

WORK AUTHORIZATION NO. 3

**PROJECT: Groundwater Services Relating to the Trinity Aquifer Within Williamson
County East of I-35**

This Work Authorization is made pursuant to the terms and conditions of the Williamson County Contract for Engineering Services, being dated **December 20, 2023** and entered into by and between Williamson County, Texas, a political subdivision of the State of Texas, (the "County") and **LRE Water, LLC** (the "Engineer").

Part 1. The Engineer will provide the following Engineering Services set forth in Attachment "B" of this Work Authorization.

Part 2. The maximum amount payable for services under this Work Authorization without modification is **\$250,449.00.**

Part 3. Payment to the Engineer for the services established under this Work Authorization shall be made in accordance with the Contract.

Part 4. This Work Authorization shall become effective on the date of final acceptance and full execution of the parties hereto and shall terminate on **December 31, 2024.** The Engineering Services set forth in Attachment "B" of this Work Authorization shall be fully completed on or before said date unless extended by a Supplemental Work Authorization.

Part 5. This Work Authorization does not waive the parties' responsibilities and obligations provided under the Contract.

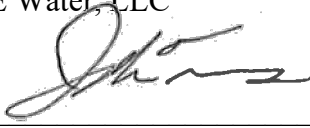
Part 6. County believes it has sufficient funds currently available and authorized for expenditure to finance the costs of this Work Authorization. Engineer understands and agrees that County's payment of amounts under this Work Authorization is contingent on the County receiving appropriations or other expenditure authority sufficient to allow the County, in the exercise of reasonable administrative discretion, to continue to make payments under this Contract. It is further understood and agreed by Engineer that County shall have the right to terminate this Contract at the end of any County fiscal year if the governing body of County does not appropriate sufficient funds as determined by County's budget for the fiscal year in question. County may effect such termination by giving written notice of termination to Engineer.

Part 7. This Work Authorization is hereby accepted and acknowledged below.

EXECUTED this _____

FIRM:

LRE Water, LLC

By:  _____
Signature

Jordan Furnans

Printed Name

Vice President - TX Operations

Title

COUNTY:

Williamson County, Texas

By: _____
Signature

Bill Gravell, Jr.

Printed Name

County Judge

Title

LIST OF ATTACHMENTS

Attachment A - Services to be Provided by County

Attachment B - Services to be Provided by Firm

Attachment C - Work Schedule

Attachment D - Fee Schedule

ATTACHMENT A
WORK AUTHORIZATION No. 3
PROJECT: 23RFSQ79

Services to be Provided by County:

None

ATTACHMENT B
WORK AUTHORIZATION No. 3
PROJECT: 23RFSQ79

Services to be Provided by Firm:

LRE Water, LLC (“The Firm”) will provide the following Professional Services, consisting of tasks that will collectively build and deploy an interactive mapping, data visualization and analytical tools dashboard based on industry standard cloud hosted database technology and web programming. Deliverables will be tailored to meet stated needs of Williamson County officials, as to be determined during workshops performed under Task 3A and Task 3B of this effort. Work under Tasks 3C-3K will commence immediately, with the initial assumption that the final deliverables for the project will include an online dashboard system with many of the same features as that maintained by the Clearwater UWCD for Bell County. Final deliverable determination will be made through discussions with stakeholder groups based on the results of Tasks 3A and 3B. Revision to this work authorization may be needed, including potential budget revisions. Completion of this task by the December 31, 2024 deadline requires immediate commencement of all project tasks.

The system developed under this Work Authorization will be tailored to leverage the previous Work Authorization deliverables to add value to those tasks and further aid the County in effectively planning water supplies for proposed and future developments. Individual subtasks include:

TASK 3A – DASHBOARD TOOLS and TASK 3B – PLATFORM & TECHNOLOGY WORKSHOPS

We recommend that Tasks 3A and 3B take place on the same day. These are each ½ day, in-person workshops (with video attendance available for those who cannot make it) to be held at a location selected by Williamson County. The workshops are intended to engage key staff who will be end users of this system or be involved in maintaining the system long term. During the workshops we will review the initial project requirements and make changes or additions to features. We will also prioritize the various functions and tools so that the development process cannot only align with the other work being done but that early deliverables can be deployed that will be immediately useful to County staff.

The workshops will also consider what content and utilities should be public facing vs secured behind a login, and what audiences are being addressed with each feature. And finally, there will be a discussion of how best this system can be hosted and maintained long term for and/or by Williamson County.

TASK 3C – COUNTY DATA INTEGRATION

LRE will work with Williamson County to identify all County owned data sets to be included in the system. For each data set it will also be determined whether the data can be integrated into the system as a web service, must be acquired periodically with a manual process and kept up to date long term, or if the data set is a one-time acquisition. LRE will then acquire and assemble the data, process it as needed to then import it into the system database/geodatabase. Where the data can be obtained

through an API (web service) LRE will program these connections, so data is automatically kept up to date.

The data collection process and processing methodology will be carefully documented, and this documentation will be provided to Williamson County. For each data set that must be manually re-submitted to the system to keep it up to date, LRE also will develop an instruction guide for this activity.

TASK 3D – GEODATABASE INTEGRATION

LRE will work internally to ensure that data sets produced in the previous Work Authorizations are successfully integrated into this system as well. To support future updates to the geodatabase deliverables, the data integration process will be carefully documented and this documentation will be provided to Williamson County along with an instruction guide for accomplishing updates in the future.

TASK 3E – PUBLIC DATA INTEGRATION

LRE will also collaborate with Williamson County to identify all publicly available data sets (e.g. TWDB, USGS, NOAA) to be included in the system. For each data set it will also be determined whether the data can be integrated into the system as a web service, must be acquired periodically with a manual process and kept up to date long term, or if the data set is a one-time acquisition. LRE will then acquire and assemble the data, process it as needed to then import it into the system database/geodatabase. Where the data can be obtained through an API (web service) LRE will program these connections, so data is automatically kept up to date.

The data collection process and processing methodology will be carefully documented, and this documentation will be provided to Williamson County. For each data set that must be manually re-submitted to the system to keep it up to date, LRE also will develop an instruction guide for this activity.

TASK 3F – INTERACTIVE MAP DEVELOPMENT

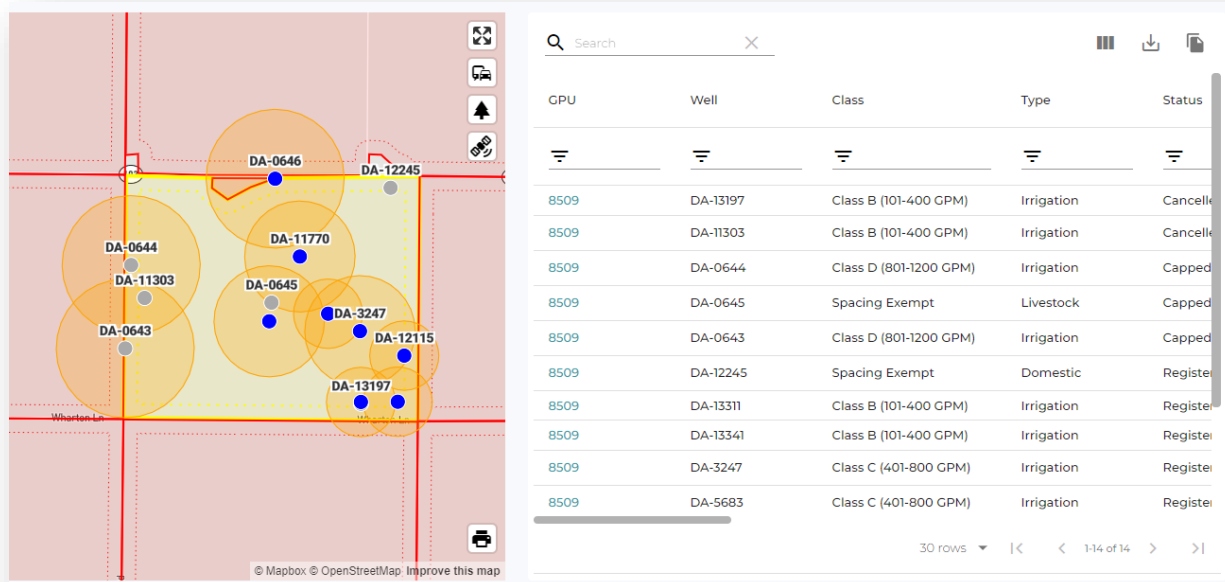
An interactive map for querying and exploring well locations, attributes and other GIS layers will be included as the primary interface to this system. This map will be deployed in three phases, to provide opportunities for early and frequent review and feedback from Williamson County staff.

The first iteration of the map will include publicly available well information and map layers, identified in Task 3E, as these data will be most easily acquired and adaptable to this system. Review of this iteration of the map will be used to refine the following functions:

- Available “quick filters” (check-box driven filters to quickly filter wells by specific attributes)
- Styling and labeling for all layers incorporated at this point
- Ordering and grouping of layers in the legends
- Fields available for map-based querying of wells

The second iteration will include Williamson County data identified in Task 3C. Along with review of the above items, this iteration will also include refinement of a **Custom Spatial Query and Reporting Tool** for searching by user-drawn polygon or specified radius from a point. This tool will provide a report that includes intersected information from other map layers. **The details of this tool and format of the**

reports returned will be designed and deployed at this time. An example of a Spatial Query and Reporting Tool developed for another system is included below.



The third map iteration will add spatial layers included in the geodatabase incorporated in Task 3D. This phase of the map will include a final pass through the four items bulleted above, and data from these layers will also be incorporated into the spatial query tools as is appropriate and defined through collaboration with Williamson County.

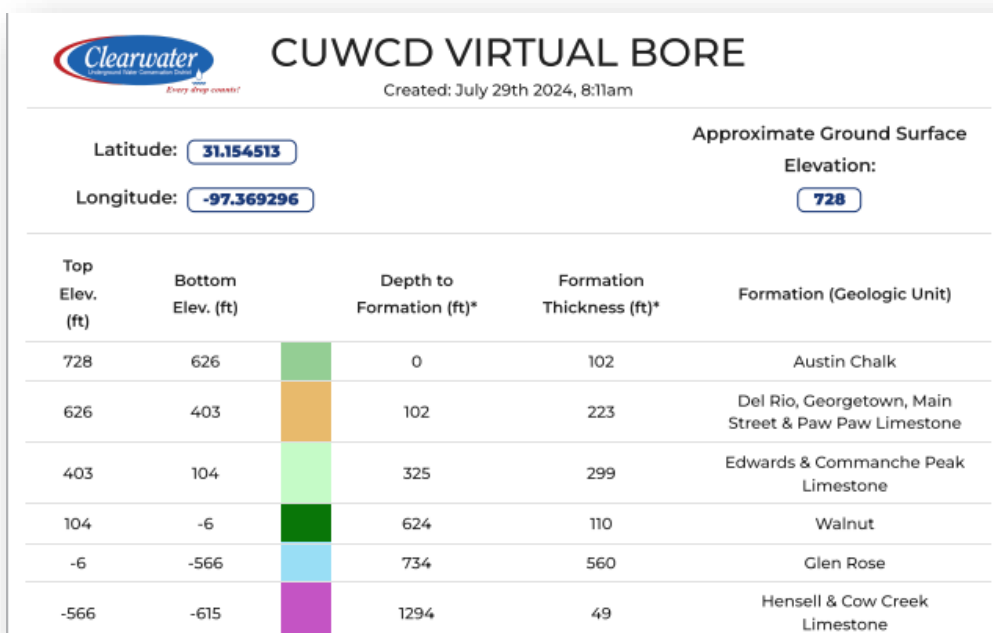
TASK 3G – ANALYTICAL TOOLS DEVELOPMENT

As part of the Task 3A Workshop, analytical tools will be identified for inclusion in this system. The list below includes analytical tools that LRE has developed previously and we believe will be useful to adapt for this system. Additional tools identified during Task 3A will be included as well.

Groundwater Availability Certification Requests Tool – This tool will allow users to complete the groundwater availability certification and plat attesting requirements set in 30 TAC 230.4 and/or 30 TAC 230.1(c)(2). The tool will automatically populate forms provided by the Texas Commission on Environmental Quality using data created/managed for this project. It will also provide supporting data, including modeled drawdown and water quality analyses to assess compliance with State of Texas requirements. Tool users would present the data for review/revision by a licensed engineer or geologist (per state requirements), and once approved the complete forms could be uploaded to the tool for dissemination to county officials for review. The review process could then be streamlined as officials would have the certainty that the results produced are consistent with data already in county databases. Any inconsistencies could be noted on the tool output, thus further directing county officials regarding the level of review scrutiny needed.

Well Impact Analysis Tool – This tool will be a planning tool to allow well owners and county officials to estimate the impacts of proposed new pumpage on existing wells and land owners. The tool would compute modeled expected drawdown to result for planned pumping, and will use provided or estimated pump-curve and water level data to assess: 1) the financial cost of the pumpage on other well owners (who will utilize more electricity/power to pump equal volumes of water once water levels decrease), and 2) if planned pumpage is likely to lower water levels such that existing pumps need to be set deeper in wells or need to be upgraded to continue adequate production. Reports generated by this tool could inform well owners and county officials on the impacts of pumping and authorization of new groundwater wells. The results could also be used in potential mitigation discussions between well owners.

Virtual Bore Tool – This tool integrates known and modeled 3D geologic formation data to provide a report for any point within the study area that visually estimates depths to each formation top and bottom. Points that are coincident with wells that have this information in the database will be actual bore log reports, and points associated with wells lacking this information, or points where no well exists are “virtual bore logs” based on 3D modeled information. An example of a Virtual Bore report developed for a similar system is included below.



New Well Impacts (Drawdown) Tool – This tool can leverage the state-wide GAM model that will return Transmissivity and Storativity for any location and provide an estimate of aquifer draw-down impacts on nearby wells from a point where a new well is being considered. For aquifers not included in the GAM model, custom T and S factors can be provided by the user. The user also specifies the impact distance of interest, and operational parameters of the well including annual production and pumping capacity. An example of a Drawdown Tool report developed for a similar system is included below.

The following table presents the calculated drawdown at the proposed well and at other nearby wells completed in the same aquifer. For 1-Day Drawdown, we applied the proposed instantaneous pumping rate for a period of 24 hours. For 30-Day Drawdown, we assumed peak pumping during the summer of about 15 percent more than the average monthly amount (that is, the proposed annual production rate divided by 12 then multiplied by 1.15). For 1-Year Drawdown, we used the proposed annual production amount.

Well Name	Distance from Proposed Well (feet)	1-Day Drawdown (feet)	30-Day Drawdown (feet)	1-Year Drawdown (feet)
Example Well 1	---	88.5	4.8	4.7
N3-23-013G	3	78.3	4.4	4.3
E-03-063G	2143	6.3	1.1	1.5
E-19-141GU	2719	4.3	0	1.4
E-02-2769G	2920	3.8	0	1.3
E-20-096P	3033	3.5	0	1.3
E-02-1165P	3319	2.9	0	1.3
E-02-3542G	3438	2.7	0	1.3
E-22-036P	3859	2	0	1.2
E-19-092GU	4054	1.8	0	1.2
E-06-030P	4476	1.3	0	1.1

TASK 3H – DOCUMENTATION

User Documentation - The system will include User Guides in a help section accessible through the system interface. These guides will be a combination of PDF files and videos, depending on which format is more helpful for describing the various functions and tools.

Technical Documentation - Documentation will also be provided to thoroughly describe the technical aspects of the system, how to access the database and data collection and automation scripts for modifications and updates, and how to maintain connected data sources and update manually loaded data sources. This technical documentation will also include schematic illustration of the database design, and a “Universe Diagram” that illustrates how the system operates, and how data sources are connected, at a high level.

TASK 3I – USER TRAINING

The system itself will be designed to be intuitive to use with the intent for user help and guides to not be necessary for basic use of the system. However we do anticipate that some of the custom map tools and the analytical tools in particular will benefit from documented user guidance. On-screen help (tool-tips) will be included where possible to help users navigate, and also to provide links to helpful resources or definitions (for instance, the original source of a public map layer will appear in a tooltip for the map layer when hovering over it in the map legend). The system will also include a help section where the User Documentation developed in Task 3H can all be accessed.

A 2-hour training workshop, held virtually so it can be recorded and so all attendees can be actively following along on their computers, will be provided to not only introduce Williamson County users to the system but to provide examples of how the system can be used with real-world applications.

TASK 3J – SYSTEM TRANSFER

During the Task 3B Workshop a plan will be developed for long term support and maintenance of this system. We anticipate it will include a combination of continues LRE Water support and training for Williamson County IT staff maintenance. During this task, the necessary training and documentation required to execute this transfer will be developed and delivered. We anticipate the ideal way to accomplish the delivery of this transfer will include a full day in-person workshop at Williamson County, with the morning focused on working through the technical documentation and the afternoon focused on hands-on training and testing. Because this system will be hosted in a cloud environment, there will not be actual migration of code or data. The transfer workshop will be focused on getting County staff comfortable with accessing all aspects of the system’s “under the hood” components, and familiar with how to troubleshoot, monitor, and update the system’s back end and data collection/updating tasks.

TASK 3K – ONGOING SUPPORT

LRE Water will continue to support this system long term and we can discuss several different ongoing support contract options, if and to the degree that Williamson County desires.

Because LRE Water maintains several dozen similar systems, we employ full time staff that are dedicated to maintaining the knowledge and expertise required for not just support but also back-end maintenance, and data collection updates and troubleshooting. At a minimum we can periodically monitor they system, keep it up to date with critical software patches and in compliance with new browser releases. There may be certain aspects of the system that are more effectively managed and maintained by County staff, and other aspects that are better suited to remain under LRE Water’s watchful eye and we can be flexible in establishing an arrangement that works best for Williamson County. As part of the 3J System Transfer Workshop, the details of this long term support and maintenance balance will be defined.

Work Authorization 3 Deliverables:

- Interactive Web-Based Mapping, Data Visualization and Analytical Tools Dashboard
- Data Acquisition and Processing Documentation
- Instructions for Updating Specific Data Sets
- Technical System Documentation and Universe Diagram
- User Guides / How-To Documentation

ATTACHMENT C

WORK AUTHORIZATION No. 3

PROJECT: 23RFSQ79

Work Schedule

Tasks performed under Work Authorization 3 will commence immediately upon receipt of notice to proceed. All task efforts shall be completed no later than December 31, 2024, with the exception of ongoing support. The system transfer workshop may be pushed later than this date as well, at Williamson County's direction.

ATTACHMENT D
WORK AUTHORIZATION No. 3
PROJECT: 23RFSQ79

Fee Schedule

The project budget for Work Authorization No 3. is \$250,449.

Expenses will be based on hours worked by project staff, per the hourly rates listed below.

Note: LRE Water Staff listed below are those most likely to work on the Williamson County Groundwater Services Project. We will utilize other staff (as needed), possibly including staff not hired as of 7/26/2024, and will provide such staff names, classifications, and hourly rates as needed.

<u>Primary LRE Water Staff – TX Operations</u>		
<u>Name</u>	<u>Classification</u>	<u>Rate (\$/hr)</u>
Furnans, Jordan	Project Manager	\$225
Clause, Vince	Senior Project Geologist	\$200
Budd, Theresa	Staff Geologist III	\$185
Darling, Wallace	Staff Geologist I	\$143
Schellhorn, Alex	Project Geologist	\$176
Standen, Allan	Senior Project Geologist	\$220
Swientek, Lauren	Staff Geologist I	\$143
Wade, Kacey	Staff Geologist I	\$137
Wong, Stephanie	Staff Geologist II	\$153
<u>Project Support Staff – TX Operations</u>		
<u>Name</u>	<u>Classification</u>	<u>Rate (\$/hr)</u>
Gilliom, Ryan	Project Geologist	\$169
D' Ambra, Lauren	Staff Geologist I	\$135
Fullmer, Tucker	Technology Specialist II	\$141
Salazar, Tim	Data Scientist II	\$169
Barry, Michael	Project Developer	\$183
Anderson, Hanna	Project Engineer	\$185
Weil, Page	Project Manager	\$220
Bauer, Jacob	Project Geologist	\$220
Barber, Joel	Project Engineer	\$215
Stokes, Scott	Staff Geologist II	\$142

Subcontractor Staff – Staff Rates

<u>Name</u>	<u>Firm/Affiliation</u>	<u>Classification</u>	<u>Rate (\$/hr)</u>
Keester, Mike	KT Groundwater	Senior Geologist	\$250
Webster, Paul	KT Groundwater	Geologist	\$150
Joe Yelderman	Baylor University	Technical Advisor	\$250
Hunt, Brian	UT BEG	Technical Advisor	\$250
Scanlon, Bridget	UT BEG	Technical Advisor	\$250
Nicot, Jean-Phillippe	UT BEG	Technical Advisor	\$250
Flaig, Peter	UT BEG	Technical Advisor	\$250