Response to

REQUEST FOR PROPOSALS FOR 2026 PAVEMENT MANAGEMENT SYSTEM UPDATE

Prepared for:

Humboldt County Association of Governments

Regional Transportation Planning Agency

APPLIED RESEARCH ASSOCIATES
165 South Chestnut Street
Ventura, CA 93001
217-356-4500
www.ara.com

CONTACT PERSON

Phillip Donovan, PhD, PE
PDonovan@ara.com

January 16, 2026

COVER LETTER

Regional Transportation Planning Agency
Humboldt County Association of Government
611 I Street, Suite B
Eureka, California 95501

January 16, 2026

Subject: Cover Letter for Pavement Management System Update

Dear members of the selection committee,

Applied Research Associates, Inc. (ARA) appreciates the opportunity to submit this proposal to assist the Humboldt County Association of Government (HCAOG) in updating its Pavement Management System (PMS). We have reviewed the Request for Proposal document, and all attachments, and understand that HCAOG seeks a qualified consultant to update PMSs for its member jurisdictions and participating Tribal lands using the StreetSaver® Online Edition, conducting tasks including roadway inventory updates, pavement condition surveys, GIS-compatible deliverables, maintenance and rehabilitation strategy development, budget scenario analysis, PMP reporting, presentations, and staff training.

ARA has extensive experience in updating PMS across California, with recent projects completed for the Cities of San Marcos, El Cajon, Desert Hot Springs, La Mesa, Chula Vista, Palm Desert, Palmdale, Red Bluff, as well as Riverside and San Francisco Counties. For this project, Dr. Phillip Donovan, Ph.D., P.E., will serve as the Project Manager, supported by Joseph Dib, P.E., PMP (Assistant Project Manager) and Salil Gokhale, P.E. (Technical Advisor and QA/QC Lead).

As a 100% employee-owned firm with a strong local presence in California, ARA brings a combination of national expertise and regional familiarity. Our PathRunner vehicle employs advanced 3D laser technology capable of detecting cracks as small as 1 mm while traveling at posted speeds, eliminating traffic disruption and ensuring crew safety. The system's comprehensive imaging suite, including 360° Ladybug cameras and forward-facing HD+ cameras, captures both pavement distress and right-of-way conditions in a single pass, with all data feeding into our PathWeb platform, providing HCAOG with immediate web-based access to view survey results, pavement images, and PCI scores throughout the collection and analysis process. In addition to pavement condition surveys, ARA has extensive experience with maintenance and rehabilitation strategy development, budget scenario analysis, and StreetSaver® training for agency staff. This proposal is a firm offer for at least 60 days from the submission date. We confirm our ability to meet all insurance requirements as specified in the RFP. We have no exceptions to any contract terms or requirements outlined in the RFP.

Sincerely,

Jason Bittner, PMP
Transportation Division Manager
T: 217.356.4500
E: jbittner@ara.com

Phillip Donovan, Ph.D., P.E.
Principal Engineer and Point of Contact
T: 217.356.4500
E: pdonovan@ara.com

1. TABLE OF CONTENTS

2. UNDERSTANDING OF PROJECT

The Humboldt County Association of Governments (HCAOG) is responsible for supporting pavement management planning across a geographically diverse and multi-jurisdictional transportation network totaling approximately 1,112.7 centerline miles. This network includes roadways within the County of Humboldt, the Cities of Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Rio Dell, and Trinidad, as well as roadways in tribal lands of the Hoopa Valley Tribe, Yurok Tribe, Karuk Tribe, and the Cher-Ae Heights Indian Community of the Trinidad Rancheria. These agencies rely on a consistent, objective, and up-to-date pavement management system to support funding decisions, coordinate investments, and communicate pavement needs to technical and non-technical stakeholders.

ARA understands that HCAOG's existing pavement management database requires a comprehensive update to reflect current pavement conditions and to maintain the long-term reliability of the system. HCAOG is seeking a qualified consultant to conduct a new network-wide pavement distress survey, collect roadway geometrics and imagery, update and validate data within the StreetSaver® Online Edition environment, and provide staff training. Additionally, the project requires review and refinement of maintenance and rehabilitation (M&R) strategies, supported by clear, defensible Pavement Management Program (PMP) reports that summarize conditions, forecast future performance, and evaluate budget scenarios.

ARA recognizes that this effort extends beyond field data collection and database updates. The project requires careful analysis and strategic planning to ensure that pavement condition information, maintenance and rehabilitation strategies, and cost assumptions are applied consistently across all participating jurisdictions. The updated StreetSaver® database and PMP reports are intended to function as practical decision-support tools that support prioritization, budgeting, and communication of pavement needs, without introducing unnecessary complexity or commitments beyond the Scope of Work.

ARA further understands the importance of clear communication and coordination throughout the project. This includes engagement with HCAOG staff and the Technical Advisory Committee, transparent data review processes, and presentations tailored to both technical and non-technical audiences. The inclusion of staff training ensures that HCAOG can confidently use and maintain the updated system beyond project completion. Overall, ARA understands that the goal of this project is to deliver accurate, consistent, and actionable information that supports sound pavement investment decisions across all participating jurisdictions, helping HCAOG and the tribal nations make the most effective use of pavement funding while preserving the condition and performance of their roadway network.

3. CONSULTANT QUALIFICATIONS AND EXPERIENCE

a. Firm

Applied Research Associates, Inc. (ARA) is an employee-owned international research and engineering company recognized for providing technically excellent solutions to complex and challenging problems in the physical sciences. Specifically, the Transportation Division focuses on technical aspects related to pavement data collection, design, engineering, and management for agencies such as Humboldt County Association of Governments. Our mission is to provide in-depth and diversified research, engineering, and technical support services.

Founded in Albuquerque in 1979, ARA has over **40 years** of experience and over **2,200 employees** in offices throughout North America serving both national and international clients. Transportation Division engineers and scientists have played a key role in the development of many currently in-use pavement management technologies. **Our founders helped pioneer the Pavement Condition Index (PCI)**, and we continue to play a vital role in the development of vehicle-based data collection systems and evaluation methodologies. ARA's transportation division includes **over 150 engineers** and technicians and the **largest fleet of pavement condition assessment equipment in the United States**.

ARA takes a holistic view on pavement health. In addition to our surface condition testing equipment, we have the capabilities to test the structural capacity, subgrade suitability, and skid resistance – all elements that contribute to the overall health and lifecycle of the pavement. ARA has experience integrating these non-PCI results into pavement management systems, leading to better, more cost-effective capital improvement plans that go beyond just improving the pavement surface and into addressing the core problems cities and counties face when maintaining their pavement infrastructure.

Figure 1. Geographical Distribution of ARA's Nationwide Office Location.

Our team's experience lies not only in accurate data collection, but also in providing consulting engineering expertise to State, County, City, Municipal, and private agencies for roadways and airports. ARA's engineers are experts in implementing and updating pavement management systems, pavement performance models, maintenance and rehabilitation business practices, acceptance and monitoring policies, life cycle cost analysis, pavement design, and most importantly, **helping agencies develop practical paving, preservation, and maintenance plans**. This includes evaluating new technologies and state-of-the-practice techniques to cost-effectively manage each member agency's pavement assets. Figure 2 shows ARA's unrivalled fleet of pavement testing equipment and services.

Figure 2. ARA's Pavement Testing Equipment Fleet.

ARA is a wholly owned subsidiary of ARA Holdings, Inc., which is the parent company. ARA Holdings, Inc. also owns the following subsidiaries: Neya Systems, LLC; BerrieHill Research Corporation; and Reusable Respirators, LLC. Other than the parent–subsidiary relationships identified above, the Proposer does not hold any controlling or financial interest in any other firms or organizations, nor is it owned or controlled by any other entity. As previously mentioned, ARA is an employee-owned company. Our employee stock ownership plan enables employees to participate in the ownership of the company and share in its success. To best serve our clients while minimizing bureaucracy, ARA operates as a flat organization structured by sectors. This approach enables each sector to concentrate on its area of expertise while also ensuring superior responsiveness to client needs. Figure 3 illustrates the organization of the company's various technology sectors. ***Our office located in Ventura CA is part of the Transportation Division and the Transportation and Infrastructure sector. This project will be primarily managed out of our Ventura, California office, located at 165 S. Chestnut St., Ventura, CA 93001. Phillip Donovan, Ph.D., P.E., a Principal Civil Engineer with ARA who is based in Ventura, will be responsible for overseeing this project.***

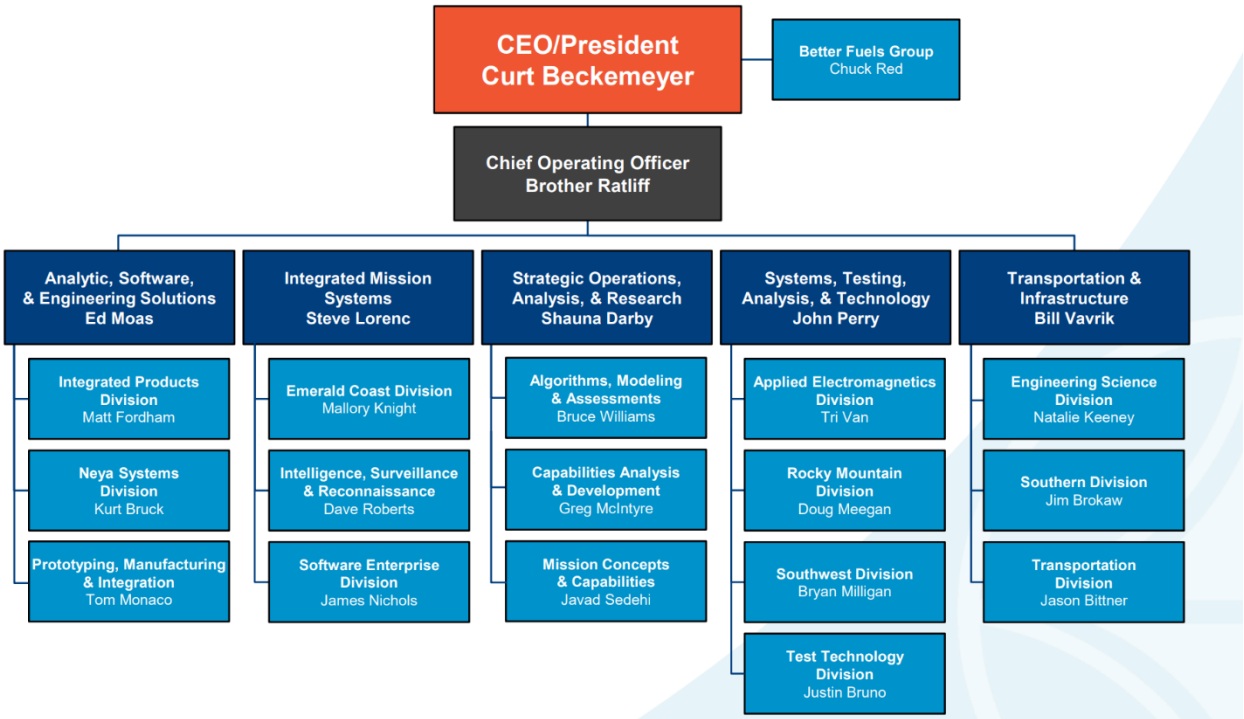


Figure 3: ARA's Organizational Chart

ARA has conducted over **100** pavement management projects with similar scope and complexity to the requirements of the Humboldt County Association of Governements over the past five years, across the U.S. Our **extensive California municipal experience** demonstrates consistent on-time, on-budget delivery of comprehensive pavement condition surveys, StreetSaver® management, and multi-year maintenance and rehabilitation planning. The table below shows representative projects from our recent portfolio, totaling over **4,300** lane miles of pavement condition assessment and management system implementation. Furthermore, Figure 4 below shows the locations in California where our firm has done similar scoped projects.

Table 1. Summary Matrix of ARA's Similar Projects.

Year	Agency	Lane Miles	PMS Database	Data Collection	Engineering Analysis	Asset Management
2025	City of Palmdale, CA	533	Lucity	Y	Y	Y
2024	City of South Gate, CA	125	StreetSaver®	Y	Y	--
2024	City of Red Bluff, CA	80	StreetSaver®	Y	Y	--
2024 – 2019	Riverside County, CA	2,200	StreetSaver®	Y	Y	--
2021	City of Chula Vista, CA	465	StreetSaver®	Y	Y	--
2024 - 2019	City and County of San Francisco, CA	275	StreetSaver®	Y	--	--
2022	City of Palm Desert, CA	256	PAVER/Cartegraph	Y	Y	Y
2020	City of San Marcos, CA	400	StreetSaver®	Y	Y	--

All projects listed above included automated pavement condition surveys following ASTM D6433 protocol, engineering analysis for network-level planning and budgeting, and development of multi-year maintenance and rehabilitation plans. Each project was delivered on time and within budget, demonstrating our consistent performance record with California municipalities. The scope and complexity of these projects directly parallel the requirements of Humboldt County Association of Governments, involving similar network sizes, municipal operational constraints, budget planning needs, and public accountability requirements. Our experience spans StreetSaver®, Lucity, and PAVER systems, ensuring seamless compatibility with the HCAOG's existing database structure.

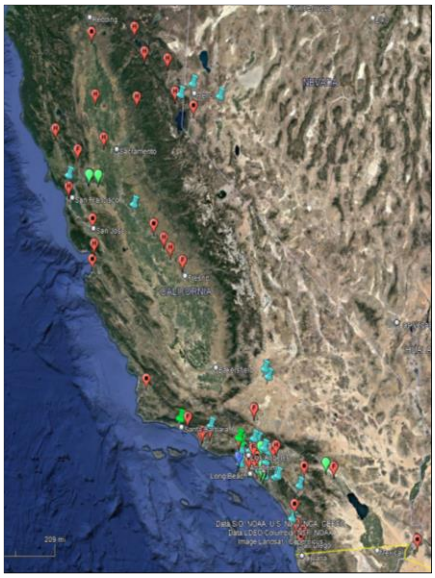


Figure 4: Project Locations in California

Our California municipal projects typically include comprehensive deliverables such as automated pavement condition surveys using our PathRunner technology, complete database updates and integration with existing GIS systems, detailed pavement management reports with multiple budget scenarios, maintenance and rehabilitation decision trees, performance modeling and forecasting, staff training on database management systems, and web-based data visualization platforms. Many projects also involve specialized services such as structural testing using Falling Weight Deflectometer (FWD) and Ground Penetrating Radar (GPR), asset inventory and management integration, and migration between different pavement management software platforms.

b. Key Personnel

ARA's Ventura CA office houses a dedicated team of pavement management specialists who bring focused expertise and proven track records directly to the project of Humboldt County Association of Governments. Our California-based team concentrates exclusively on pavement condition assessment, database management, PMS software training (StreetSaver®, Lucity, PAVER, OpenGov), and infrastructure planning for municipal clients. The project team has been structured to ensure technical excellence, clear communication, and continuity of personnel from project initiation through completion. The team members bring extensive hands-on experience with StreetSaver® systems, having successfully completed similar projects for California cities and counties over the past several years. To ensure the highest level of accuracy and consistency, our quality control checks will be performed by MTC (Metropolitan Transportation Commission) and OCTA (Orange County Transportation Authority) certified raters who maintain current certifications and adhere to California's rigorous pavement assessment standards.

Project supervision follows a clear hierarchical structure with multiple quality control checkpoints. The project team structure is as shown in Figure 5. Dr. Phillip Donovan, P.E., serves as Project Manager with overall responsibility for schedule, budget, and deliverable quality. Joseph Dib, P.E., PMP, functions as Assistant Project Manager, overseeing daily operations and coordinating technical teams. Salil Gokhale, PE provides technical oversight as Technical Advisor and QA/QC lead, ensuring all analyses meet professional standards and regulatory requirements. Dr. Donovan will serve as the primary point of contact with HCAOG and will be responsible for coordinating all formal communications, including project kickoff meetings, regular progress updates, data review milestones, and deliverable submissions. Routine communication will be maintained through scheduled status meetings, written progress summaries, and

email correspondence, with additional coordination meetings held as needed to address schedule, scope, or technical questions. Any issues or problems that arise during the project will be addressed promptly through direct coordination between the Project Manager, Assistant Project Manager, and HCAOG staff. Dr. Donovan and Mr. Dib will employ their extensive experience to resolve technical, schedule, and scope-related issues as they arise, with support from the Technical Advisor and QA/QC lead as needed to confirm technical adequacy and compliance. This approach ensures timely problem resolution and minimizes impacts to project progress and deliverable quality.

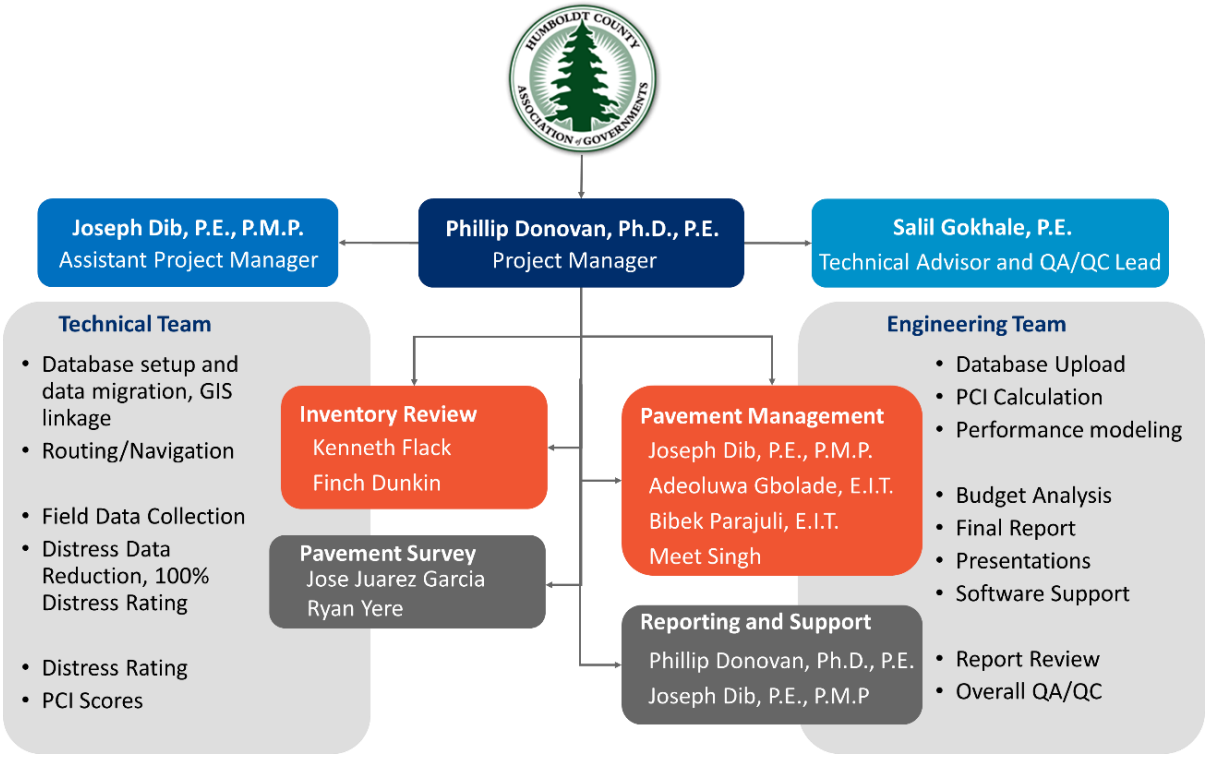


Figure 5: Project Team Structure

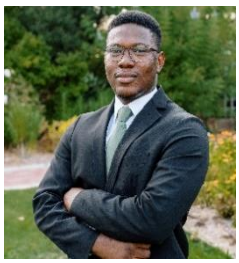
Brief descriptions of the individual team members are provided below.

Phillip Donovan, Project Manager | Ph.D., Civil Engineering, University of Illinois at Urbana-Champaign: Dr. Donovan, Ph.D., P.E., brings 30 years of civil and pavement engineering experience, including project management for California municipal clients such as Riverside County, Merced City, and multiple Bay Area agencies. His recent three-year experience includes overseeing PCI surveys and StreetSaver®, Lucity, and PAVER implementations for over 15 California municipalities. As Project Manager, he maintains direct client relationships, ensures schedule compliance, and provides final quality approval for all deliverables.

Joseph Dib, Assistant Project Manager | M.S., Civil Engineering, University of Nevada, Reno: Mr. Dib, PE (California), PMP, specializes in California municipal pavement management with direct experience supporting Riverside County, Santa Clara County, San Francisco, Palmdale, and Palm Desert over the past three years. **Certified by both MTC and OCTA as a pavement condition rater**, he has provided Pavement Management Program training (including Streetsaver®, Lucity, PAVER, and PERS) to multiple California cities and manages all fieldwork coordination. His role includes daily oversight of data collection teams and quality control of all technical analysis.

Salil Gokhale, Principal Engineer | M.S., P.E., Civil Engineering Pennsylvania State University: Mr. Gokhale, PE, brings 24 years of pavement engineering experience as Principal Civil Engineer and Director of Consulting Services. His recent three-year municipal experience includes pavement management system updates and automated distress data collection for over 15 agencies. Licensed in Texas and Florida, Mr. Gokhale will provide technical oversight and guidance to the project team. His role includes being a technical advisor and conducting quality assurance review of complex pavement evaluations and treatment recommendations.

Meet Singh, Staff Civil Engineer | M.S., Civil Engineering, California State University: Mr. Singh combines Caltrans experience with two years at ARA focusing on California municipal projects. **MTC and OCTA certified**, he has conducted pavement condition surveys for Riverside County, Palmdale, San Jose, Los Angeles County, and Port of Long Beach within the past three years. His role includes field data collection supervision and preliminary analysis of condition data.



Adeoluwa Gbolade, Staff Civil Engineer | M.S., Civil Engineering, Oklahoma State University: Mr. Gbolade recently joined ARA as a Staff Civil Engineer with more than three years of pavement-focused experience spanning pavement design, maintenance and rehabilitation (M&R) strategy development, and life-cycle cost analysis (LCCA) to compare M&R alternatives and support investment decisions. His role on this project will include field data collection supervision, contributing to the development of the five-year M&R program, and contributing to network-level budget analysis and scenario summaries.

Bibek Parajuli, Staff Civil Engineer | M.S., Civil Engineering, Oklahoma State University: Mr. Parajuli recently joined ARA as a Staff Civil Engineer with specialized expertise in pavement engineering, data analysis, and advanced signal processing techniques. He brings graduate research experience in transportation infrastructure evaluation, big data analysis, and machine learning applications to pavement condition assessment. His expertise includes Traffic Speed Deflectometer (TSD) and Falling Weight Deflectometer (FWD) data analysis, pavement structural evaluation, and development of innovative software solutions. With strong Python programming and GIS integration skills, he will support data processing workflows and advanced data analysis for the project.

Ryan Yere, Junior Civil Engineer: Mr. Yere is a Junior Civil Engineer in ARA's Ventura office with experience in pavement condition data collection, GIS analysis, and automated data processing. He supports ARA's pavement management and infrastructure projects across California, operating PathView/Pathways survey systems, performing GIS integrations, and utilizing Python to streamline data

workflows. His work ensures accurate and efficiently processed data that supports pavement condition evaluation and asset management.

Jose-Juarez Garcia, Senior Technician: Mr. Garcia brings 18+ years of pavement testing equipment operation with extensive California municipal experience. Over the past three years, he has conducted automated PCI surveys for San Francisco, Santa Clara County, Riverside County, Palm Desert, and Palmdale. His expertise ensures reliable field data collection and equipment operation throughout the project duration.

Kenneth Flack, Senior Technician: Mr. Flack, **MTC and OCTA certified**, manages GIS integration and data delivery with six years of pavement management experience. His recent California municipal work includes Palm Desert, Riverside County, Newport Beach, San Francisco, and San Marcos. He ensures seamless integration between field data and GIS systems while maintaining data quality standards.

Finch Dunkin, GIS Specialist / Senior Technician: Mr. Dunkin is a Senior Civil Engineering Technician and GIS Specialist based in Austin, Texas, with extensive experience in GIS and software programming. Over the past three years, he has conducted LCMS-based PCI surveys for multiple agencies including Bexar County, San Antonio, and Howard County. His role includes database development, routing and navigation plans, field data processing, and quality assurance. He has developed programming tools that integrate pavement testing equipment with analysis software, enhancing project efficiency.

c. References

Name of owner and project location, Name of project	Name of owner's contact person and telephone number	Brief description of work and ARA's specific involvement	ARA's Professional Staff Who Performed Work	Project Cost	Date
Riverside County PCI Survey and PMS Updates	Randy Flowers, Principal Engineering Technician, Riverside County, rflowers@rivco.org 951-961-7110	*Multi-year PCI monitoring contract for 2,200 centerline miles. Semi-automated surveys using 3D laser technology, updated StreetSaver® database, performance modeling, and annual budget/work plan recommendations.*	Dr. Phillip Donovan, P.E. Joseph Dib, P.E., P.M.P. Meet Singh Ryan Yere Kenneth Flack Jose-Juarez Garcia Finch Dunkin	*$4M over 9 Years*	Ongoing since 2019
Palmdale, CA, Citywide Sign Inventory and Retro-reflectivity and Lucity Based PCI Survey Update	Marc Zuber, Public Works Project Manager, City of Palmdale, mzuber@cityofpalmdaleca.gov 661-267-5100	*Comprehensive citywide sign inventory and retroreflectivity evaluation covering up to 20,400 signs. ARA conducted a two-phase approach: (1) office-based mapping using right-of-way imagery, and (2) field assessments using ASTM E1709-compliant handheld retroreflectometers and high-accuracy GPS. Each sign*	Dr. Phillip Donovan P.E. Joseph Dib, P.E., P.M.P. Meet Singh Ryan Yere Kenneth Flack Jose-Juarez Garcia Finch Dunkin	*$380,890 (sign survey only)*	Ongoing since 2023

Name of owner and project location, Name of project	Name of owner's contact person and telephone number	Brief description of work and ARA's specific involvement	ARA's Professional Staff Who Performed Work	Project Cost	Date
		is geo-tagged and evaluated for physical condition, visibility, and retroreflectivity, with digital photos and full CAMUTCD attribute documentation. Deliverables included a GIS database, compliance status, prioritized maintenance recommendations, and a three-year sign replacement strategy. *ARA has completed 2 PCI surveys for Palmdale and updated their Lucity database.*			
City of La Mesa, La Mesa 2024 Pavement Management System Project	Tristan Leger, PE, Associate Engineer I, Public Works – Engineering, City of La Mesa, TLegaz@cityoflamesa.us 619-667-1347	Pavement condition survey and PMS update for 151 centerline miles of city streets using PAVER software. Deliverables included network condition assessment, GIS integration, and budget analysis.	Dr. Phillip Donovan, P.E. Joseph Dib, P.E., P.M.P. Meet Singh Ryan Yere Kenneth Flack Jose-Juarez Garcia Finch Dunkin	*$69,640*	2024-2025

4. APPROACH

ARA's work plan is structured to address all items listed in the HCAOG's Scope of Services, ensuring that the HCAOG's pavement management system is fully updated, GIS-integrated, and optimized for long-term decision-making. This section outlines the activities that will be undertaken to refine and update the HCAOG's current StreetSaver® pavement management system, providing accurate data and improved usability for long-term planning.

Task 1 – Kick-Off Meeting, Project Management, and Reporting

Task 1.1 – Kick-Off Meeting

ARA will organize and facilitate an online kick-off meeting within 10 days of contract execution. Dr. Donovan will coordinate the meeting, prepare a detailed agenda covering project goals, scope, schedule, milestones, deliverables, and quality control procedures. We will prepare and distribute comprehensive meeting minutes with action items and assigned responsibilities within 48 hours of the meeting.

Deliverable

No.	Deliverable
1.1	Technical memorandum summarizing the results of the meeting

Task 1.2 – Project Coordination and Management

ARA will provide comprehensive project coordination and management throughout the engagement, with Dr. Phillip Donovan, P.E., serving as the main point of contact for all HCAOG communications. ARA's project management framework ensures proactive communication, accountability, and timely completion of all tasks in alignment with HCAOG's objectives.

Project Meetings: ARA will conduct regular project meetings as needed to ensure continuous communication and progress monitoring. Each meeting will include agenda preparation, minute-taking, and action item tracking.

Project Schedule: We will develop and maintain a detailed project schedule using Microsoft Project, with clearly defined milestones, deadlines, and critical path activities. The schedule will be updated weekly and shared with HCAOG to ensure transparency and accountability. Our schedule includes buffer time for HCAOG review periods and incorporates lessons learned from similar projects.

Quality Management: ARA will implement a rigorous Quality Assurance and Quality Control process to ensure that all collected data meet the highest standards of accuracy and consistency. We believe that dedication to quality is paramount to the overall success of any project. Hence, we will draw on our extensive experience and proven Data Quality Management Plans (DQMPs) to tailor a project-specific DQMP that covers every phase of work for the HCAOG. An example high-level DQMP chart that spans the life of the project is shown in Figure 6. Throughout all tasks, ARA will implement rigorous quality assurance procedures:

- **Data Verification** - Independent verification of some of the collected data
- **MTC Compliance** - Verification of data compatibility with StreetSaver® requirements
- **Milestone Reviews** - Regular progress assessments and HCAOG approval checkpoints
- **Documentation and traceability** - Version control, issue logs, and complete metadata for updates
- **Continuous Communication** - Regular status updates and immediate notification of issues

During the collection phase, ARA will conduct daily equipment checks and data review and maintain weekly control sites for consistency verification. The data processing phase includes completeness verification, distress rating quality control by MTC-certified personnel, data upload verification for StreetSaver® compatibility, and PCI audits. All deliverables will undergo a two-level internal review, followed by HCAOG review and acceptance. This systematic approach ensures accurate, consistent results that meet the HCAOG's requirements.

Figure 6. ARA Quality Control Plan.

Deliverables

No.	Deliverable
1.2	Schedule of project meetings and project milestones
1.3	Monthly status updates and invoices

Task 2 – Risk Management

ARA recognizes that successful project delivery depends on proactive risk and safety management. Prior to and during data collection, ARA will implement preventive measures to minimize risk to its employees and the general public. Key potential risks include field safety and traffic control requirements, as well as weather-related survey issues. These risks are mitigated through established protocols:

- **Field safety and traffic control:** Data collection is performed using PathRunner® survey vans operating at normal traffic speeds. Because field activities are vehicle-based, project staff are not required to work within travel lanes or on sidewalks, **and traffic control is therefore not required and will not be provided as part of this project**. Field safety risks are limited to normal driving conditions and are mitigated through the use of trained, experienced drivers and established operating procedures. Each survey vehicle is staffed by a two-person team, consisting of a dedicated driver and a separate data collection operator, to ensure the driver's full attention remains on safe vehicle operation at all times.
- **Weather and schedule risk:** Flexible mobilization scheduling and built-in contingency days.

Deliverable

No.	Deliverable
2.1	ARA's written agreement of adherence to this task.

Task 3 – Data Collection and Reporting

ARA will conduct comprehensive pavement distress surveys of the roadway network in the seven cities and the unincorporated areas of the county (including roads on Tribal lands), ensuring consistent and accurate assessments across all 1112.7 centerline miles of roads. Our team will conduct automated field surveys on all paved roads using ARA's PathRunner vehicles equipped with high-definition imaging systems and 3D laser technology. All surveys will follow MTC's 8AC/7PCC protocol, and all data collected will first be submitted using Excel spreadsheets for local staff review and approval before being entered into the existing PMS database.

Data Collection will include the following features:

- Street geometrics measured with GPS precision.
- Surface type identification and documentation.
- Comprehensive surface condition assessment.
- Detailed surface distress mapping and quantification.
- Pavement Condition Index (PCI) calculation.

Downward 3D LASER Crack Detection

Pathway Services' single camera and single laser 3D system stores high-resolution laser line scan images of the road surface to view cracks as small as 1mm. The 3D infrared laser system is not susceptible to environmental shadowing from trees, bridges, or other vehicles. The software creates a 3D pavement surface image from the millions of points of data collected each second. An example of the resulting imagery is shown in Figure 7. The images show detailed cracking and texture, and the transverse profile data is analyzed to calculate rutting and faulting. Note that because of the specially configured single-laser illumination, our 3D system avoids the problems seen with other vendors of inconsistent illumination and difficulty in synchronizing multiple cameras.

The cracking detection and identification algorithms used in Pathway's AutoCrack and AutoClassification software modules have been field verified on multiple pavement management projects and is relied upon **by nearly half of all U.S. DOTs** and complies with AASHTO R 85-18 – "Standard Practice for Quantifying Cracks in Asphalt Pavement Surfaces from Collected Pavement Images Utilizing Automated Methods."

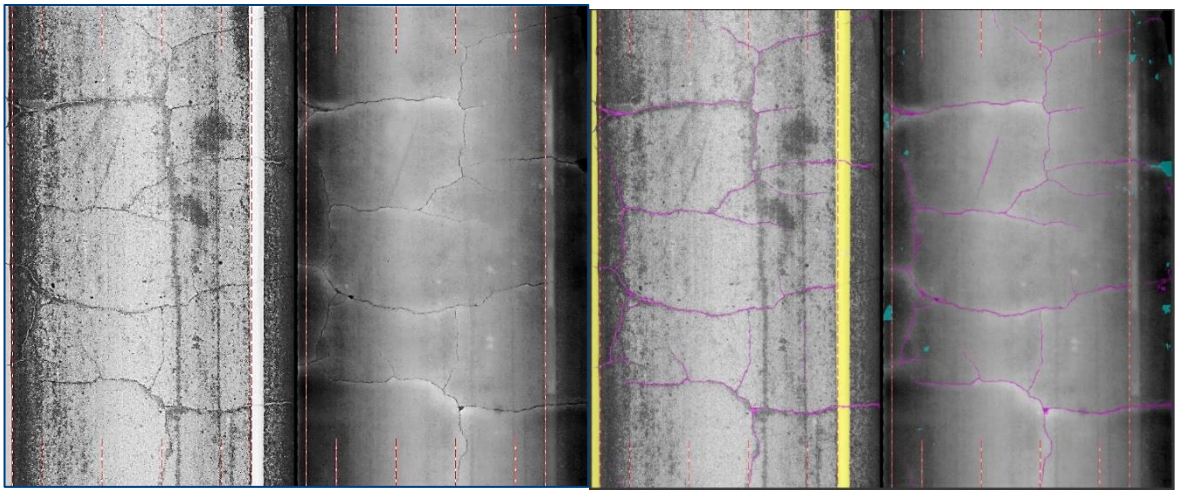


Figure 7. 3D Pavement Images (left) and Software Identified Cracks (in purple)

Right-Of-Way Images

In addition to the downward images, right-of-way data collection includes three forward-facing HD+ cameras as shown in Figure 8. The included cameras provide digital images, each with a resolution of 2750 x 2200, with the three forward-facing cameras presenting a combined resolution of 8250 x 2200. The cameras are equipped with wide angle lenses capturing a panoramic-like perspective of the right of way. The forward-facing cameras provide images for verifying the travel lane and identifying right-of-way zones with an example of the image quality shown in Figure 9. The images are a visual reference used to validate the 3D pavement image data captured by the laser system and are critical to the QC processes employed by ARA Engineers and any additional QA by City /County personnel.

At no additional cost, a Ladybug 360° camera subsystem is mounted to the van to collect continuous panoramic image data along each street. The Ladybug system creates a GPS synchronized immersive environment similar to Google Streetview®, but at a higher resolution.

Figure 8. Forward-Facing HD+ Cameras (on the left) and LadyBug Camera (on the right).

Figure 9. Panoramic Front View

Transverse Profile, Rutting, and IRI

Transverse profiles are collected according to AASHTO R88-18 - Standard Practice for Collecting the Transverse Pavement Profile. The transverse line scan is also used to calculate rutting in both wheel paths. The Pathway system rut depth precision is +/-1mm and is calculated according to ASTM E1703 and AASHTO PP69. Our Pathrunner van will also provide pavement roughness through the collection of the International Roughness Index. The PathRunner laser profiling system shown in Figure 10 conforms with ASTM E950-09 and AASHTO MP328-14 guidelines.

Figure 10. Inertial Profilers (Left) and Laser Camera for Pavement Imaging (Right).

Distress Identification

The Autoclassification software output contains detailed distress information, including section StreetIDs, GPS coordinates, Station from/to, distress type, severity, quantity, and location. In addition, the data also includes IRI and rutting values. The raw distress data is compiled into an Excel file for further review and QC and then exported into a StreetSaver® import ready Excel format for calculation of the PCI.

ARA proposes utilizing a 2-step distress rating procedure for HCAOG. In the first step, we plan on using Pathway's AUTOCRACK software for identifying and locating the extents of distresses. The software is fully customizable to include the distress data interpretation guidance from HCAOG's existing StreetSaver® database. In the second step, our team of experienced pavement inspectors will manually analyze up to

10% of the roads for quality control. The distress data includes distress types, severities, extents, and locations and is exported in StreetSaver® Excel format.

Project Specific Data Acquisition System and Data Visualization

With over a decade of experience in semi-automated pavement condition surveys, ARA maintains its position at the forefront of road assessment technology through strategic partnerships and continuous innovation. Recognizing the ever-evolving demands of road surface data collection, ARA tapped into the expertise of Pathway Services Inc., a well-established name in pavement imaging equipment and pavement management. Figure 11 illustrates the data acquisition system integrated into the PathRunner vehicle with a detailed description of the various installed measuring mechanisms. In addition to the surface distress measuring devices, PathRunner is equipped with two imaging systems, Super HD front roadway imaging and immersive 360-degree panoramic images. This acquisition system is geared towards enhancing ARA's existing capabilities, ensuring we continue to provide detailed and accurate data in our pavement assessment projects. Figure 12 displays the **Pathweb Data Visualization website, which will enable the ARA team and HCAOG staff to view and interpret the extensive collected data in an accessible format**, ensuring efficient extraction of critical information for more informed decision-making. All collected data is GIS integrated (downloadable as ESRI shapefiles) and includes multiple windows showing the Right of Way (ROW) cameras, 360° Streetview, a map window, transverse profile at any selected location, IRI graph, and pavement surface images (not shown below). Users are set up with a single website link and a username/password to access their data. The website also includes video style "play/stop/forward/rewind/step" buttons on the bottom so that users can virtually "drive" along a road.

It should be noted that all products from Pathway Services, Inc. are made and supported entirely in the United States of America, ensuring data security, quality, and reliability. Our field operators perform equipment quality control and calibration checks daily, with data quality assessment performed prior to analysis. Additionally, prior to processing laser image data, automatic checks have been streamlined to ensure data quality and to eliminate any errors or artifacts arising in the final processed images.

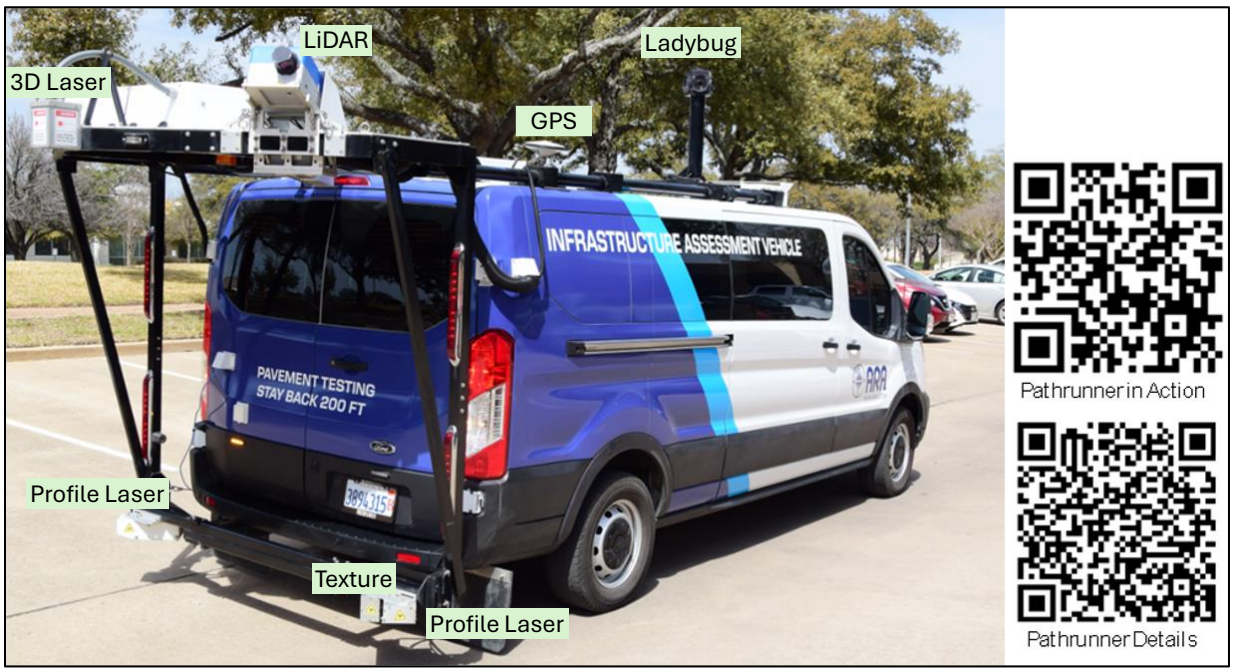


Figure 11: PathRunner Vehicle.

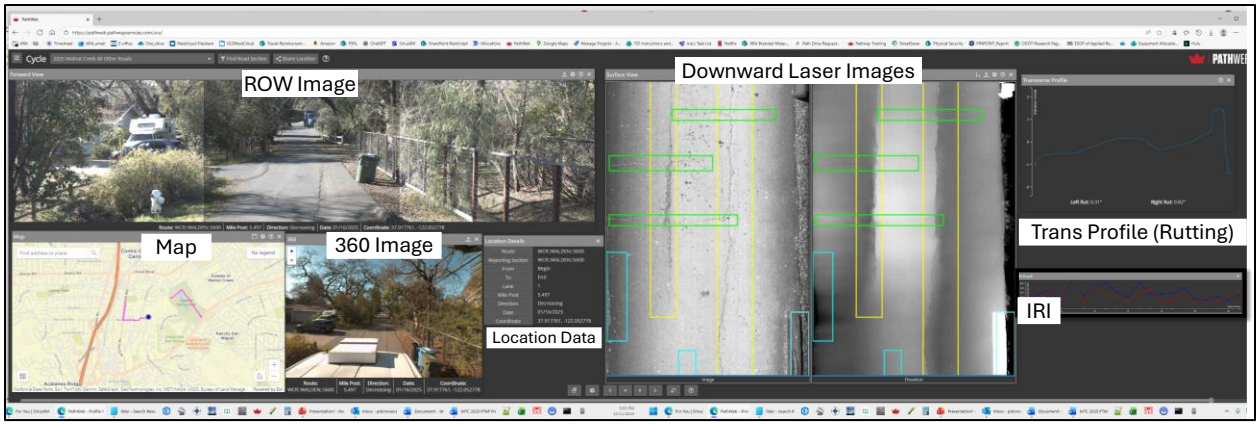


Figure 12. PathWeb Data Visualization Site.

Deliverables

No.	Deliverable
3.1	Inventory and condition information for each paved road and street by jurisdiction
3.2	Photographs of each condition throughout the county
3.3	Data entered into PMS database, and provided in GIS format

Task 4 – Review Maintenance and Rehabilitation Strategies

ARA will work closely with local representatives of the jurisdictions to develop practical and cost-effective multi-year Maintenance and Rehabilitation (M&R) strategies. The strategies will identify candidate street segments for treatment each year, based on updated pavement condition data, functional classification, and budgetary considerations. As part of this effort, ARA will develop and evaluate four recommended budget scenarios, which may be adjusted as desired by HCAOG and its member jurisdictions: (1) the current annual budget, (2) the budget required to maintain the current network PCI, (3) the budget required to achieve a specified target PCI, representing an unlimited budget scenario, and (4) an increased budget scenario equal to the current budget plus 20 percent. The recommended treatments will be prioritized to maximize system-wide benefits, address deferred maintenance, and align with individual jurisdictions' operational goals. StreetSaver® forecasts will report network PCI trends, remaining service life, and lane-miles by condition. We will perform a StreetSaver®-based network analysis of treatment options and agency costs over the analysis horizon. We will review and update decision trees, unit costs, and treatment triggers as needed, and then run analyses to produce actionable annual work programs.

Decision Trees Development: We will develop a comprehensive M&R decision tree tailored to HCAOG's jurisdictions' conditions, incorporating:

- Local climate and traffic conditions
- Available treatment options and costs
- Maintenance capabilities and resources
- Budget optimization strategies
- Performance prediction models
- Treatment timing and coordination considerations

Deliverable

No.	Deliverable
4.1	Maintenance and rehabilitation decision trees

Task 5 – Final Reports

ARA will prepare clear and comprehensive Pavement Management Program (PMP) Reports for each of the seven cities and the county that will document the findings and recommendations of the entire effort by consolidating all data, analyses, and results from previous tasks. The reports will serve as a foundational tool for communicating pavement needs, justifying investments, and supporting funding requests. The report will be suitable for both technical and non-technical audiences and will include, at a minimum:

- **Executive Summary** – Overview of the pavement management program, key findings, statistics, and summary of survey results for each component.
- **Introduction and HCAOG's Pavement Management Program Philosophy** – Description of how the HCAOG uses Lucity and data-driven planning for pavement management.
- **Methodology and Software Documentation** – Summary of data collection and analysis procedures, including software used.
- **Inventory Reports on PMS** – Inventory reports for the entire PMS database.
- **Current Pavement Condition Summary** – PCI values and PCI by functional classification.
- **Maintenance and Rehabilitation History** – Historic M&R activities.
- **Maintenance and Rehabilitation Decision Trees** – Report on M&R decision trees.
- **Multi-Year Maintenance and Rehabilitation Plans**– Recommended M&R projects for each year of the plans.
- **Budgetary Needs and Estimated M&R Costs** – Cost estimates based on treatment recommendations and current market material and labor rates.
- **Budget Scenarios** – Report on at least four alternative budget scenarios.
- **Graphs, Maps, and Other Supporting Information** – PCI map, deflection trends, annual project maps and tables.
- **Recommendations** – Strategic guidance for program implementation and management.

Quality Assurance: HCAOG will have the opportunity to review and comment on draft reports before finalization. The reports will be provided in bound copies, digital PDF and editable formats.

Deliverables

No.	Deliverable
5.1	Draft and final reports
5.2	Updated PMS database

Task 6 – Presentation of Completed Pavement Management System Update

ARA will present the completed Pavement Management System Update to both the HCAOG Technical Advisory Committee (TAC) and the HCAOG Board. The presentations will be made remotely to keep the budget within expected limits. Presentations will summarize key findings, analyses, and recommendations developed throughout the project and will be tailored to the needs of each audience. The TAC presentation will be detailed and technical in nature, focusing on data collection methods, pavement condition results, maintenance and rehabilitation strategies, decision trees, budget scenarios, and the technical basis for recommended work programs. Sufficient detail will be provided to support technical discussion. The HCAOG Board presentation will be structured for a non-technical audience and will emphasize overall network condition, funding needs, budget scenarios, and recommended actions, using clear graphics, maps, and summary tables to support informed decision-making. Both presentations will be prepared in PowerPoint and will be delivered in coordination with HCAOG staff.

Deliverables

No.	Deliverable
6.1	TAC presentation
6.2	HCAOG Board presentation

Task 7 – Training

ARA will provide one day of hands-on computer training for HCAOG employees and local staff. The training will be conducted via Zoom or another virtual platform and will be structured to support practical, day-to-day use of the StreetSaver® Program. The training will cover all major components of StreetSaver®, including data entry and editing, pavement condition and PCI calculations, budget analyses, report generation, and use of the Geographic Information System Toolbox. Training will be demonstration-based and interactive, with opportunities for participants to follow along during demonstrations and ask questions. Training materials will be tailored to the updated HCAOG StreetSaver® database and workflows and will be provided in electronic format for future reference.

Deliverable

No.	Deliverable
7.1	Training manuals

5. WORK PLAN AND SCHEDULE

We are confident in our ability to deliver exceptional and defendable data for Humboldt County Association of Governments through our efficient project timeline. Based on the HCAOG's Scope of Work, ARA has developed a detailed and realistic schedule presented in Figure 13, assuming receipt of the Notice to Proceed on March 2, 2026. ARA can begin work earlier if the Notice to Proceed is issued sooner and will shift the timeline accordingly while maintaining task durations and sequencing.

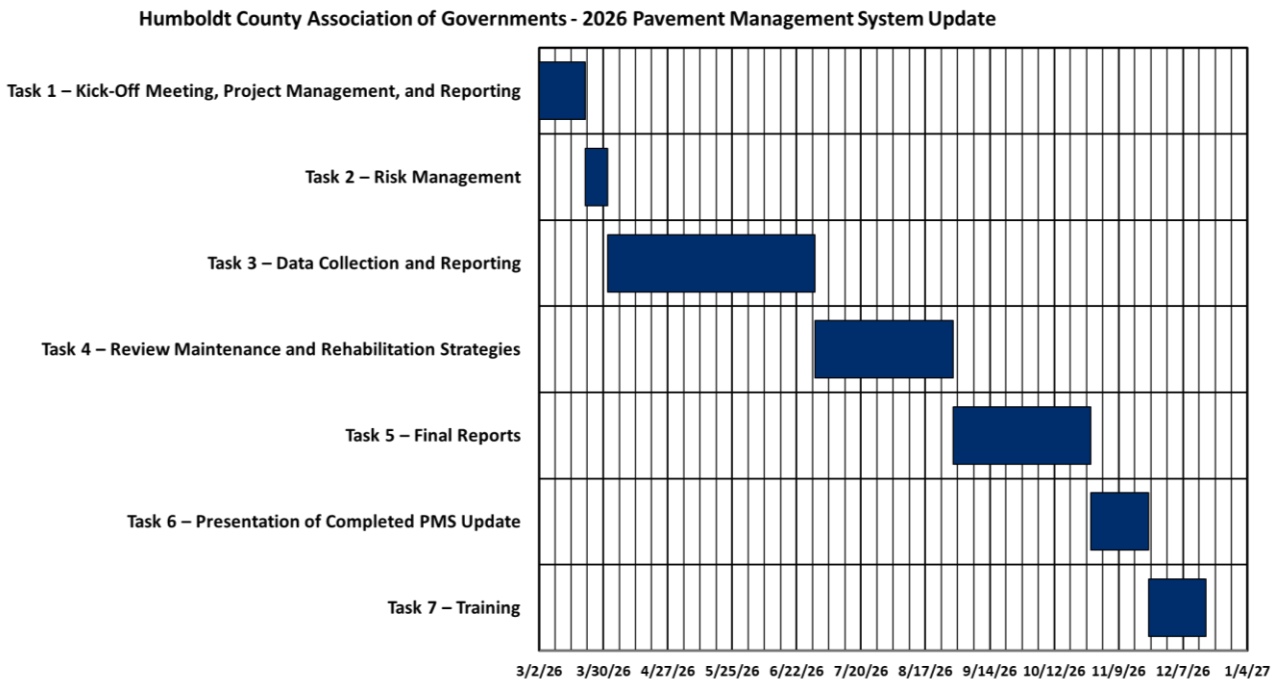


Figure 13: Proposed Project Schedule

Task Overview and Schedule

- Task 1 – Kick-Off Meeting, Project Management, and Reporting (March 2 – March 22, 2026): Initiates the project and establishes communication, coordination, and quality control procedures. Project management and reporting activities, including internal coordination, the TAC kick-off meeting, schedule management, quality control, and monthly progress reporting, are conducted throughout the project in accordance with the approved schedule.
- Task 2 – Risk Management (March 22 – April 1, 2026): Finalization and implementation of field safety and risk mitigation procedures prior to and during data collection.
- Task 3 – Data Collection and Reporting (April 1 – June 30, 2026): Inventory updates, pavement condition surveys, quality control, staff review of data submitted in Excel, PMS database updates, and GIS deliverables for all participating jurisdictions.
- Task 4 – Review Maintenance and Rehabilitation Strategies (June 30 – August 29, 2026): Review of maintenance and rehabilitation strategies with local representatives and development of decision trees and unit costs, and budget scenario analysis.
- Task 5 – Final Reports (August 29 – October 28, 2026): Preparation of draft and final Pavement Management Program reports, including budget analyses, a minimum of four budget scenarios, and multi-year work plans, along with updates to the PMS database.
- Task 6 – Presentation of Completed Pavement Management System Update (October 28 – November 22, 2026): Presentation of results to the HCAOG Technical Advisory Committee and the HCAOG Board.
- Task 7 – Training (November 22 – December 17, 2026): One day of hands-on virtual training covering all aspects of the StreetSaver® system.

Meetings and Progress Reporting

Internal project-team coordination, meeting with HCAOG personnel, and progress reporting are integrated into the schedule to support effective communication and timely decision-making. These include an internal project kickoff meeting, a kick-off meeting with the HCAOG Technical Advisory Committee, coordination meetings associated with data collection and strategy development, monthly progress reports, formal presentations to the TAC and HCAOG Board, and the final training session. A summary of anticipated meetings and progress reporting activities, applicable tasks, and tentative timeframes is provided in Table 2.

Table 2: Meetings and Progress Reporting Schedule

Meeting / Progress Report*	Applicable Task (s)	Tentative Date
Internal Project Kick-Off Meeting	Task 1	Between 03/02/2026 – 03/06/2026
Kick-Off Meeting with HCAOG TAC	Task 1	Between 03/02/2026 – 03/12/2026
Internal Field Safety, Mobilization and Risk Coordination Meeting	Tasks 2 and 3	Between 03/22/2026 – 04/01/2026
Monthly Progress Report – April	Project Reporting	End of April 2026
Data Review Coordination with HCAOG and Local Staff	Task 3	Between 05/20/2026 – 06/10/2026
Monthly Progress Report – May	Project Reporting	End of May 2026
Monthly Progress Report – June	Project Reporting	End of June 2026
Maintenance and Rehabilitation Strategy Review Meeting(s)	Task 4	Between 07/25/2026 – 08/14/2026
Monthly Progress Report – July	Project Reporting	End of July 2026
Monthly Progress Report – August	Project Reporting	End of August 2026
Internal Draft Report Review Meeting	Task 5	Between 09/20/2026 – 09/29/2026
Draft Report Review Meeting	Task 5	Between 09/29/2026 – 10/08/2026
Monthly Progress Report – September	Project Reporting	End of September 2026
Presentation to TAC	Task 6	Between 10/28/2026 – 11/11/2026
Presentation to HCAOG Board	Task 6	Between 11/12/2026 – 11/22/2026
StreetSaver® Training Session	Task 7	Between 11/22/2026 – 12/17/2026
Final Project Meeting	Project Closeout	End of December 2026 / Start of January 2027

**Meetings will be conducted virtually due to budgetary constraints. Progress reports will be provided via email.*

Staffing and Hours

ARA has assigned qualified staff to each task based on expertise, workload, and availability to ensure continuity and adherence to the proposed schedule. Estimated staff assignments and labor hours by task are summarized in Table 3. ARA anticipates a fixed-price contract, and the proposed staffing plan and level of effort have been developed to satisfy the requirements of the RFP. The greatest level of effort is allocated to data collection and reporting (Task 3), with focused effort also assigned to maintenance and rehabilitation strategy development (Task 4), final report preparation (Task 5), presentations (Task 6), and training (Task 7). This work plan and schedule satisfy all RFP requirements and provide a clear, defensible framework for successful project delivery.

Table 3: Project Team Proposed Workload Distribution by Task

Personnel	Estimated Hours by Task						
	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7
Phillip Donovan – Principal Civil Engineer 1	38	8	43	10	5	6	8
Joseph Dib – Senior Civil Engineer	28	8	44	15	5	6	8
Meet Singh – Staff Civil Engineer 1	4	-	28	-	-	-	-
Adeoluwa Gbolade – Staff Civil Engineer 1	4	-	16	12	20	6	8
Bibek Parajuli – Staff Civil Engineer 1	-	-	-	12	20	-	-
Ryan Yere – Junior Civil Engineer	-	10	161	-	-	-	-
Ryan Yere – OVERTIME	-	-	8	-	-	-	-
Kenneth Flack – Staff Civil Eng. Tech. 2	-	-	175	-	-	-	-
Kenneth Flack – OVERTIME	-	-	-	-	-	-	-
Jose Juarez-Garcia – Senior Civil Eng. Tech. 2	-	10	161	-	-	-	-
Jose Juarez-Garcia – OVERTIME	-	-	8	-	-	-	-

6. COST PROPOSAL

Figure 14 presents the cost per activity breakdown for the project. The total cost for the project is $214,900. Table 4 presents the hourly rate for all ARA personnel that will be involved with this project. ARA anticipates a fixed-price contract and will provide the services described in this proposal based on the detailed task-level breakdown presented here. To keep the budget within the “not-to-exceed” limit set in the RFP, all meetings are planned to be conducted virtually, and travel regarding this project is limited to those required for the data collection phase of the project. Table 5 presents the cost breakdown for the project based on cost type. Total travel cost is $12,593. Other direct costs total $69,825 and represent non-labor and non-travel expenses associated with field data collection. No subconsultants are proposed for this project. This offering is based on the following ground rules and assumptions:

1. ARA anticipates a fixed price contract. This proposal is good for 60 days.
2. The assumed period of performance is March 2026 through June 2027.
3. ARA will submit invoices monthly on a percent complete basis with payment terms of net30.

Project Name: Humboldt County Association of Government PMS Update			
Task	**Item**	**Price**	**Price**
Task 1: Kick-Off Meeting, Project Management, and Reporting	Item 1: Kickoff Meeting	$4,100	**$18,500**
	Item 2: Project Coordination and Management	$14,400	
Task 2: Risk Management	Item 1: Risk Management	$6,500	**$6,500**
Task 3: Data Collection and Reporting	Item 1: Survey Setup and Pathrunner Mobilization	$10,700	**$164,000**
	Item 2: PCI Data Collection	$113,500	
	Item 3: Image Analysis and QA/QC	$32,100	
	Item 4: Data Upload to GIS and StreetSaver®	$7,700	
Task 4: Review Maintenance and Rehabilitation Strategies	Item 1: Pavement Rehabilitation Strategies Review	$9,200	**$9,200**
Task 5: Final Reports	Item 1: Final Report Writing	$7,700	**$7,700**
Task 6: Presentation of Completed PMS Update	Item 1: TAC and Board Presentations	$3,900	**$3,900**
Task 7: Training	Item 1: Training	$5,100	**$5,100**
	TOTAL:	**$214,900**	

Figure 14: Cost Per Activity Breakdown for the Project

Table 4: Hourly Rate for All Personnel (fully loaded rates)

Personnel	Hourly Rate ($)
Phillip Donovan – Principal Civil Engineer 1	305.26
Joseph Dib – Senior Civil Engineer	195.20
Meet Singh – Staff Civil Engineer 1	126.33
Adeoluwa Gbolade – Staff Civil Engineer 1	120.43
Bibek Parajuli – Staff Civil Engineer 1	127.97
Ryan Yere – Junior Civil Engineer	95.93
Ryan Yere – OVERTIME	143.90
Kenneth Flack – Staff Civil Eng. Tech. 2	89.75
Kenneth Flack – OVERTIME	134.62
Jose Juarez-Garcia – Senior Civil Eng. Tech. 2	135.85
Jose Juarez-Garcia – OVERTIME	203.77

Table 5: Cost Breakdown for the Project

Cost Type	Amount ($)
Labor	$132,482
Travel	$12,593
Other Direct Costs	$69,825
TOTAL	$214,900

7. REQUIRED ATTACHMENTS

a. Subconsultant List Form

No subconsultant is proposed to be used during this project.

b. Staff Resumes for Key Personnel

Detailed qualifications of the project team can be found in the resumes provided below.

Phillip R. Donovan, Ph.D., P.E.

PRINCIPAL ENGINEER – ARA

ROLE

Project Manager

YEARS OF EXPERIENCE

30

YEARS AT ARA

5

EDUCATION

B.S., Civil Engineering, United State Air Force Academy, 1995

M.S., Civil Engineering, Civil Engineering, University of Washington, Seattle, WA, 1996

Ph.D., Civil Engineering, University of Illinois at Urbana-Champaign, 2009

LICENSE & REGISTRATION

PE – Wisconsin, No. 35794-6

PE – Colorado, No. 0047356

AREAS OF EXPERTISE

►Pavement Management System Implementation and Optimization

Dr. Phillip Donovan is a licensed engineer with more than 30 years of experience in civil and pavement engineering. He retired as a Lt. Colonel after 20 years of active duty with the US Air Force in 2015. He was a Civil Engineer for his entire military career and worked in design, construction, and project management around the world. His final Air Force assignment was teaching geotechnical and pavement engineering at the US Air Force Academy. He has substantial experience in non-destructive testing (NDT) using the Falling Weight Deflectometer (FWD) and Heavy-Weight Deflectometer (HWD) and has extensive knowledge in pavement evaluation and design, pavement and asset management, and Geographic Information Systems (GIS).

EXPERIENCE

February 2020–present: Applied Research Associates, Inc.

August 2015–January 2020: Dynatest North America, Inc.

May 1995–July 2015: United State Air Force

SPECIFIC PROJECT EXPERIENCE

- ***Project Management.*** Dr. Donovan served as a project manager on several time-sensitive projects throughout his military career and knows how to organize and execute complex jobs on time and on budget. He has conducted Air Force civil engineering research in Florida, built dorms in South Korea, planned anti-terrorism construction in Hawaii, forecast construction requirements for expanded Air Force operations, coordinated large renovation projects at the Air Force Academy, and taught hands-on pavement construction from subgrade preparation to paving with asphalt. During a deployment to Afghanistan, Dr. Donovan evaluated all runway surfaces throughout the country. He has also helped design and implement rapid pavement repairs for deteriorating operational runways.

Dr. Donovan is currently the project manager for the PCI survey and implementation of the pavement management system for Riverside County (CA), Merced City (CA) Association of Governments, San Francisco, Fort Huachuca, Arizona, and Fort McCoy, Wisconsin using StreetSaver®. He is also the project manager for the linear segmentation, manual and automated PCI survey, and implementation of the PAVER system for the Naval Facilities Command for Naval Base Ventura City, Naval Support Activities Joint Base Anderson, Guam, Naval Base Guam, and Commander Fleet Activities Okinawa and Sasebo, Japan with over a thousand miles of asphalt and concrete roadways and parking lots to inspect and manage.

- ***Friction Data Collection and Analysis.*** Dr. Donovan is one of ARA's experts in managing friction data collection, processing, and reporting. He has completed friction projects for Caltrans; the South Dakota DOT; the auto proving grounds for Ford, Chrysler, and FT Techno; Las Vegas, NV; Montgomery and Foley, AL; and the Louisville, LeSueur City, MN, and White Cloud, MI airports.

- ***Pavement Structural Data Collection and Analysis.*** Dr. Donovan is responsible for project management, data collection, and structural data analysis using Dynatest's FWD and HWD equipment. He is working on or has completed projects for the Navy; the City of Portland, OR; the Los Angeles World Airports; and several cities throughout the US. He has also deployed a Heavy Weight Deflectometer to Tinian Island, which is north of Guam, to evaluate their harbor pavements in anticipation of the expansion of a marine training ground on Tinian.

Joseph Dib, PE, PMP

SENIOR CIVIL ENGINEER - ARA

ROLE

Assistant Project Manager

YEARS OF EXPERIENCE

7

YEARS AT ARA

5

EDUCATION

►B.S., Civil Engineering, University of Balamand, Koura, Lebanon, 2017

►M.S., Structural Engineering, University of Balamand, Koura, Lebanon, 2019

►M.S., Civil Engineering, University of Nevada, Reno, Nevada, 2021

LICENSE & REGISTRATION

►California PE - C 98323

►Arizona PE –No. 81949

►Project Management Professional (PMP)

►MTC and OCTA Certified Rater

AREAS OF EXPERTISE

►Pavement Condition Inspections
►Pavement Engineering
►Pavement Design
►Geotechnical Engineering

Mr. Dib will act as assistant project manager and will oversee preparation for fieldwork and field operations. Mr. Dib brings two masters' degrees in Structural and Pavement Engineering and more than five years of consulting transportation engineering experience to this role. Mr. Dib has been served in this role for many similar projects, including projects for Riverside County, Mohave County, Santa Clara County and the Cities of San Francisco, Palmdale, Palm Desert, Pico Rivera, Napa, Concord, Industry among many others.

Mr. Dib has more than five years of experience in civil, geotechnical, and pavement engineering research and consulting projects to Nevada Department of Transportation (NDOT), US Army Corps of Engineers (USACE), and several cities and counties in the state of California. He specializes in asphalt material/soil characterization, highway pavement design, pavement condition evaluation and field investigations including Falling Weight Deflection (FWD) testing, Ground Penetrating Radar (GPR), Pavement Condition Index (PCI) surveys for roadway pavements, GIS Integration, and pavement preservation and rehabilitation techniques. **He is a Metropolitan Transportation Commission (MTC) and Orange County Transportation Authority (OCTA) Certified rater** and has extensive experience with StreetSaver® Software. He provided multiple training sessions on pavement management for City staff of Cities and Counties in California.

EXPERIENCE

June 2021–present: Applied Research Associates, Inc.
June 2016–June 2019: El Douaihy Group LTD.
June 2014–November 2015: Infrast LTD.

SPECIFIC PROJECT EXPERIENCE

Pavement Management and Data Collection Experience

- **Riverside County, CA**. Semi-automated pavement condition survey, pavement management system update for 2,300 miles of roads, and budget analysis. (2021)
- **Port of Long Beach, CA.** Provided comprehensive StreetSaver® implementation, pavement condition assessment, and reporting for the Port's road network.
- Los Angeles County, CA. Performed numerous pavement condition inspections.
- **City of Chula Vista, CA.** Conducted pavement distress data collection, condition assessment, and StreetSaver® Software training.
- **City of Mount Vernon, WA.** Performed pavement condition inspections.
- **City of San Francisco, CA.** Semi-automated pavement data collection and processing for 160 miles of roadway, data submitted in Esri Geodatabase format and uploaded to StreetSaver®. (2021-2024)

Evaluation and Rehabilitation Design

- **City of Carpinteria, CA.** Semi-automated pavement condition assessment, Falling Weight Deflectometer (FWD) testing and analysis of roadways used as construction haul routes for pre- and post-construction pavement conditions. (2021)
- **City of Pico Rivera, CA.** Completed pavement rehabilitation designs on more than 130 streets in a City-wide pavement rehabilitation optimization to the network level Capital Improvement Plan.
- **Maricopa County, AZ.** Conducted roughness testing and evaluation for multiple projects.

Salil Gokhale, PE

PRINCIPAL CIVIL ENGINEER - ARA

ROLE

QA/QC Lead

YEARS OF EXPERIENCE

24

YEARS AT ARA

12 (2001 to 2008, 2020 to present)

EDUCATION

MBA, University of Illinois at Urbana-Champaign , 2025
M.S., Civil Engineering, Pennsylvania State University, 2001
B.E., Civil Engineering, Govt. College of Eng., Pune, India, 1998

LICENSE & REGISTRATION

PE Florida #66552
PE Texas #129345

PROFESSIONAL AFFILIATIONS

►Member, ASCE
►President, ATPIO
►Member, APWA

Mr. Gokhale is an Associate Division Manager and Principal Engineer with ARA. He is a licensed engineer with more than 24 years of experience in pavement engineering and has extensive experience with highway and airfield pavement engineering and evaluation projects worldwide. His areas of expertise include implementation/updates of pavement management systems, automated and manual pavement condition surveys, non-destructive structural testing with the Falling Weight Deflectometer (F/HWD), Ground Penetrating Radar (GPR), GIS integration, pavement profile measurements, friction testing, and Accelerated Pavement Testing (APT). Mr. Gokhale has published more than 15 journal papers and technical reports and is a past member of the Transportation Research Board's standing committee on pavement monitoring and evaluation. He is based in Austin, Texas.

SPECIFIC PROJECT EXPERIENCE

Mr. Gokhale has extensive experience in managing pavement evaluation and management projects on highways and city/county roadways. Mr. Gokhale has vast experience in managing pavement evaluation and engineering projects for various agencies using 3D pavement imaging systems, non-destructive structural testing, profile measurements and friction testing. A partial listing of Mr. Gokhale's pavement management and evaluation projects is shown below.

PAVEMENT Management and EVALUATION PROJECTS

- 3D scanning laser technology data collection and reporting on more than 10,600 miles of State maintained roadways for the Florida Department of Transportation in support of HPMS reporting to FHWA.
- Visual distress surveys, pavement roughness measurements and pavement management system updates using StreetSaver®, Cartegraph and CRAB on more than 2,500 miles of roadways for Snohomish County, WA (2013-2017). The County opted for automated measurements from 2018 through 2022. Mr. Gokhale has been the project manager since its inception. The new contract is in place for 2023-2028.
- Comprehensive pavement evaluation and design for Guam Route 1 and Route 3 Haul Road Network (2023)
- Pavement management system implementation and automated surveys for Howard County, MD on more than 1,450 miles of County maintained roads (2019, 2021, 2023 and 2025)
- Pavement management system implementation and automated surveys on more than 650 lane miles in Benton County, Washington (2023 and 2025)
- Automated distress data collection and pavement management system update for Arlington County, VA on more than 1,000 lane miles of County maintained roads (2019)
- Automated distress data collection and pavement management system update for City of Richmond, VA on more than 1,800 lane miles of City maintained roads (2019)
- Automated distress data collection, and pavement management system update for the City of Minneapolis, MN, on more than 1,600 lane miles of City streets and alleys. (2017)
- Evaluation of roadway conditions during pre- and post-construction phases of the Rover Pipeline project on more than 3,200 lane miles of rural roadways in Ohio, Michigan, West Virginia, and Pennsylvania. (2016-2018).
- Evaluation of roadway conditions during pre- and post-construction phases of the Enbridge Energy Flanagan South, Line 6B and Line 79 projects on more than 7,000 miles of rural County haul routes in Michigan, Illinois, Missouri, Kansas, and Oklahoma. (2013-2014).

Meet Singh, M.S.

STAFF CIVIL ENGINEER - ARA

ROLE

Project Engineer

YEARS OF EXPERIENCE

4

YEARS AT ARA

2

EDUCATION

►M.S. Civil Engineering, California State University, Long beach, California, 2022

►B.S., Civil Engineering, Gandhinagar Institute of technology, Ahmedabad, India, 2017

AREAS OF EXPERTISE

►Pavement Management Systems
►Pavement Design
►Geotechnical Engineering

Mr. Singh will be responsible for Data Acquisition and Analysis, overseeing the preparation for fieldwork and field operations. He holds a master's degree in civil engineering with a specialization in Transportation/Geotechnical engineering.

Mr. Singh has 2 years of experience in civil, geotechnical, and material testing research work for Caltrans. He specializes in asphalt material/soil characterization, highway pavement design, pavement condition evaluation, and field investigations including Falling Weight Deflection (FWD) testing, Ground Penetrating Radar (GPR), Pavement Condition Index (PCI) surveys for roadway pavements, GIS Integration, and pavement preservation and rehabilitation techniques. **He is a Metropolitan Transportation Commission (MTC) and Orange County Transportation Authority (OCTA) Certified rater.**

EXPERIENCE

Jan 2023–present: Applied Research Associates, Inc.
June 2022-December 2023: Total Western-INC
November 2017–August 2019: Sadbhav Infrastructure LTD.

SPECIFIC PROJECT EXPERIENCE

• ***Riverside County, CA*.** Performed a semi-automated pavement condition survey, pavement management system update for 2,300 miles of roadways, and budget analysis for the city. (2023-2024)

City of Palmdale, CA: Completed a Sidewalk survey and ADA Ramp compliance for year 2024.

• ***Los Angeles County, CA*.** Conducted numerous pavement condition inspections and several road pavement examinations.

• ***San Jose, CA*.** Automated pavement data collection, rating, processing, and reporting for the City's roadway network. (2023-2024)

• ***City of Industry, CA*.** Completed pavement evaluation and FWD data analysis for rehabilitation and reconstruction projects using Falling Weight Deflectometer (FWD) data.

• ***Benton County, WA*.** Automated distress data collection and pavement management system update for more than 619 center lane miles of arterial and collector roads. (2024)

• ***Mill Creek, WA*.** Semi-automated pavement data collection and processing for 110 miles of roadway, submitted in ESRI Geodatabase format and uploaded to StreetSaver®. Budget analysis was also performed. (2024)

• ***City of Palmdale, CA*.** Performed a citywide pavement management update along with sidewalk and ADA ramps survey for compliance.

• ***Port of Long Beach, CA*.** Provided comprehensive StreetSaver® implementation, pavement condition assessment, and reporting for the Port's road network, and assisted in manual pavement condition rating.

Adeoluwa Gbolade, EIT

STAFF CIVIL ENGINEER - ARA

ROLE
Staff Civil Engineer

YEARS OF EXPERIENCE

4

YEARS AT ARA
<1

EDUCATION
►M.S., Civil Engineering, Oklahoma State University, Stillwater, Oklahoma, 2024

►B.Sc., Civil Engineering, Obafemi Awolowo University, Ile-Ife, Nigeria, 2022

AREAS OF EXPERTISE
►Pavement Condition Evaluation
►Pavement M&R Scheduling
►Life Cycle Cost Analysis
►Advanced Data Processing
►Machine Learning
►R Programming

Mr. Gbolade recently joined ARA as a Staff Civil Engineer with about four years of pavement-focused experience spanning pavement design, maintenance and rehabilitation (M&R) strategy development, and life-cycle cost analysis (LCCA). His work at Oklahoma State University focused on designing and analyzing flexible pavements, developing balanced mix design frameworks for performance-graded asphalt mixtures, and applying LCCA to support decision-making on long-term maintenance alternatives. He has conducted big data analysis for pavement engineering works and has contributed to several LCA and LCCA studies for agencies and national research projects. Adeoluwa has coordinated multi-disciplinary research teams, developed dashboards in Tableau for engineering analysis, and contributed to agency-focused deliverables. He also has hands-on experience in supervising field data collection, QA documentation, and lab testing of materials, and he has presented findings at technical conferences and industry forums.

EXPERIENCE

September 2025 – Present: Applied Research Associates, Inc.

August 2022 – September 2025: Oklahoma State University

SPECIFIC PROJECT EXPERIENCE

Pavement Design and Life-Cycle Cost Analysis

Adeoluwa conducted life-cycle cost analysis (LCCA) using FHWA RealCost to evaluate alternative maintenance and rehabilitation strategies for flexible pavements. He applied pavement design tools to design new pavement sections, assess structural adequacy, and simulate performance across climate and subgrade scenarios. He prepared comparative cost-performance summaries to support project-level and network-level decision making.

Light Weight Deflectometer Testing and Data Analysis.

Adeoluwa conducted full-scale field testing to develop a compaction control protocol for open graded aggregates using Dynamic Cone Penetrometer (DCP), Light Weight Deflectometer (LWD), and plate compactors. He conducted big-data analysis to relate required compactor passes for adequate compaction to variables such as aggregate gradation, layer thickness, and compactor size.

Balanced Mix Design and Performance Testing

Adeoluwa supported design and performance evaluation of warm mix asphalt and asphalt mixtures containing reclaimed asphalt shingles (RAS). He conducted Hamburg Wheel Tracking and Indirect Tensile Cracking Tests, analyzed results, and interpreted performance thresholds for mix optimization. This work contributed to recommendations for sustainable pavement strategies with lifecycle and durability considerations.

Bibek Parajuli, EIT

STAFF CIVIL ENGINEER - ARA

ROLE
Staff Civil Engineer

YEARS OF EXPERIENCE

3

YEARS AT ARA
<1

EDUCATION
►B.E., Civil Engineering, Tribhuvan University, Kathmandu, Nepal, 2022

►M.S., Civil Engineering, Oklahoma State University, Stillwater, Oklahoma, 2025

AREAS OF EXPERTISE
►Pavement Condition Evaluation
►Advanced Data Processing
►Machine Learning
►GIS Integration
►Python Programming

Mr. Parajuli is a Civil Engineer with ARA who has specialized expertise in pavement engineering, data analysis, and advanced signal processing techniques. Prior to joining ARA, he gained extensive experience in transportation infrastructure evaluation, big data handling, and machine learning applications to pavement condition assessment through his graduate research work. His expertise includes Traffic Speed Deflectometer (TSD) and Falling Weight Deflectometer (FWD) data analysis, pavement structural evaluation, thermal segregation analysis, and development of innovative software solutions for transportation engineering applications. Mr. Parajuli has a strong background in Python programming, GIS integration, and automated data processing workflow.

EXPERIENCE

August 2025–present: Applied Research Associates, Inc.

SPECIFIC PROJECT EXPERIENCE

Traffic Speed Deflection Device Data Analysis for Pavement Structural Evaluation. Mr. Parajuli investigated Traffic Speed Deflectometer data for the Oklahoma Department of Transportation and Idaho Transportation Department. He georeferenced FWD data through web scraping and data mining techniques and implemented machine learning methods to compare functional and structural pavement parameters. His work involved advanced data processing, principal component analysis (PCA), and GIS mapping to support pavement evaluation efforts.

Metropistas Pavement Management Implementation and Update: As a project engineer, Mr. Parajuli played a key role in developing and implementing comprehensive pavement management solutions for the Metropistas highway network. His responsibilities included designing and maintaining complex ArcGIS databases to store and manage extensive pavement condition data, geometric information, and maintenance history records. Mr. Parajuli developed automated data aggregation workflows using Python programming, creating custom scripts that significantly improved data processing efficiency and reduced manual data entry errors. He implemented geospatial analysis tools to correlate pavement condition assessments with network characteristics, enabling better prioritization of maintenance activities. His work included creating standardized data validation procedures, developing automated quality control checks, and establishing data export protocols that streamlined the delivery of analysis results to project stakeholders. The enhanced workflow systems he developed reduced data processing time by approximately 40% while improving data accuracy and consistency across the entire pavement management database

South Brooklyn Marine Terminal (SBMT) in Brooklyn, NY: As a project engineer, Mr. Parajuli provided forensic investigation and quality assurance support for Equinor's transformation of the South Brooklyn Marine Terminal into a Wind Turbine Staging and Assembly facility requiring heavy-duty asphalt capable of supporting 3,000 psf loads. Following quality concerns during asphalt installation, he conducted comprehensive data analysis to review field measurements and correlate them with laboratory test results, ensuring consistency and reliability. Mr. Parajuli performed detailed compliance verification of air void content, compaction testing results, and placement specifications, developing automated data validation scripts to identify quality control deviations. His forensic analysis included statistical evaluation of placement practices and root cause identification for quality variations. The data analysis and visualization tools he created enabled rapid identification of problematic areas and supported development of corrective action recommendations for the specialized wind turbine facility requirements.

Ryan Yere

JUNIOR CIVIL ENGINEER - ARA

ROLE
Junior Civil Engineer

YEARS OF EXPERIENCE
2

YEARS AT ARA
2

EDUCATION
► B.S., Civil Engineering, California State University, Long Beach, CA, 2022

AREAS OF EXPERTISE
►Pavement Data Collection
►Python Programming and Workflow Optimization
►GIS Integration
►Pavement Management Systems

Mr. Yere is a Junior Civil Engineer in ARA's Ventura office with practical experience in pavement condition data collection, GIS-based analysis, and automated data processing workflows. He contributes to ARA's pavement management and infrastructure assessment projects across California and other jurisdictions, supporting data acquisition, quality control, and GIS integration for large-scale roadway networks.

He has demonstrated proficiency in operating ARA's PathView/Pathways pavement survey systems for municipal, county, and state clients, acquiring roadway imagery and roughness data used in condition evaluations. His responsibilities include performing QA/QC on collected datasets to verify spatial accuracy and completeness, processing and managing data within ArcGIS Pro, and developing Python-based automation tools to streamline workflow efficiency and data merging operations.

Mr. Yere's work extends to the preparation of client deliverables, including GIS-based maps, interactive web viewers, and technical data summaries that enhance project visualization and communication. His combined background in data analytics, geospatial visualization, and software integration enables him to deliver accurate, defensible, and efficiently processed data products that support ARA's pavement management and asset inventory initiatives.

EXPERIENCE

February 2024 – present: Applied Research Associates, Inc.

SPECIFIC PROJECT EXPERIENCE

City of Palmdale – Palmdale, CA

Mr. Yere conducted comprehensive sidewalk surveys and ADA ramp inspections to evaluate compliance with accessibility standards, and he collected pavement condition data using Pathways survey vehicles to support the City's infrastructure planning efforts.

Los Angeles County – CA

He collected and processed pavement condition data using Pathways survey systems for regional asset management and performed quality control of bike path data, rendering and reviewing GoPro imagery to visually represent pavement conditions.

Metropistas – Puerto Rico
He integrated field-collected data and imagery into ArcGIS Pro for visualization and reporting, and he developed Python scripts to automate data manipulation and generate custom map viewers for client presentations.

City of Carson – Carson, CA
He collected and processed pavement condition data using Pathways survey systems, ensuring accuracy, consistency, and proper alignment across the roadway network.

Kenneth Flack

CIVIL ENGINEERING TECHNICIAN - ARA

ROLE

Civil Engineering Technician/Data Collection

YEARS OF EXPERIENCE

6

YEARS AT ARA

4

EDUCATION

►B.A., Urban Studies and Planning, California State University, Northridge, 2009.

►Urban and Regional Planning Coursework, Graduate Studies (48 units), San Jose State University, 2009-2011.

LICENSE & REGISTRATION

►MTC StreetSaver® Rater Certification Program, Serial no. 1078, May 2019.

►OCTA Pavement Inspector Prequalification Certification, Automated Survey Techniques, February 2020.

Kenneth Flack has been a pavement rater and technician with ARA and Dynatest for over 6 years. He possesses certification with the MTC for their standard of pavement condition assessment and has completed pavement rating for numerous client projects. Mr. Flack also performs QA/QC on rated data, does field data collection and equipment operation, and completes map updates for clients using ArcGIS. Mr. Flack also has extensive expertise in ArcGIS Software. He has served as a GIS specialist technician for several projects including the City of Palmdale, Palm Desert, Riverside County, Newport Beach, and many others.

EXPERIENCE

February 2020–present: Applied Research Associates, Inc.
May 2018–February 2020: Dynatest Consulting Inc.
January 2009–June 2009: City of Los Angeles, Department of City Planning
May 2008–January 2009: CSUN Environmental Geography Lab (GIS for the Southern California Coastal Watershed Research Project)

SPECIFIC PROJECT EXPERIENCE

- ***Rehabilitation design for several streets – Palm Desert, CA.*** Mr. Flack served as a technician for a Falling Weight Deflectometer (FWD) and Ground Penetrating Radar (GPR) survey at Palm Desert. His role included overseeing the data collection at the field, performing GPR data analysis to estimate the pavement layers thicknesses and to provide coring location recommendations for the engineer final review.

- ***Rehabilitation design for Priority Streets in 2021– Palmdale, CA.*** Mr. Flack served as a data analysis technician on this project. The tasks included analysis of FWD and GPR data on routes with embedded rubblized concrete layers to recommend this type of material layer moduli to be used for design purposes by the State.

- ***City of San Marcos, CA – San Marcos, CA.*** Collected pavement condition data with survey vehicle and completed pavement rating.

- ***City of San Francisco, Department of Public Works – San Francisco, CA.*** Collected pavement condition data with survey vehicle, completed pavement rating, performed manual pavement inspections where necessary, verified special conditions in the field and took notes/photos, and completed QC of rated pavement data using StreetSaver®.

- ***County of Riverside, CA – Riverside, CA*** – Collected pavement condition data with survey vehicle and completed pavement rating using StreetSaver®.

- ***International Parkway PCI Survey at DFW Airport – IEA, Inc. – Dallas, TX.*** Completed QC of rated pavement data using StreetSaver®.

- ***Sidewalk Condition Survey – City of Alpharetta – Alpharetta, GA.*** Updated, sectioned, and verified sidewalk data in the city's GIS map; performed field inspection of sidewalk conditions and facilities locations and took notes/photos; and updated inspection data in ArcPad.

- ***SMART Runways Initiative – US Army Corps of Engineers, Engineer Research and Development Center – Hill AFB – Layton, Utah.*** Assisted in installation of instrumentation array, wiring, and conduits under runway pavement, including asphalt strain gauges, pressure cells, moisture/temperature sensors, and multi-depth deflectometers. Performed lightweight deflectometer (LWD) data collection on multiple soil layers. Assisted in installation of data acquisition system for remote access of real-time runway sensor data.

Jose-Juarez Garcia

SENIOR TECHNICIAN – ARA

ROLE

Field Technician/Data Collection

YEARS OF EXPERIENCE

18

YEARS AT ARA

4

EDUCATION

►Antelope Valley College. Contemporaneous Business 1988-1990
►Antelope Valley College. Emergency Medical Technician 1991-1992
►University of Antelope Valley. Auto Mechanic Engine Rebuilding 1997-1998

LICENSE & REGISTRATION

►ASE Automotive Service Excellence Certified. Brakes systems.
►AC Delco Certified. Engine performance Computer Controls.

AREAS OF EXPERTISE

►Pavement Data Collection

Jose Juarez is a field technician at ARA. He has over 10 years of experience operating and maintaining pavement testing equipment including Ground Penetrating Radar, Falling Weight Deflectometers (F/HWDs), profilers, Dynatest Multi-Function Vehicles (MFV), Digital Survey Vehicles (DSV), and runway and roadway friction testing equipment.

EXPERIENCE

2004-2020: Dynatest Consulting

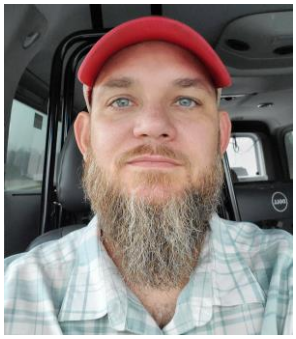
February 2020–present: Applied Research Associates, Inc.

SPECIFIC PROJECT EXPERIENCE

- ***Semi-Automated Pavement Condition Index (PCI) Surveys in:***
  - State of California, CA for Caltrans
  - San Francisco, CA
  - Santa Clara County, CA
  - SH-91 Anaheim, CA
  - Palmdale, CA
  - Palm Desert, CA
  - Riverside County, CA
- ***Ground Penetrating Radar (GPR) Testing in:***
  - Red Bluff, CA
  - Newport Beach, CA
  - I-10 Ramps in Riverside California
- ***Falling Weight Deflectometer (FWD) Testing in:***
  - Port of Tinian Island, Commonwealth of Northern Mariana Islands
  - Pico Rivera, CA
  - Los Angeles International Airport, CA
  - Yolo, CA
  - Lake Forest, CA
  - Carpinteria, CA
  - Creech AFB

Finch Dunkin

SENIOR TECHNICIAN / GIS SPECIALIST



ROLE

GIS/Programming

YEARS OF EXPERIENCE

18

YEARS AT ARA

3

EDUCATION

►BBA, Business Administration-Management/Marketing, West Texas A&M University, 2005

LICENSE & REGISTRATION

►TXDOT PMIS Flexible Pavement Certification

►TXDOT PMIS Rigid Pavement Certification

►TXDOT Profiler Certification

AREAS OF EXPERTISE

►Pavement Data Collection

Finch Dunkin is a senior civil engineer technician at ARA. He is ARA's GIS and software programming expert based in Austin, Texas. Mr. Dunkin works with ARA's consulting engineering team to develop databases, routing/navigation plans, data processing of field data, performs QA/QC of field data, distress rating etc. He has developed numerous programming tools to inter-operate with various pavement testing equipment and analysis software.

EXPERIENCE

February 2020–present: Applied Research Associates, Inc.

September 2017–February 2020: Dynatest

SPECIFIC PROJECT EXPERIENCE

- ***Automated Pavement Condition Index (PCI) Surveys in:***
  - Bexar County, TX
  - City of San Antonio, TX
  - Howard County, MD
  - Clay County, FL
  - Arlington County, VA
  - Mohave County, AZ
  - City of Mount Vernon, WA
  - City of San Marcos, TX
  - City of Commerce, TX
  - City of Austin, TX
  - City of Alexandria, VA
  - City of Vienna, VA
  - DFW Connector Roads
  - SH130 Toll Road
  - HCTRA Toll Roads
  - Haul Route Evaluation for SAM, Illinois and Missouri
  - Dulles Airport Access Roads, VA
  - Research with MIT Boston on Ride Quality
- ***Manual Pavement Condition Surveys in:***
  - City of Wichita Falls, TX
  - Fort Campbell, KY
  - Many Districts for TXDOT
- ***Heavy Weight Deflectometer (HWD) Test***

8. CONFLICT OF INTEREST

No conflicts of interest for this project have been identified.