

COB - BOSAIR FORM

03/20/2026 10:08 AM (MST)

Submitted by Nancy Cole@pima.gov



BOARD OF SUPERVISORS AGENDA ITEM REPORT (BOSAIR)

All fields are required. Enter N/A if not applicable. For number fields, enter 0 if not applicable.

Record Number: PO FC PO2600002189

Award Type: Contract

Is a Board Meeting Date Requested? Yes

Requested Board Meeting Date: 04/07/2026

Signature Only:

NO

Procurement Director Award / Delegated Award: • N/A

Supplier / Customer / Grantor / Subrecipient: Hydrologic Research Center

Project Title / Description: Flash Flood Warning Capacity Enhancement

Purpose: Enhance the Regional Flood Control District's (District) Flood Warning System by developing several hydrometeorological products that enhance the capacity of the District to assess flash flood risks across Pima County in real-time.

Procurement Method: Direct Select for Professional Services: Direct Select per Board of Supervisors Policy D29.6, III-C.

Procurement Method Additional Info: n/a

Program Goals/Predicted Outcomes: The main purpose of this project is to develop a forecasting tool to provide increased flood-hazard awareness across Pima County and particularly in areas where direct rainfall or streamflow measuring sensors are sparse or absent.

This tool will provide flash flood guidance based on a combination of gage, radar and satellite estimated rainfall and will assist District staff to provide timely warning of flood hazards to residents of Pima County.

Public Benefit and Impact: This project will increase District's ability to identify and issue warnings of flood risks in a timely manner and will benefit public safety.

Budget Pillar • Conservation, sustainability & climate resiliency

Support of Prosperity Initiative: • C-S 2. Address Climate Resilience and Environmental Justice

TO: COB, 3/25/26 (1)

VERSION: 0

PAGES: 17

Provide information that explains how this activity supports the selected Prosperity Initiatives

This project will increase District's ability in early detection of flash flood hazards across Pima County including in flood prone watersheds where measuring sensors are sparse or absent.

Metrics Available to Measure Performance:

Deliverables as described in scope of work, including a Flash Flood Guidance model that provides warning for imminent and pending flash flood risks in target watersheds in Pima County.

Retroactive:

NO

Contract / Award Information

Record Number: PO FC PO2600002189

Document Type: PO
Department Code: FC
Contract Number: PO2600002189
Commencement Date: 04/07/2026
Termination Date: 04/06/2028

Total Expense Amount:

\$235,078.00

Total Revenue Amount:

\$0.00

Funding Source Name(s) Required: 20010FD Special Revenue

Funding from General Fund?

NO

Contract is fully or partially funded with Federal Funds?

NO

Were insurance or indemnity clauses modified?

NO

Vendor is using a Social Security Number?

NO

Department: Regional Flood Control District

Name: Martha Guzman

Telephone: 520-724-4654

Add Procurement Department Signatures

No

Add GMI Department Signatures



Department Director Signature: _____  _____ Date: 3/20/2026

Deputy County Administrator Signature: _____  _____ Date: 3/20/26

County Administrator Signature: _____  _____ Date: 3-25-2026

DATE: February 10, 2026

TO: Jan Leshar
County Administrator

FROM: Eric Shepp, P.E.
Director 

SUBJECT: Request for Direct Selection of Professional Services from Hydrologic Research Center for Flash Flood Warning Capacity Enhancement for Pima County Regional Flood Control District

Pursuant to Board of Supervisors Policy D29.6 III.C – Direct Selection and Procurement Procedure No. PO-50, this memorandum seeks approval to select Hydrologic Research Center (HRC), a non-profit research corporation located in San Diego, California to provide Flash Flood Warning Capacity Enhancement for the Pima County Regional Flood Control District (District).

BACKGROUND

The District operates a Flood Warning System based on a network of Automated Local Evaluation in Real Time (ALERT) data transmitters. The network currently consists of roughly 150 rainfall and 50 streamflow sensors that provide point data that is used to evaluate flooding hazards. While this is an effective tool, point data is limited by the large geographic area of Pima County, and flood hazards are difficult to evaluate in areas where ALERT sensors are absent or geographically distant. The District is exploring ways to use NOAA radar and other remote sensing tools to create real-time predictive tools to augment the warning system and provide flood warning in areas where ALERT sensors are geographically distant or absent. We are proposing to collaborate with HRC, who has developed tools that provide real-time spatial radar and satellite-based Quantitative Precipitation Estimates, and a continuous high resolution hydrologic model that tracks and assesses the risk of flash flood occurrences in target watersheds. HRC deploys this technology in countries around the world and in several counties in the United States. The tools and models HRC have developed are unique to their organization.

This effort to enhance the capability of the District's flood warning system is consistent with the 2025-2030 Floodplain Management Plan approved by the Board of Supervisors in April 2025 which includes Action Plan Item 4.7, "*Develop a plan to enhance public safety where roads flood and/or create isolated areas (e.g. reporting, warning, signage, permanent closures, all-weather crossings, automated temporary closures)*" and Item 4.8, "*Evaluate potential for use of latest forecasting tech and collaborate with groups such as the NWS, FAA, and Air Force to expedite installation of next generation radar and other technologies to improve "now-casting" and allow better warnings and alerts to the public, first responders and aviation.*"

REQUESTED ACTION

The District requests HRC to be selected for Flash Flood Warning Capacity Enhancement with a not to exceed amount of \$235,078 for a contract term of two (2) years with the option to renew this contract for up to one (1) additional one-year terms (each an "Extension Option") with a not to exceed cost of \$381,000 pursuant to the Direct Select provisions of Board of Supervisors Policy D29.6, III-C.

If you have any questions, please contact me.

ES/tj

c: Carmine DeBonis, Deputy County Administrator -- Public Works

Jan Leshar, County Administrator

**Request for Direct Selection of Professional Services from Hydrologic Research Center for Flash Flood
Warning Capacity Enhancement for Pima County Regional Flood Control District**

February 10, 2026

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APPROVED AS TO FORM

Bruce Collins

Bruce D. Collins, Procurement Director

February 23, 2026

Date

CONCUR

Carmine DeBonis, Jr.

Carmine DeBonis, Jr., Deputy County Administrator for Public Works

3/11/2026

Date

APPROVED

Jan Leshar

Jan Leshar, County Administrator

3/12/2026

Date

Pima County Regional Flood Control District

Project: Flash Flood Warning Capacity Enhancement

Contractor: Hydrologic Research Center

Amount: \$235,078

Contract No.: PO2600002189

Funding: 20010FD Special Revenue

PROFESSIONAL SERVICES CONTRACT

1. Parties and Background.

- 1.1. Parties. This Contract is between Pima County Regional Flood Control District, a body politic and corporate of the State of Arizona ("District"), and Hydrologic Research Center ("Contractor").
- 1.2. Authority. District selected Contractor pursuant to and consistent with Board of Supervisors Policy D29.6.

2. Term.

- 2.1. Initial Term. The term of this Contract commences on April 7, 2026 and will terminate on April 6, 2028 ("Initial Term"). "Term," when used in this Contract, means the Initial Term plus any exercised extension options under Section 2.2. If the commencement date of the Initial Term is before the signature date of the last party to execute this Contract, the parties will, for all purposes, deem the Contract to have been in effect as of the commencement date.
- 2.2. Extension Options. District may renew this Contract for up to one (1) additional period of up to 1 year each (each an "Extension Option"). An Extension Option will be effective only upon execution by the Parties of a formal written amendment.

3. **Scope of Services**. Contractor will provide District with the services described in **Exhibit A** (8 pages), at the dates and times described on **Exhibit A** or, if **Exhibit A** contains no dates or time frames, then upon demand. The Services must comply with all requirements and specifications in the Solicitation.

4. **Key Personnel**. Contractor will employ suitably trained and skilled professional personnel to perform all consultant services under this Contract. Prior to changing any key personnel, especially those key personnel District relied upon in making this Contract, Contractor will obtain the approval of District. The key personnel include the following staff:

Eylon Shamir, Chief Research Scientist
Dr. Theresa Modrick Hansen, Chief Operating Officer
Mehret (Marcy) Isaac, Financial Manager

5. **Compensation and Payment.**

- 5.1. Rates; Adjustment. District will pay Contractor at the rates set forth in **Exhibit A** (7 pages). Those rates will remain in effect during an Extension Option period unless Contractor, at least 90 days before the end of the then-existing Term, or at the time the District informs Contractor that the District intends to extend the Term, if that is earlier, notifies District in writing of any adjustments to those rates, and the reasons for the adjustments.
- 5.2. Maximum Payment Amount. District's total payments to Contractor under this Contract, including any sales taxes, may not exceed \$235,078 per two (2) year contract term (the "NTE Amount"). The NTE Amount can only be changed by a formal written amendment executed by the Parties. Contractor is not required to provide any services, payment for which will cause the District's total payments under this Contract to exceed the NTE Amount; if Contractor does so, it is at the Contractor's own risk.
- 5.3. Sales Taxes. The payment amounts or rates in **Exhibit A** do not include sales taxes. Contractor may invoice District for sales taxes that Contractor is required to pay under this Contract. Contractor will show sales taxes as a separate line item on invoices.
- 5.4. Timing of Invoices. Contractor will invoice District on a monthly basis unless a different billing period is set forth in **Exhibit A**. District must receive invoices no more than 30 days after the end of the billing period in which Contractor delivered the invoiced products or services to District. District may refuse to pay for any product or service for which Contractor does not timely invoice the District and, pursuant to A.R.S. § 11-622(C), will not pay for any product or service invoiced more than 6-months late.
- 5.5. Content of Invoices. Contractor will include detailed documentation in support of its invoices and assign each amount billed to an appropriate line item.
- 5.6. Invoice Adjustments. District may, at any time during the Term and during the retention period set forth in Section 22 below, question any payment under this Contract. If District raises a question about the propriety of a past payment, Contractor will cooperate with District in reviewing the payment. District may set-off any overpayment against amounts due to Contractor under this or any other contract between District and Contractor. Contractor will promptly pay to District any overpayment that District cannot recover by set-off.
6. **Insurance.** Contractor will procure and maintain at its own expense insurance policies (the "**Required Insurance**") satisfying the below requirements (the "**Insurance Requirements**") until all its obligations under this Contract have been met. The below Insurance Requirements are minimum requirements for this Contract and in no way limit Contractor's indemnity obligations under this Contract. The District in no way warrants that the required insurance is sufficient to protect the Contractor for liabilities that may arise from or relate to this Contract. If necessary, Contractor may obtain commercial umbrella or excess insurance to satisfy the Insurance Requirements.
- 6.1. Insurance Coverages and Limits: Contractor will procure and maintain, until all its obligations have been discharged, coverage with limits of liability not less than those

stated below. Coverage must be placed with insurers acceptable to Pima County with A.M. Best rating of not less than A-VII, unless otherwise approved by Pima County.

- 6.1.1. Commercial General Liability (CGL) – Occurrence Form with limits not less than \$2,000,000 Each Occurrence and \$2,000,000 General Aggregate. Policy shall include coverage for liability arising from premises, operations, independent contractors, personal injury, bodily injury, broad form contractual liability and products-completed operations. Any standard coverages excluded from the CGL policy, such as products/completed operations, etc. shall be covered by endorsement or separate policy and documented on the Certificates of Insurance.
 - 6.1.2. Business Automobile Liability – Coverage for bodily injury and property damage on any owned, leased, hired, and/or non-owned autos assigned to or used in the performance of this Contract with minimum limits not less than \$1,000,000 Each Accident.
 - 6.1.3. Workers' Compensation and Employers' Liability – Statutory coverage for Workers' Compensation. Workers' Compensation statutory coverage is compulsory for employers of one or more employees. Employers Liability coverage with limits of \$1,000,000 each accident and \$1,000,000 each employee – disease.
 - 6.1.4. Professional Liability (E & O) Insurance – This insurance is required for work from professionals whose coverage is excluded from the above CGL policy. The policy limits shall be not less than \$2,000,000 Each Claim and \$2,000,000 Annual Aggregate. The insurance shall cover professional misconduct or negligent acts of anyone performing any services under this contract.
- 6.2. Additional Coverage Requirements:
- 6.2.1. Claims Made Coverage: If any part of the Required Insurance is written on a claims-made basis, any policy retroactive date must precede the effective date of this Contract, and Contractor must maintain such coverage for a period of not less than three (3) years following Contract expiration, termination or cancellation.
 - 6.2.2. Additional Insured Endorsement: The General Liability, Business Automobile Liability and Technology E&O Policies shall each be endorsed to include Pima County, its departments, districts, officials, agents, and employees as additional insureds with respect to liability arising out of the activities performed by or on behalf of the Contractor.
 - 6.2.3. Subrogation Endorsement: The General Liability, Business Automobile Liability, Workers' Compensation and Technology E&O Policies shall each contain a waiver of subrogation endorsement in favor of Pima County, and its departments, districts, officials, agents, and employees for losses arising from work performed by or on behalf of the Contractor.

- 6.2.4. Primary Insurance Endorsement: The Required Insurance policies must stipulate that they are primary and that any insurance carried by Pima County, or its agents, officials, or employees, is excess and not contributory insurance.
- 6.2.5. The Required Insurance policies may not obligate Pima County to pay any portion of Contractor's deductible or Self Insurance Retention (SIR).
- 6.2.6. Subcontractors: Contractor must either (a) include all subcontractors as additional insureds under its Required Insurance policies, or (b) require each subcontractor to separately meet all Insurance Requirements and verify that each subcontractor has done so, Contractor must furnish, if requested by Pima County, appropriate insurance certificates for each subcontractor. Contractor must obtain District's approval of any subcontractor request to modify the Insurance Requirements as to that subcontractor.
- 6.3. Notice of Cancellation: Contractor must notify District, within two (2) business days of Contractor's receipt of notice from an insurer, if any Required Insurance policy is suspended, voided, or cancelled for any reason. Notice must include District project or contract number and project description.
- 6.4. Verification of Coverage:
- 6.4.1. Contractor must furnish District with a certificate of insurance (valid ACORD form or equivalent approved by Pima County) for each Required Insurance policy, which must specify that the policy has all the required endorsements, and must include District project or contract number and project description. Each certificate must be signed by an authorized representative of the insurer.
- 6.4.2. District may at any time require Contractor to provide a complete copy of any Required Insurance policy or endorsement. Note: Contractors for larger projects must provide actual copies of the additional insured and subrogation endorsements.
- 6.4.3. Contractor must provide the certificates to District before work commences. Each Required Insurance policy must be in effect at least 10 days before work under this Contract commences. Contractor must provide District a renewal certificate not less than 15 days prior to a Required Insurance policy's expiration date. Failure to maintain the Required Insurance policies, or to provide evidence of renewal, is a material breach of this Contract.
- 6.4.4. All insurance certificates must be sent directly to the appropriate Pima County Department.
- 6.5. Approval and Modifications: The Pima County Risk Manager may modify the Insurance Requirements at any point during the Term of this Contract. This can be done administratively, with written notice from the Risk Manager and does not require a formal Contract amendment. Neither District's failure to obtain a required insurance certificate or endorsement,

the District's failure to object to a non-complying insurance certificate or endorsement, nor District's receipt of any other information from the Contractor, its insurance broker(s) and/or insurer(s), constitutes a waiver of any of the Insurance Requirements.

7. **Indemnification.** To the fullest extent permitted by law, Contractor will defend, indemnify, and hold harmless Pima County and any related taxing district, and the officials and employees of each of them (collectively, "Indemnitee") from and against any and all claims, actions, liabilities, losses, and expenses (including reasonable attorney fees) (collectively, "Claims") arising out of actual or alleged injury of any person (including death) or loss or damage to tangible or intangible property caused, or alleged to be caused, in whole or in part, by any act or omission of Contractor or any of Contractor's directors, officers, agents, employees, volunteers, or subcontractors. This indemnity includes any claim or amount arising or recovered under the Workers' Compensation Law or arising out of the failure of Contractor to conform to any federal, state or local law, statute, ordinance, rule, regulation or court decree. The Indemnitee will, in all instances, except for Claims arising solely from the acts or omissions of the Indemnitee, be indemnified by Contractor from and against any and all Claims. Contractor is responsible for primary loss investigation, defense and judgment costs for any Claim to which this indemnity applies. This indemnity will survive the expiration or termination of this Contract.
8. **Laws and Regulations.**
 - 8.1. Compliance with Laws. Contractor will comply with all federal, state, and local laws, rules, regulations, standards and Executive Orders.
 - 8.2. Licensing. Contractor warrants that it is appropriately licensed to provide the services under this Contract and that its subcontractors will be appropriately licensed.
 - 8.3. Choice of Law; Venue. The laws and regulations of the State of Arizona govern the rights and obligations of the parties under this Contract. Any action relating to this Contract must be filed and maintained in the appropriate court of the State of Arizona in Pima County.
9. **Independent Contractor.** Contractor is an independent contractor. Neither Contractor, nor any of Contractor's officers, agents or employees will be considered an employee of Pima County for any purpose or be entitled to receive any employment-related benefits, or assert any protections, under the Pima County Merit System. Contractor is responsible for paying all federal, state and local taxes on the compensation received by Contractor under this Contract and will indemnify and hold District harmless from any and all liability that District may incur because of Contractor's failure to pay such taxes.
10. **Subcontractors.** Contractor is fully responsible for all acts and omissions of any subcontractor, and of persons directly or indirectly employed by any subcontractor, and of persons for whose acts any of them may be liable, to the same extent that the Contractor is responsible for the acts and omissions of its own employees. Nothing in this Contract creates any obligation on the part of District to pay or see to the payment of any money due any subcontractor, except as may be required by law.

11. **Assignment.** Contractor may not assign its rights or obligations under this Contract, in whole or in part, without District's prior written approval. District may withhold approval at its sole discretion.
12. **Non-Discrimination.** Contractor will comply with all provisions and requirements of Arizona Executive Order 2009-09, which is hereby incorporated into this contract, including flow-down of all provisions and requirements to any subcontractors. During the performance of this Contract, Contractor will not discriminate against any employee, client or any other individual in any way because of that person's age, race, creed, color, religion, sex, disability or national origin.
13. **Americans with Disabilities Act.** Contractor will comply with Title II of the Americans with Disabilities Act (Public Law 110-325, 42 U.S.C. §§ 12101-12213) and the federal regulations for Title II (28 CFR Part 35).
14. **Authority to Contract.** Contractor warrants its right and power to enter into this Contract. If any court or administrative agency determines that District does not have authority to enter into this Contract, District will not be liable to Contractor or any third party by reason of such determination or by reason of this Contract.
15. **Full and Complete Performance.** The failure of either party to insist, in one or more instances, upon the other party's complete and satisfactory performance under this Contract, or to take any action based on the other party's failure to completely and satisfactorily perform, is not a waiver of that party's right to insist upon complete and satisfactory performance, or compliance with any other covenant or condition in this Contract, either in the past or in the future. The acceptance by either party of sums less than may be due and owing it at any time is not an accord and satisfaction.
16. **Cancellation for Conflict of Interest.** This Contract is subject to cancellation for conflict of interest pursuant to A.R.S. § 38-511, the pertinent provisions of which are incorporated into this Contract by reference.
17. **Termination by District.**
 - 17.1. Without Cause. District may terminate this Contract at any time without cause by notifying Contractor, in writing, at least 30 days before the effective date of the termination. In the event of such termination, District's only obligation to Contractor will be payment for services rendered prior to the date of termination.
 - 17.2. With Cause. District may terminate this Contract at any time without advance notice and without further obligation to District when District finds Contractor to be in default of any provision of this Contract.
 - 17.3. Non-Appropriation. Notwithstanding any other provision in this Contract, District may terminate this Contract if for any reason there are not sufficient appropriated and available monies for the purpose of maintaining District or other public entity obligations under this Contract. In the event of such termination, District will have no further obligation to Contractor, other than to pay for services rendered prior to termination.

18. **Notice.** Any notice required or permitted to be given under this Contract must be in writing and be served by personal delivery or by certified mail upon the other party as follows:

District:

Eric Shepp, P.E. Director
201 N Stone Ave., Fl 9
Tucson, AZ 85701

Contractor:

Eylon Shamir, Chief Research Scientist
16870 W Bernardo Drive, Suite 380
San Diego, CA 92127

19. **Non-Exclusive Contract.** Contractor understands that this Contract is nonexclusive and is for the sole convenience of District. District reserves the right to obtain like services from other sources for any reason.
20. **Remedies.** Either party may pursue any remedies provided by law for the breach of this Contract. No right or remedy is intended to be exclusive of any other right or remedy and each is cumulative and in addition to any other right or remedy existing at law or at equity or by virtue of this Contract.
21. **Severability.** Each provision of this Contract stands alone, and any provision of this Contract found to be prohibited by law will be ineffective to the extent of such prohibition without invalidating the remainder of this Contract.
22. **Books and Records.** Contractor will keep and maintain proper and complete books, records and accounts, which will be open at all reasonable times for inspection and audit by duly authorized representatives of District. In addition, Contractor will retain all records relating to this Contract for at least five (5) years after its expiration or termination or, if later, until any related pending proceeding or litigation has concluded.
23. **Public Records.**
- 23.1. **Disclosure.** Pursuant to A.R.S. § 39-121 et seq., and A.R.S. § 34-603(H) in the case of construction or Architectural and Engineering services procured under A.R.S. Title 34, Chapter 6, all documents submitted in response to the solicitation resulting in award of this Contract, including, but not limited to, pricing schedules, product specifications, work plans, and any supporting documents, are public records. As such, those documents are subject to release and/or review by the general public upon request, including competitors.
- 23.2. **Records Marked Confidential; Notice and Protective Order.** If Contractor reasonably believes that some of those records contain proprietary, trade-secret or otherwise-confidential information, Contractor must prominently mark those records "CONFIDENTIAL." In the event a public-records request is submitted to District for records marked CONFIDENTIAL, District will notify Contractor of the request as soon as reasonably possible. District will release the records 10 business days after the date of that notice, unless Contractor has, within that period, secured an appropriate order from a court of competent jurisdiction, enjoining the release of the records. District will not, under any circumstances, be responsible for securing such an order, nor will District be in any way financially responsible for any costs associated with securing such an order.

24. **Legal Arizona Workers Act Compliance.**

24.1. Compliance with Immigration Laws. Contractor hereby warrants that it will at all times during the term of this Contract comply with all federal immigration laws applicable to its employment of its employees, and with the requirements of A.R.S. § 23-214 (A) (together the "State and Federal Immigration Laws"). Contractor will further ensure that each subcontractor who performs any work for Contractor under this Contract likewise complies with the State and Federal Immigration Laws.

24.2. Books & Records. District has the right at any time to inspect the books and records of Contractor and any subcontractor in order to verify such party's compliance with the State and Federal Immigration Laws.

24.3. Remedies for Breach of Warranty. Any breach of Contractor's or any subcontractor's warranty of compliance with the State and Federal Immigration Laws, or of any other provision of this section, is a material breach of this Contract subjecting Contractor to penalties up to and including suspension or termination of this Contract. If the breach is by a subcontractor, and the subcontract is suspended or terminated as a result, Contractor will be required to take such steps as may be necessary to either self-perform the services that would have been provided under the subcontract or retain a replacement subcontractor, as soon as possible so as not to delay project completion. Any additional costs attributable directly or indirectly to such remedial action are the responsibility of Contractor.

24.4. Subcontractors. Contractor will advise each subcontractor of District's rights, and the subcontractor's obligations, under this Section 24 by including a provision in each subcontract substantially in the following form:

"Subcontractor hereby warrants that it will at all times during the term of this contract comply with all federal immigration laws applicable to

Subcontractor's employees, and with the requirements of A.R.S. § 23-214 (A). Subcontractor further agrees that District may inspect the Subcontractor's books and records to insure that Subcontractor is in compliance with these requirements. Any breach of this paragraph by Subcontractor is a material breach of this contract subjecting Subcontractor to penalties up to and including suspension or termination of this contract."

25. **Israel Boycott Certification.** Pursuant to A.R.S. § 35-393.01, if Contractor engages in for-profit activity and has 10 or more employees, and if this Contract has a value of \$100,000.00 or more, Contractor certifies it is not currently engaged in, and agrees for the duration of this Contract to not engage in, a boycott of goods or services from Israel. This certification does not apply to a boycott prohibited by 50 U.S.C. § 4842 or a regulation issued pursuant to 50 U.S.C. § 4842.

26. **Forced Labor of Ethnic Uyghurs.** Pursuant to A.R.S. § 35-394, if Contractor engages in for-profit activity and has 10 or more employees, Contractor certifies it is not currently using, and agrees for the duration of this Contract to not use (1) the forced labor of ethnic Uyghurs in the People's Republic of China; (2) any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China; and (3) any contractors, subcontractors or suppliers that use the forced labor or any goods or services produced by the forced labor of ethnic Uyghurs in the People's Republic of China. If Contractor becomes aware during the term of the Contract that Contractor is not in compliance with A.R.S. § 35-394, Contractor must notify District within five business days and provide a written certification to District regarding compliance within one hundred eighty days.
27. **Heat Injury and Illness Prevention and Safety Plan.** Pursuant to Pima County Procurement Code 11.40.030, Contractor hereby warrants that if Contractor's employees perform work in an outdoor environment under this Contract, Contractor will keep on file a written Heat Injury and Illness Prevention and Safety Plan. At District's request, Contractor will provide a copy of this plan and documentation of heat safety and mitigation efforts implemented by Contractor to prevent heat-related illnesses and injuries in the workplace. Contractor will post a copy of the Heat Injury and Illness Prevention and Safety Plan where it is accessible to employees. Contractor will further ensure that each subcontractor who performs any work for Contractor under this Contract complies with this provision.
28. **Amendment.** The parties may modify, amend, alter or extend this Contract only by a written amendment signed by the parties.

29. **Entire Agreement.** This document constitutes the entire agreement between the parties pertaining to the subject matter it addresses, and this Contract supersedes all prior or contemporaneous agreements and understandings, oral or written.

This agreement will become effective when all parties have signed it. The effective date of the agreement will be the date this agreement is signed by the last party (as indicated by the date associated with that party's signature).

**PIMA COUNTY REGIONAL
FLOOD CONTROL DISTRICT**

CONTRACTOR

Chair, Board of Directors


Authorized Officer Signature

Date

OLUFEMI OSIDELE, CEO
Printed Name and Title

18 March 2026
Date

ATTEST

Clerk of the Board

Date

APPROVED AS TO FORM


Deputy County Attorney

Bobby Yu
Print DCA Name

3/12/2026
Date



HYDROLOGIC RESEARCH CENTER

A Nonprofit Research Corporation

Established 1993

Exhibit A

Scope of Work

Flash Flood Warning Capacity Enhancement for Pima County Regional Flood Control District

Prepared by
Hydrologic Research Center

16870 West Bernardo Drive, Suite 380, San Diego, CA 92127,

USA

January 29, 2026

The Hydrologic Research Center (HRC), San Diego, California is a nonprofit research, technology transfer, and training organization with a mission to bridge gaps between scientific research in hydrology and science-based applications for the solution of important societal challenges that involve water. For nearly 30 years HRC has developed and implemented numerous independent operational hydrometeorological systems worldwide for capacity enhancement of hydrometeorological forecasters and disaster managers to issue reliable prompt and location-specific warnings for hydrometeorological hazards including flash floods.

The Pima County Regional Flood Control District (PCRFCD) operates an Automated Local Evaluation in Real Time (ALERT) system to support the timely production of early watches and warnings for floods and flash floods. The PCRFCD ALERT system consists of approximately 150 automatic rain gauges and 50 river stage sensors. Notwithstanding this dense ALERT network, PCRFCD is often requested to provide warnings for locations throughout the County that are not covered by ALERT sensors. Addressing this request and after consultation with PCRFCD, HRC proposes herein to develop several hydrometeorological products that enhance the capacity of PCRFCD to assess flash flood risks across the County in real-time.

The proposed hydrometeorological products include (1) improved real-time spatial radar and satellite-based Quantitative Precipitation Estimates (QPE), and (2) a continuous high resolution hydrologic model that tracks antecedence moisture conditions in small basins and assesses the risk of flash flood occurrences. It is important to note that the development of the regional hydrologic model of (2) requires high-quality QPE inputs from (1).

16870 West Bernardo Drive, Suite 380, San Diego, California 92127 USA

Tel: (858) 798 9440 <https://hrcwater.org>

PO2600002189 - Exhibit A (Page 1 of 7)

1. Sope of Work

Stage 1: Spatial QPE Estimates

A. Radar Quantitative Precipitation Estimate

The KEMX radar is the National Weather Service's Next Generation Weather Surveillance Radar 1988 Doppler (NEXRAD WSR-88D) serving most of Pima County. This Doppler, dual-polarization, S-Band radar is located in the Empire Mountains, approximately 35 miles southeast of the city Tucson, and it provides broad and relatively unobstructed coverage of the County. The National Weather Service supplies various high-resolution, real-time Level-III radar products, including QPE products such as the Digital Precipitation Rate (DPR) and Hourly Precipitation (OHP).

We propose to develop an enhanced, quality-controlled, and bias-corrected radar QPE product by (1) a careful evaluation of the historical performance of the existing Level-III QPE; and (2) enhancing the Level-III product by integrating it with both the archived and real-time in-situ rainfall data from the ALERT system. The enhanced radar QPE product will be developed in two steps, as follows:

Step 1: Clutter Mask: Using the available archive of Level-III radar QPE data from Google Cloud Services, which dates back to the early 1990s, we will analyze historical radar estimates alongside in-situ rainfall measurements from the ALERT gauge network to identify areas within the radar coverage exhibiting persistent echoes and biases. These erroneous signals may be caused by various sources such as electromagnetic interference, physical obstructions (e.g., terrain or structural blockages), or atmospheric effects. A radar clutter mask will be developed to classify grid cells based on data quality, thereby distinguishing high-quality cells from those consistently prone to errors.

Step 2: Radar Bias Adjustment: The bias adjustment procedure will be developed by comparing ALERT rain gauge data with the radar-derived QPE. This procedure will consist of two main steps. The first step is a *climatological bias adjustment*, which utilizes historical records to derive bias adjustment coefficients for different seasons and radar ranges. This step ensures that the radar estimates are statistically aligned with the gauge measurements across varying conditions. The second step is a *dynamic bias adjustment*, which compares real-time rain gauge observations with radar QPE and continuously updates the bias coefficients. This step allows for adaptive correction of radar estimates based on evolving rainfall patterns and conditions. (Georgakakos et. al., 2022).

B. Satellite Rainfall Estimate

An additional real-time spatial QPE source is the satellite-based Self-Calibrating Multivariate Precipitation Retrieval (SCaMPR). The SCaMPR product was developed and is operationally distributed by the National Environmental Satellite, Data, and Information Service of the U.S. National Oceanic and Atmospheric Administration. It combines the strengths of infrared data from geostationary satellites with passive microwave data from a constellation of low-Earth-orbit satellites.

The SCaMPR product has been available since February 2021, providing rainfall intensity estimates approximately every 10 minutes at approximately 2×2 km resolution, with an initial release latency of less than 10 minutes. HRC has maintained an archive of the operational SCaMPR product for its operational applications. This combination of high spatial and temporal resolution and short latency makes SCaMPR potentially valuable for supporting flash flood warning operations by providing critical information on the short-lived, small-scale convective summer rainfall events in Pima County.

A bias adjustment procedure similar to that developed for radar QPE will be implemented for SCaMPR to generate bias-corrected satellite precipitation estimates. The SCaMPR gridded QPE will be available for display and analysis, enabling direct comparison with radar- and gauge-based precipitation data. This dataset offers a valuable large-domain perspective, filling gaps in regions not covered by radar and potentially verifying or even detecting events that might go unnoticed by radar and gauge networks.

Product delivery and dissemination: The system for QPE estimation will be developed by HRC with the support and ongoing consultation of PCRFC. Upon completion, the products will be made available to PCRFC in real time. HRC proposes to provide access to a visualization interface based on MapServer technology. This interface will allow for secure remote access that enables visualization and interrogation of the gridded QPE products. Furthermore, the QPE data will be provided in an agreed-upon non-proprietary format that can be easily transferred and integrated into other hydrometeorological platforms via a commonly available Application Programming Interface (API).

Stage 2: Flash Flood Guidance Model

A. Development of Flash Flood Guidance Model

Based on 20+ years of experience in implementing regional Flash Flood Early Warning Systems within a global program (Georgakakos et. al., 2022), HRC proposes to implement an operational, real-time Flash Flood Early Warning System to inform PCRFC D officials of flash flood risks and to support their decisions for flood response in the County. The basis of this system is the concept of Flash Flood Guidance, which defines the amount of rainfall for a given duration (e.g., 1-, 3-, or 6-hour) and over a small watershed that is required to produce minor flash flooding at the basin outlet. This system, termed herein as the Pima County Flash Flood Guidance System or PC-FFGS, will be built around a distributed high-resolution land surface model covering the entire County. The land surface model will use the high-quality QPE estimates from Stage 1 to continuously update basin antecedent conditions, which is a key factor in the generation of flash floods. The land-surface model will be developed from local datasets available from the County, including high resolution DEM, land cover, land use, soil texture and depth, alluvial sections, and channel cross sectional information.

The land surface model will generate updated Flash Flood Guidance (FFG) values for small watersheds defined within the region. The basin resolution will be decided in consultation with PCRFC D. A preliminary recommendation is for average drainage area of approximately 10 km² for rural basins and about 1 km² for urban regions. The FFG values will be used in real-time to identify the small basins where the rainfall amounts approach or exceed the guidance thresholds. These locations indicate risk for flash flooding. FFG values will be compared with recent observed QPEs to evaluate whether conditions indicate *imminent* flooding. FFG estimates will also be compared to Quantitative Precipitation Forecasts (QPF) of matching durations from available numerical weather prediction models to assess and forecast the potential for flash flooding. Based on experience of PCRFC D and ability to access the models, HRC proposes to ingest forecast precipitation data from the University of Arizona Weather Research and Forecasting (WRF) model, and the operational model(s) provided by the National Weather Service. Table 1 summarizes the continuously updated basin-level products that will be available from the PC-FFGS.

Finally, after the PC-FFGS is implemented, a study will be conducted using the ALERT network of streamflow gauges to inform the calibration of land surface model parameters. The calibrated parameters will be regionalized and implemented for the ungauged basins. Furthermore, the County's road closure dataset will be leveraged to further refine and validate the model's ability to detect minor flooding for improved flood detection and warning accuracy.

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It is envisioned that the PC-FFGS system would be initially implemented on HRC computing resources, with secure access to PCRFCO officials. Future discussion and potential Stage 3 project would assess preference for deployment of system at PCRFCO or establishment of agreement for on-going operational maintenance at HRC.

Table 1. PC-FFGS hourly or sub-hourly updated basins products

Product Name	Description
Flash Flood Guidance (FFG)	Rainfall depth over specified duration needed to cause a minor flooding at the basins outlet.
Imminent Flash Flood Threat	The assessment of exceedance of FFG by observed rainfall.
Forecasted Flash Flood Threat	The assessment of exceedance of FFG by QPFs
Flash Flood Risk	Long-term (e.g., 48hr) probability of flash floods
Merged Mean Areal Precipitation	Average precipitation over a basin for a given duration estimated from the gauge-radar-satellite QPEs.
Mean Areal Precipitation	Average precipitation over a basin for a given duration estimated separately from the gauge, radar, and satellite QPEs .
Mean Areal Forecast Rainfall	Short-term rainfall forecasts from the different numerical weather prediction models (e.g., 0-48 hrs)
Soil Saturation Index	Effective soil water content fraction in two vertical layers (top soil and sub soil)
Evapotranspiration	Estimate the actual ET

2. Cost Projection and Schedule

Table 2 presents an itemization of major activities and the cost estimate. Table 3 presents the expected time line for the project implementation.

Table 2. Cost Estimate for Stage 1

Stage 1 Activities	Cost (USD)
Data collection, analysis, and development	41,270
Implementation of Real-Time QPE Estimation System and Interface @ HRC	24,332
Coordination and Training at Pima County (Travel)	9,699
Project Management and Oversight	8,470
Stage 1 Project Final Report	6,537
Stage 2 Activities	
Data collection and Model Development	48,200
Implementation of Real-Time PC-FFGS @ HRC	31,519
Validation Study	28,782
Training at PCRFCO Offices	12,075
Stage 2 Project Reporting	11,777
Project Management and Oversight	12,418
TOTAL COST:	235,078

Table 3. Timeline of Activities

	Months from Project Start																							
	Year 1												Year 2											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Stage 1 Activities																								
PCRFCO Engagement / Kick-off Meeting (virtual)	█																							
Data Collection	█	█																						
Radar Precipitation Analysis			█	█	█																			
Satellite Precipitation Analysis				█	█	█																		
Interim PCRFCO Engagement Meeting (virtual)							█																	
Implementation of Real-Time QPE Estimation System								█	█															
PCRFCO Engagement: In-person Training & Presentation										█														
Stage 2 Activities																								
Initial PCRFCO Engagement / Kick-off Meeting											█													
Data Collection											█	█	█	█	█	█	█	█	█	█	█	█	█	█
Land Surface Model Development and Testing												█	█	█	█	█	█	█	█	█	█	█	█	█
Implementation of PC-FFGS at HRC																	█	█	█	█	█	█	█	█
Interim PCRFCO Engagement Meeting																	█							
Validation Study																		█	█	█	█	█	█	█
Final Project Reporting																								█
PC-FFGS Training & Presentation at PCRFCO																								█

3. Timing of invoices:

Invoices will be submitted on a four-month billing cycle throughout the two-year period of performance. Accordingly, the Contractor will provide a total of six invoices (one every four months), each corresponding to work completed during the preceding four-month interval and aligned with the approved scope, schedule, and associated deliverables.

References

Georgakakos, K. P., and Coauthors, 2022: The Flash Flood Guidance System Implementation Worldwide: A Successful Multidecadal Research-to-Operations Effort. Bull. Amer. Meteor. Soc., 103, E665–E679, <https://doi.org/10.1175/BAMS-D-20-0241.1>.

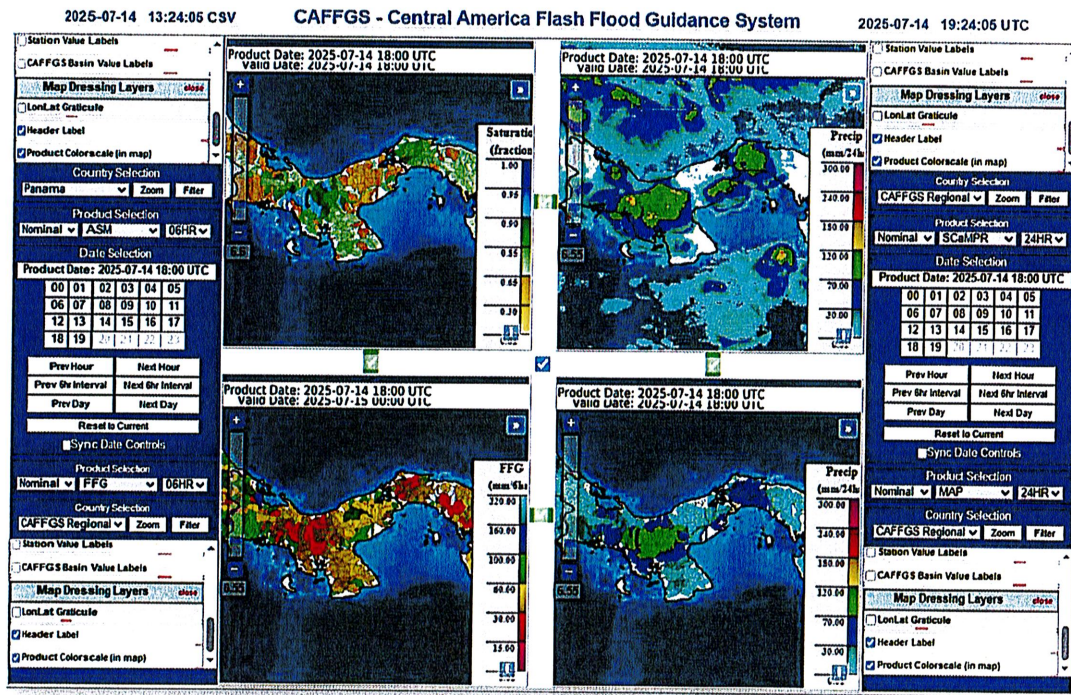


Figure 1: An example of HRC's interface displaying four different products arranged left to right and top to bottom: basins' moisture content fraction at the upper soil, gridded satellite-based precipitation, basins' flash flood guidance, and basins' mean areal precipitation estimates.