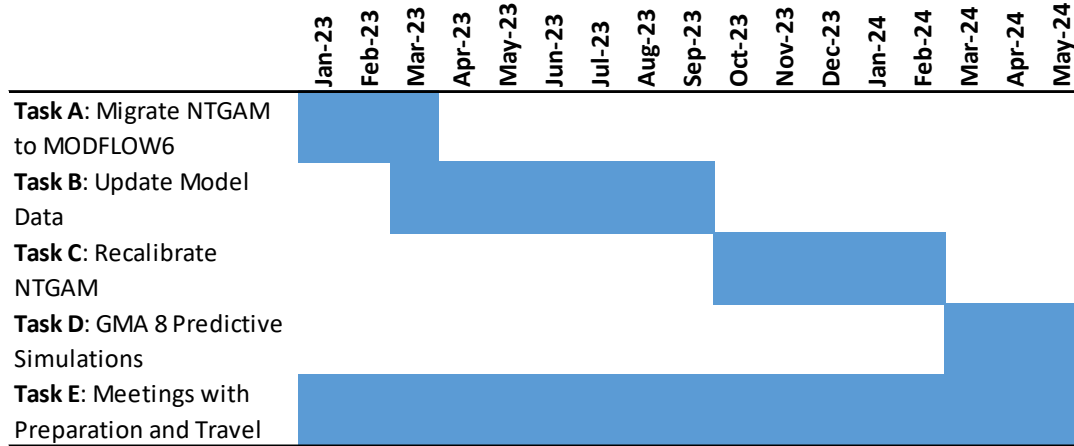
**Cost Estimate**

The table below summarizes each of the tasks described above and details the estimated costs for each task. We propose to complete the work for the GCDs in GMA 8 on a time and materials basis.

<b>Task</b>	<b>Subtask</b>	<b>Estimated Costs by Task</b>
<b>Task A: Migrate NTGAM to</b>	Migrate original packages	\$ 32,440
	Validate conversion by running base calibration and current MAG run	
<b>Task B: Update Model Data</b>	Collect new data from GMA 8 GCDs and discuss model issues	\$ 265,720
	Collect new data from TWDB and discuss model issues	
	Update Structure/Faults/Layering	
	Recharge through SWB Model	
	Pumping	
	Stream Routing	
	ET through SWB Model	
	Update model properties	
	Update head and flow calibration targets (2012-2020)	
	QA	
	Documentation	
<b>Task C: Recalibrate NTGAM</b>	Recalibration	\$ 160,120
	QA	
	Documentation	
<b>Task D: GMA 8 Predictive Simulations</b>	Run 1 - MAG that achieves the DFC	\$ 59,500
	Run 2 - DFC that achieves the MAG	
	Run 3 - Sustainable Production	
	QA	
	Documentation	
<b>Task E: Meetings with Preparation and Travel</b>	GMA 8 + Stakeholders: Kickoff Meeting	\$ 73,320
	GMA 8 + Stakeholders: MODFLOW 6 Migration Results and Data Request	
	TWDB: Model Issues Discussion and Data Request (virtual)	
	GMA 8 + Stakeholders: Model Update Results Meeting	
	GMA 8 + Stakeholders: Recalibration Update Meeting	
	TWDB: Recalibration Update Workshop Meeting (virtual)	
	GMA 8 + Stakeholders: Recalibration Results	
	TWDB: Recalibration Results (virtual)	
	GMA 8: Predictive Simulations Kickoff	
	GMA 8: Predictive Simulations Results	
GMA 8: Project Wrap Up Meeting		
<b>Total for All Tasks</b>		<b>\$ 591,100</b>

**Proposed Schedule**

The table below shows our proposed 17-month schedule for completing each of the tasks described above. This schedule includes eight meetings of the GMA 8 GCDs over the period as well as the three virtual meetings with TWDB. This schedule is designed to provide sufficient time for the GMA 8 GCDs to review the model update and predictive simulations in Task D leading into the 2026 round of joint planning.



If you have any questions, please don't hesitate to reach out to me at [woliver@intera.com](mailto:woliver@intera.com) or 832-535-5763. Thank you again for the opportunity to submit this scope of work and cost estimate. The INTERA Team is excited to work with each of the GMA 8 GCDs on this important project.

Sincerely,



Wade Oliver, P.G.  
 INTERA Inc.

**EXHIBIT B**

**GMA 8 Districts Total Funding of Contract Price**

<b><i>District Funding at an Equal Share</i></b>	<b><i>Share</i></b>	<b><i>%</i></b>
Central Texas Groundwater Conservation District	\$ 66,387.50	11.23%
Clearwater Underground Water Conservation District	\$ 66,387.50	11.23%
Middle Trinity Groundwater Conservation District	\$ 66,387.50	11.23%
North Texas Groundwater Conservation District	\$ 66,387.50	11.23%
Northern Trinity Groundwater Conservation District	\$ 66,387.50	11.23%
Prairielands Groundwater Conservation District	\$ 66,387.50	11.23%
Red River Groundwater Conservation District	\$ 66,387.50	11.23%
Upper Trinity Groundwater Conservation District	\$ 66,387.50	11.23%
<b><i>Total for Equal Share</i></b>	<b><i>\$ 531,100.00</i></b>	<b><i>89.85%</i></b>
<b><i>District Funding at a Committed Amount</i></b>	<b><i>Share</i></b>	<b><i>%</i></b>
Post Oak Savannah Groundwater Conservation District	\$ 40,000.00	6.77%
Saratoga Underground Water Conservation District	\$ -	0.00%
Southern Trinity Groundwater Conservation District	\$ 20,000.00	3.38%
<b><i>Total for Committed Amount</i></b>	<b><i>\$ 60,000.00</i></b>	<b><i>10.15%</i></b>
<b><i>Project Total</i></b>	<b><i>\$ 591,100.00</i></b>	<b><i>100.00%</i></b>



ATTACHMENT 12 a

**RED RIVER GROUNDWATER CONSERVATION DISTRICT**  
**Well Registration Summary**  
 (as of 1/31/2023)

Well Type	Fannin	Grayson	Total RRGCD	New Registrations January 2023
Domestic	240	407	647	0
Public Water	59	192	251	0
Livestock	17	31	48	0
Agriculture	21	29	50	1
Commercial	10	18	28	0
Surface Impoundments	16	15	31	0
Oil / Gas	0	19	19	0
Golf Course	0	14	14	0
Irrigation	1	11	12	0
Monitoring	2	8	10	0
Industrial	0	4	4	0
*Other	1	0	1	0
<b>TOTALS</b>	<b>367</b>	<b>748</b>	<b>1115</b>	<b>1</b>

**NOTE: Plugged wells have been excluded**  
**\*Construction Water**



**RED RIVER GROUNDWATER CONSERVATION DISTRICT**  
**Well Registration Summary**  
 (as of 2/28/2023)

Well Type	Fannin	Grayson	Total RRGCD	New Registrations February 2023
Domestic	241	413	654	7
Public Water	59	192	251	0
Livestock	17	31	48	0
Agriculture	21	29	50	0
Commercial	10	18	28	0
Surface Impoundments	16	16	32	1
Oil / Gas	0	19	19	0
Golf Course	0	14	14	0
Irrigation	1	11	12	0
Monitoring	2	8	10	0
Industrial	0	4	4	0
*Other	1	0	1	0
<b>TOTALS</b>	<b>368</b>	<b>755</b>	<b>1123</b>	<b>8</b>

**NOTE: Plugged wells have been excluded**  
**\*Construction Water**

**RED RIVER GROUNDWATER CONSERVATION DISTRICT**  
**Well Registration Summary**  
 (as of 3/31/2023)

Well Type	Fannin	Grayson	Total RRGCD	New Registrations March 2023
Domestic	241	420	661	7
Public Water	59	195	254	3
Livestock	17	32	49	1
Agriculture	21	29	50	0
Commercial	10	19	29	1
Surface Impoundments	16	16	32	0
Oil / Gas	0	19	19	0
Golf Course	0	14	14	0
Irrigation	1	11	12	0
Monitoring	2	8	10	0
Industrial	0	4	4	0
*Other	1	0	1	0
<b>TOTALS</b>	<b>368</b>	<b>767</b>	<b>1135</b>	<b>12</b>

**NOTE: Plugged wells have been excluded**  
**\*Construction Water**

ADJOURN