June 16, 2025

Aleta Allen
Madera County GSAs
200 West Fourth Street
Madera, CA 93637
Email: Aleta.Allen@maderacounty.com

Dear Ms. Allen,

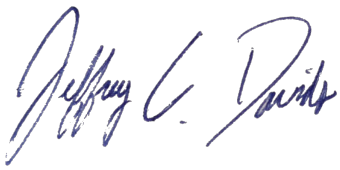
On behalf of Davids Engineering, Inc. (DE) and H2oTech, LLC (collectively the DE-H2oTech Team), thank you for the opportunity to respond to the RFP questions listed below. We have retained the original questions and numbering below as **bold underlined text** and included our enumerated responses directly after each question.

As previously highlighted, the DE-H2oTech Team brings over 30 years of experience in agricultural water management, water accounting, remote sensing, flow measurement, data management, and groundwater sustainability plan development and implementation across California. We are committed to our coequal goals of technical excellence and client success. Together, the DE-H2oTech Team has successfully implemented water accounting and allocation management systems for over 800,000 acres in California.

We continue to believe that the combined technical capabilities and regional experience of the DE-H2oTech Team uniquely positions us to deliver a high-performing, cost-effective solution aligned with Madera County GSAs' goals.

We look forward to the opportunity to respond to any remaining questions and work collaboratively with the Madera County GSAs in support of a sustainable groundwater management future.

Best Regards,



Jeffrey (Jeff) C. Davids, Ph.D., P.E.
Proposed Project Manager
Vice President and CTO, Davids Engineering, Inc. and President, H2oTech, LLC

Questions for RFP Responders

Instructions: Please review the questions below and provide responses. If you think the question does not apply, please type N/A.

1. **QA/QC - What processes are in play for quality assurance and quality control for data?**

    a. DE's QA/QC process has been custom-tailored to meet the needs of the different water accounting data sources (i.e., remote sensing and flowmeter datasets) involved in our various water accounting efforts. Importantly, high quality data starts with collecting the right data (i.e., primary observations) and meta data (i.e., the data about the data) in transparent and reproduceable ways. Additionally, observational data needs to be properly tied to an unchanging and unique identifier representing the subject of the observation. For example, a flowmeter needs to have a unique and unchanging identifier that each observation of time and total volume is associated with.
        i. Flowmeter data
            1. In the case of flowmeter data, the primary data are the totalizing flowmeter readings. However, essential meta data includes:
                a. GPS coordinates to ensure that the photo was taken at the flowmeter.
                b. Photographic evidence, including the unique unchanging identifier.
                c. Observational time from both photographs but also from the operating system being used for data collection.
            2. DE developed a custom data portal currently used by the Madera GSAs to facilitate efficient and robust review and quality control of all grower-submitted flowmeter observations (and other periodic observations such as fallow-field assessments, etc.).
            3. All grower-supplied flowmeter submissions are manually reviewed against the relevant meta data and corrected as necessary to ensure a high-quality dataset that can be used for critical water accounting purposes.
            4. All edits made to any grower-supplied submissions are tracked, including who made the edit and when.
            5. The quality control status of the submission and associated data is tracked with a quality control flag. Additionally, all edits can be reverted as necessary.

6. Flowmeter data are automatically processed to identify outliers and negative totalizing values, indicating incorrect data entry and/or flowmeter rollover.
7. Only data marked as good is used in subsequent processing and computations, ensuring that only high quality data is used in grower water allocation reports.
8. Remotely sensed applied groundwater (AGW) estimates are used to verify the magnitudes of flowmeter-based AGW measurements to ensure flowmeter data completeness and accuracy.

ii. Remote sensing data
1. We employed Python-based automated data processing to identify outliers and erroneous values in all raster data.
2. Additionally, data visualizations, mapping, and tabular summaries are developed to review all remote sensing data components (e.g., ET, ETAW, ETPR).
3. These quality control products are manually reviewed by knowledgeable exports to ensure that values fall within expected ranges at the various spatial scales, from field, to farm unit, to GSA.
4. Raster projects of ET and precipitation are compared against other similar data products for both automated and manual outlier detection.
5. Remotely sensed ETAW is compared to applied groundwater (AGW) data, if available, to verify the remotely sensed datasets.

iii. Assessor's Office parcel data
1. Both geospatial data delineating parcel locations and associated parcel attributes such as the unique and unchanging identifier (Assessor Parcel Number or APN) and assessed acreage are essential for processing remote sensing data for water accounting purposes.
2. We review the quality of the geometric and assessed acreage data by comparing the geometric area against the assessed area. Ideally, the two should match within a reasonable tolerance. When the acreages do not match, we coordinate with the Assessor's Office to understand what might be causing the discrepancy.
3. Each year, parcel data is updated, and both new and missing parcels are flagged for manual review.

iv. GSA boundary data
1. Official GSA geospatial boundary data are obtained from the Department of Water Resources (DWR) and used to create the

official annual farm unit zones and all associated parcels within the relevant boundaries.

2. GSA boundaries are automatically clipped to the official parcel boundaries within a certain tolerance. Parcels are not simply clipped by the GSA boundaries because this often causes parcel boundaries to be artificially clipped due to geometric boundary uncertainties and errors in the GSA boundary data.

v. Field and cropping data

1. Field boundaries, and subsequent cropping patterns, are provided to DE by a third party vendor and can change on an annual basis.
2. All fields are spatially joined to parcels and the associated accounts/growers. During this annual update, we review the parcel-field boundaries and corresponding ownership to ensure all groundwater consumptive use on a field is attributed to the right owner, which is essential for remote sensing users.
3. A fallow field verification is also performed at least once per year. This first involves a desktop analysis of vegetation presence throughout the County GSAs. Following this initial screening, high priority fields are marked for an infield verification where Madera GSAs staff physically observe the crop type (if present), irrigation method, and other relevant features. This process helps verify if a field is fallow or cropped, allowing us to update and refine our dataset throughout the year.
4. All verified fallow fields will have any corresponding ETAW automatically set to zero.

2. <u>Data Security -How do you make sure that your data is securely shared and stored?</u>

a. The DE-H2oTech team uses industry standard protocols for securely storing, processing, and communicating data both onsite, in the cloud, and via our custom developed web applications.

b. <u>Data onsite (local to DE-H2oTech hardware)</u>

i. Data are stored behind a fire wall so that only users attached to the local area network (LAN) are able to access information.
ii. Remote users connected to the LAN via an industry standard Virtual Private Network (VPN).
iii. Domain-based active directory authentication is employed.
iv. Users are authenticated with multi-factor authentication (MFA).
v. Data are backed up on a daily or real-time basis as changes are made depending on storage location.

vi. Systems are monitored in real time with a Remote Monitoring and Management (RMM) system to proactively identify and resolve issues before they impact users.
vii. Users are trained regarding phishing and other data breach tactics.
viii. Strong password practices are enforced.
ix. Hard drives are encrypted with BitLocker.

c. Data on the cloud (Digital Ocean)
   i. The DE-H2oTech team uses Digital Ocean for cloud computing resources.
   ii. Digital Ocean employs the following security measures:
      1. Infrastructure security with biometric or proximity cards, PINs, 24/7 surveillance, and logs.
      2. Networking and Connect segmentation, virtual LANs, and port disabling.
      3. Encryption and data protection with industry standard algorithms.
      4. Access control and account security is ensured via strong authentication features including SSH and enforced MFA.
      5. API tokens support custom scopes to limit privileges at granular levels.
      6. Monitoring, compliance, and audits are implemented to ensure system performance.

d. Custom web applications (on Digital Ocean)
   i. Django framework, and associated cutting edge security measures, are employed for all web application development.
   ii. HTTPS encryption with TLS 1.2 or higher is employed on all inbound and outbound traffic.
   iii. Industry standard user authentication protocols are employed.
   iv. Django framework parameterized queries to project against SQL injections are employed.
   v. Django secure password storage is utilized.
   vi. Django authentication framework for user and group permission management.
   vii. Secure session management is enacted.
   viii. Secure cookies are employed.

3. Mobile Apps - Does your product have a mobile applications or interface?

a. The FLOW water accounting web application is natively designed for both desktop and mobile devices.
b. The DE-H2oTech team has developed a native Android mobile application for flowmeter data collection that the Madera GSAs' growers currently use.

Additionally, the same application is available on any device with a web browser.

4. **Use by Other GSAs - Please list any other Groundwater Sustainability Agencies (GSAs) using your products.**

    a. GSAs
        i. Madera County GSAs
        ii. Western Canal Water District
        iii. Richvale Irrigation District
        iv. Biggs-West Gridley Water District
        v. Reclamation District 1004
    b. Water districts that are part of GSAs via a Joint Powers Authority or other agreement
        i. Reclamation District 108
        ii. Glenn-Colusa Irrigation District
        iii. Princeton-Codora-Glenn Irrigation District
        iv. Provident Irrigation District
        v. Dunnigan Water District
        vi. Orland-Artois Water District
        vii. Colusa County Water District
        viii. South Sutter Water District
        ix. Sutter Mutual Water District

5. **NOAA - Are any of your satellites/data collection capabilities affected by the loss of weather prediction in NOAA data?**

    a. Not applicable. DE's proposal is solely focused on the request for a grower portal.

6. **Crops - Is there a list of crops covered by either the ET data collection or platform service? If so, can the public see it?**

    a. Yes, the FLOW water accounting system is developed to support any combination of irrigated and non-irrigated land uses.
    b. The list of irrigated and non-irrigated land uses is customizable by GSA and accessible to growers.

7. **Grower Accessible Platform:**
    - **Does the platform have the ability to aggregate ET data over unique geospatial polygons provided by the GSA (fields)?**

- Yes, we aggregate data to any scale relevant to the County GSAs, from the field, to farm unit zone, to GSA or subbasin scale.

- **Does the platform have the ability for growers and /or the GSA to combine field polygons into larger management groups (farm units)?**

  - Yes, the platform automatically populates with the predetermined farm units as defined by the County GSAs.
  - The County GSAs will have the ability to change these grower-field/parcel associations on the desired timestep using a visual map-based interface.
  - The system will dynamically partition these associations into the relevant farm units based on the spatial delineations of farm unit zones.

- **Does the platform have the ability to display and compare groundwater allocation amounts to current groundwater use (budgets) by farm unit or grower account?**

  - Yes, the portal displays allocation amounts (allocation from the current year plus any carryover) vs. ETAW volumes. These data are displayed via cumulative time series plots (show ETAW volumes vs. total allocation) or in table format with the same information.
  - These data can be displayed at any relevant scale (i.e., field, parcel, farm unit, and/or grower scales) based on user permissions (e.g., the County sees all farm unit zones while a grower only has access to their fields/parcels.

- **Does the platform have the ability to incorporate allocation adjustments provided by the GSA (recharge credits, surface water credits, carryover)?**

  - Yes, the portal has the ability to show processed credits, carryover, and any other relevant information that would adjust the growers allocation.

- **Does the platform have the hold grower-uploaded, geotagged photos?**

  - The DE Data Portal stores grower-uploaded, geotagged photos for subsequent quality control review of flowmeter observations as described above. These grower-uploaded photos can be linked to the FLOW water accounting platform if desired.
  - Data submitted via the DE Data Portal will be programmatically transferred to the FLOW water accounting platform, and growers and Madera County GSAs team members will be able to view reports summarizing applied groundwater (AGW) data, including tabular and

graphical summaries. Flowmeter data will be viewable on a flowmeter by flowmeter basis.

- Additionally, if additional purposes beyond flowmeter readings for grower-uploaded photos are identified (e.g., fallow field verification), the existing functionality can be easily extended to these use cases.

- **Explain why your platform is the best.**

  - There are three primary reasons why we believe our platform and associated professional services are what is best for the Madera County GSAs and associated growers:
    - Experience
      - The DE-H2oTech Team has over 30 years of experience in water accounting and agricultural water management.
      - We are experts in water accounting and data management/visualization.
      - We have nearly 15 years of experience managing water accounts for irrigation/water districts and, more recently, GSAs.
      - Collectively, our water accounting efforts include nearly 1,000,000 acres of land with approximately 10,000 measurement points.
    - Insights
      - The DE-H2oTech Team has deep knowledge of Madera GSAs' groundwater sustainability planning.
      - DE developed the initial and revised GSPs for both the Madera and Chowchilla subbasins.
      - DE has been deeply involved in GSP implementation, including the design and construction of a number of projects originally envisioned in the GSPs.
      - We have extensive understanding of resolutions that specify the unique allocation rules for the Madera County GSAs and the resulting data models required to support the implementation of these rules.
      - We have developed trust with growers and measurement providers through collaboration, technical excellence, and transparency.
      - The FLOW accounting platform has been developed with the Madera County GSAs' allocation program at the forefront of our minds.
      - We deeply understand how farm unit transitions occur, how recharge/surface water credits are processed, how GSA staff like to interface with available data and grower

information, how growers prefer to see their allocation and ETAW data, and more.
        - While the portal is flexible and has the ability to be modified over time, many components and existing functionalities have been tailored to what has worked best already within the County GSAs.
    - Independence
        - The DE-H2oTech Team is independent of any single measurement data source.
        - We are able to integrate measurement data from any provider selected.

8. **ET Data: Not applicable. DE's proposal is solely focused on the request for a grower portal.**

a. Does your service calculate for ET? ETAW? If so, how does the calculation work (and why do you think it's the best). If not, where does the data come from?
b. Can your firm's ET data be integrated into a groundwater accounting platform?
c. Does your firm have the capability of providing ET data through an automated method (such as an API) to an accounting platform and at what frequency and with what delay factor?
d. What is the expected accuracy of your calculation of ETAW, including its margin of error? Explain how the accuracy figure is calculated. Feel free to discuss "absolute accuracy" and accuracy relative to others. Quantify the improved accuracy.
e. What details can be shared on how the data is validated?