Michael Baker INTERNATIONAL

April 17, 2023

Mr. Andrew Simmons, P.E.
City Engineer, City of Coachella
53990 Enterprise Way
Coachella, CA 92236

RE: 2023 Pavement Condition Assessment Request for Proposals

Dear Mr. Simmons,

Michael Baker International, Inc. (Michael Baker) appreciates the opportunity to provide the City of Coachella, CA (the City) a scope and fee proposal to update the City's Pavement Management Program and supply the City with updated Pavement Management Reports that will enable the City to make effective pavement management decisions over the next five years.

We have been serving California clients for more than 82 years as trusted engineering consultants and have successfully provided practical and cost-efficient pavement engineering and pavement management solutions tailored to the needs of both urban and suburban California communities. **It is because of the unmatched value our pavement management team brings that the City of Los Angeles recently selected Michael Baker to update LA's pavement management system that includes 5,000 centerline miles of roadway**. In line with our reputation of exceeding expectations, Michael Baker will deliver a City-wide Pavement Condition Assessment that can reliably be used to develop a multi-year maintenance and rehabilitation plan for the City's approximately 126 miles of roadway network.

Primary Contact Information

Firm Name:
Michael Baker International
Address:
75410 Gerald Ford Drive
Suite 100
Palm Desert, CA 92211
Contacts:
Christopher Alberts, PLS
Steven Latino, PE, TE
Phone:
760-346-7481
Email:
calberts@mbakerintl.com
steven.latino@mbakerintl.com

Thank you again for the opportunity to offer our expertise and assist you with this project. Please contact either of us should you have any questions.

Sincerely,

MICHAEL BAKER INTERNATIONAL, INC.

Steven Latino, PE, TE
Associate Vice President & Project Manager

Christopher Alberts, PLS
Vice President & Office Executive

Table of Contents

PROJECT UNDERSTANDING/APPROACH

Michael Baker understands that the City is seeking an experienced firm to provide professional engineering services to perform pavement evaluation on the City's 126 lane-mile roadway network. The City has used the PAVER pavement management software in the past and seeks to leverage pavement condition data for multi-year maintenance planning, rehabilitation tracking, and future budget & condition scenario forecasting tasks for the roadway network.

We will collect and deliver pavement condition data in a format that is compatible with the City's GIS so that the City can integrate the data with other GIS-based applications as well as display color-coded pavement condition and street rehabilitation maps. We will also prepare detailed reports that describe the existing status of the City's roadway network condition as well as forecasts of future condition. The report will include budget estimates for various pavement condition goals and resulting pavement conditions for various annual funding scenarios.

Our approach to the City's Pavement Management System Update will be implemented following the project plan described below.

TASK 1: KICKOFF MEETING

Within two weeks after receiving the Notice to Proceed, our team will schedule a project kickoff meeting with the designated City Project Manager. The topics of discussion during the kickoff meeting may include but are not limited to the following subjects:

- Introduction of key project team members and their roles
- Establishment of lines of communication
- Confirmation of project scope, schedule, key milestones, and budget
- Review and confirm deliverables, data acceptance standards, and Quality Assurance/Quality Control (QA/QC) documentation
- Review and verification of the City's roadway GIS files
- Parking lot surveys
- Public outreach plan

Other items discussed will include the existence of ongoing paving programs, construction projects, or other public works activities to aid us in preparing a well-informed field data collection mission plan.

TASK 2: PROJECT SETUP

We will execute our Standard Operating Procedures (SOPs) in preparation to complete field data collection and data processing. The activities conducted in this task include:

- Project database initialization and configuration
- Distress Selector (DS) application configuration for ASTM D6433
- Review and loading of the City's roadway GIS map into our web-based tracking system
- Project SharePoint site setup for secure document sharing with the City
- Calibration of data collection equipment

We will thoroughly review the City's roadway network map to identify all roads to be included in our pavement data collection map. We will then use the pavement data collection map to carefully plan our field data collection activities. Should we have any concerns or observe inconsistencies observed with the City's roadway network map, we will promptly bring these issues to the attention of City staff to reach a resolution that benefits the City.

TASK 3: PAVEMENT CONDITION DATA COLLECTION

Central to Michael Baker's capacity to provide the best-quality pavement condition data is our use of certified and advanced pavement data collection technologies. Our fleet of pavement data collection vehicles utilize advanced 3D pavement scanners, ultra-high-definition right-of-way (ROW) cameras, GPS, high-precision inertial navigation, and other remote sensing technologies to collect accurate pavement and ROW data while traveling at prevailing traffic speeds. The image below provides a comprehensive description of the sensors and technology in each of our pavement data collection vehicles.

GPS Antennas

GPS antennas that are differentially corrected and integrated with military-grade inertial measurement unit for precise location identification even in areas where GPS signal is unavailable.

Spherical Camera

A 75MP camera that captures continuous 360-degree spherical imagery of the right of way allows users to view the survey surrounding with ultra-high resolution imagery.

Area-scan Cameras

4 adjustable 9MP area-scan cameras (36MP total) with GPS georeferencing and are calibrated for scale to enable asset inventory extraction and distance measurement.

LCMS-2

Next-Generation Laser Crack Measurement System that captures a continuous laser scan of the roadway surface with a resolution of 1mmX1mmX0.05mm (longitudinal x transverse x vertical) can identify cracking as small as 1mm wide.

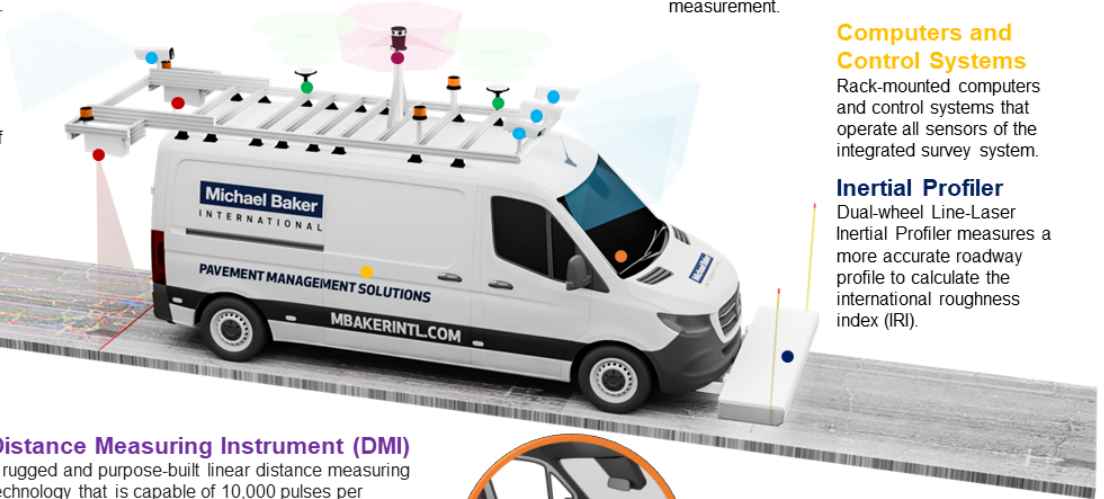**Computers and Control Systems**

Rack-mounted computers and control systems that operate all sensors of the integrated survey system.

Inertial Profiler

Dual-wheel Line-Laser Inertial Profiler measures a more accurate roadway profile to calculate the international roughness index (IRI).

Distance Measuring Instrument (DMI)

a rugged and purpose-built linear distance measuring technology that is capable of 10,000 pulses per revolution is accurate to within 1 inch for every mile of measurement (99.98% accurate). DMI linear measurements are used to reference collected pavement data to Linear Referencing Systems (LRS) or can integrate with GPS systems for precise spatial referencing.

Command Center

The fully integrated survey system is operated through a single command and control center accessible from the passenger seat

Our pavement data collection vehicle is available for immediate deployment to gather continuous and high-quality pavement data on all identified roads. Data will be collected in one direction on undivided two-lane local roads, while two passes will be made on divided streets and those roads with 4+ lanes.

For optimal pavement scans and ROW imagery capture, data collection is conducted exclusively on dry pavement surfaces during adequate daylight hours. Our vans are staffed by two data collection experts to ensure both safety and efficiency.

TASK 4: PAVEMENT DISTRESS PROCESSING

Once we transfer collected pavement data from the field and conduct verifications for completeness, we will utilize our cloud-based data processing and analysis tools to process 3D pavement scans. Our software tools will be carefully configured to account for distress type, distress extent, and distress severity required by *ASTM D6433 Standard Practice for Roads and Parking Lots Pavement Condition Index Survey*. Our experienced pavement data analysts will also use our Distress Selector (DS) software application to review all automatically identified pavement defects and make the necessary adjustments when needed.
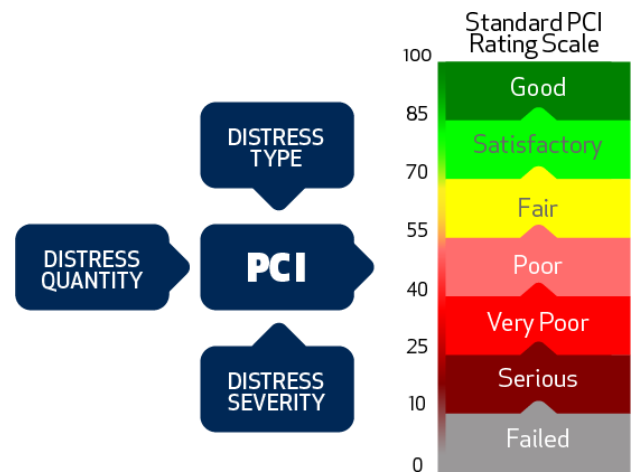
We will also use the detailed longitudinal-profile data collected by the pavement data collection vehicle to calculate the International Roughness Index (IRI) for each street segment.
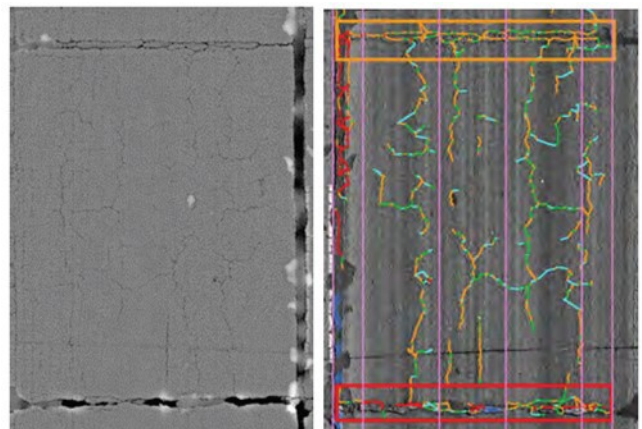
Pavement surface images produced from the LCMS-2

TASK 5: PAVEMENT CONDITION INDEX CALCULATIONS

Developed in the 1970s by the United States Military, the Pavement Condition Index (PCI) is described by the ASTM D6433 standard and is the most widely accepted pavement scoring metric used by Pavement Management Engineers for the planning of pavement rehabilitation, maintenance, and preservation activities. Michael Baker will calculate a PCI for each City street segment using the detailed pavement distress data gathered and processed during previous tasks. **PCI will be calculated with strict adherence to the ASTM D6433 specifications and will provide the City a convenient and standardized scoring method to categorize pavement sections into different condition groups.**

Standard PCI Rating Scale

PCI	Rating
100	
85	Good
70	Satisfactory
55	Fair
40	Poor
25	Very Poor
10	Serious
0	Failed

DISTRESS QUANTITY → PCI ← DISTRESS TYPE / DISTRESS SEVERITY

TASK 6: PAVEMENT MANAGEMENT ANALYTICS

Michael Baker routinely develops pavement maintenance and comprehensive pavement management plans for state and municipality clients. We use detailed pavement distress data and PCI values to determine the appropriate preservation, maintenance, or repair activity for each road segment. We also recognize that the City does not have unlimited resources to address all the roadway repair needs at once; therefore, we use quantitative (how much funding, how much improvement, how much benefit, how many miles of streets, etc.) and qualitative (proximity to schools and hospitals, high-traffic routes, access to first responders, etc.) measures to develop a prioritized list of recommended roadway repairs to assist the City in selecting appropriate pavement maintenance projects. Our Pavement Engineers will work with City staff to review the City's pavement repair strategies and maintenance budget to ensure that our analysis approach aligns with the City's needs. Our review will include:

Identification of an appropriate list of pavement preservation, rehabilitation, and maintenance treatments for the City street network

Determination of unit cost and anticipated performance for selected pavement treatment types

Development of condition/time triggers for preservation, rehabilitation, and maintenance activities

Developments or updates to pavement performance models used in budget and condition forecasting analytics

Our Pavement Engineers will make recommendations for updating the City's pavement repair strategies based on our experience with regional and national pavement management projects. The recommendations may include updates to the list of treatment activities the City uses to include more effective or cost-efficient options, improvements on conditions that trigger repair activities, and prioritization of projects that maximize financial and functional benefits to the City.

Using the updated pavement repair and maintenance strategy, we will perform multi-year forecasting analyses to determine the expected annual budget and average pavement condition of the City's roadway network. The multi-year analyses can be conducted for different time horizons, and we recommend considering 3-year, 5-year, and 10-year time horizons so that the City will have a thorough understanding of the short-term and long-term impact of the City's pavement maintenance budget and pavement condition goals. The analyses will include scenarios such us different annual budget considerations, different annual PCI targets, and backlog elimination.

The forecasting analytics will inform the appropriate budget and condition targets the City should adopt over the next 3 to 5 years. Upon approval of an annual pavement maintenance and rehabilitation budget by the City, we will develop a 5-year work-plan that includes recommended maintenance activities, estimated cost, and expected condition improvement for street segment to be included in the 5-year maintenance and rehabilitation plan by the City.

TASK 7: PAVEMENT CONDITION DATA DELIVERY

Michael Baker will prepare and deliver the following deliverables to the City.

DELIVERABLES

Pavement Condition Database – Collected raw field data will be processed, reduced, and loaded into an Excel Spreadsheet database delivered to the City. The database will include IRI, rutting, cracking, and other observed pavement defects as well as calculated PCIs in accordance with the ASTM D6433 standard.

Street network GIS map – Michael Baker will link all PCI values to the GIS street network map (shapefile). The shapefile will be presented in Esri ArcGIS format and will provide the City with the capability to generate and display customized color-coded maps based on pavement condition or anticipated street maintenance plans. The City will also be able to integrate this data with any other GIS applications the City may choose to use.

Pavement Management Report - Michael Baker will prepare and deliver a comprehensive pavement management report that includes key statistics, project summary, street inventory and condition summary, description of the City's current pavement management process, details of the data collection equipment, data collection methodology, data analysis, and findings of the pavement assessment. The report will also include the results of the various pavement condition and budget forecasting analyses as well as the 5-year pavement maintenance and rehabilitation work-plan.

TASK 8: OPTIONAL SERVICES

Pavement Data Viewer (PDV)

Michael Baker developed the PDV, a web-based application that will allow City staff to access synchronized right-of-way and pavement-view images along with a map that allows users to take virtual drives within the City's roadway network. PDV also incorporates synchronized pavement condition data so that users can view the details of the pavement distresses recorded at any point within the roadway network. PDV's data filtering capabilities makes it very easy for users to search for street segments based on street name and pavement distress types. PDV has been successfully used by our clients for construction work estimation and as a repository of facts-on-the-ground pavement imagery and data to support maintenance plans.

Michael Baker can provide a 3-year PDV subscription to the City as an optional service.

Web-based PDV accessible to City staff for simultaneous review of pavement distress, ROW imagery, and historical imagery.

Pavement Management Software

To supplement our findings and recommendations, Michael Baker can implement the AtlasView Pavement Management Software for the City as an optional service. AtlasView (www.atlasview.co) is a web-based pavement management application that is specifically built for municipal pavement management needs. It includes powerful, but simple to use, tools that will enable City staff to easily update maintenance records, download GIS files, update road segment pavement conditions, and perform budget needs and condition forecasts. AtlasView's dashboard allows City leaders to easily access a dynamically updated status of the City's pavement network at any time. The graphical status report on the dashboard includes pavement inventory by functional classification, network-wide pavement condition, remaining service years, and budget needs. AtlasView can parallel the City's Esri GIS pavement inventory database or MicroPAVER database and serve as a complimentary pavement management tool that is more accessible to City staff. The City can assign multiple users to its AtlasView account, and Michael Baker will work with AtlasView and the City to configure and update the application according to the City's preferences and policies.
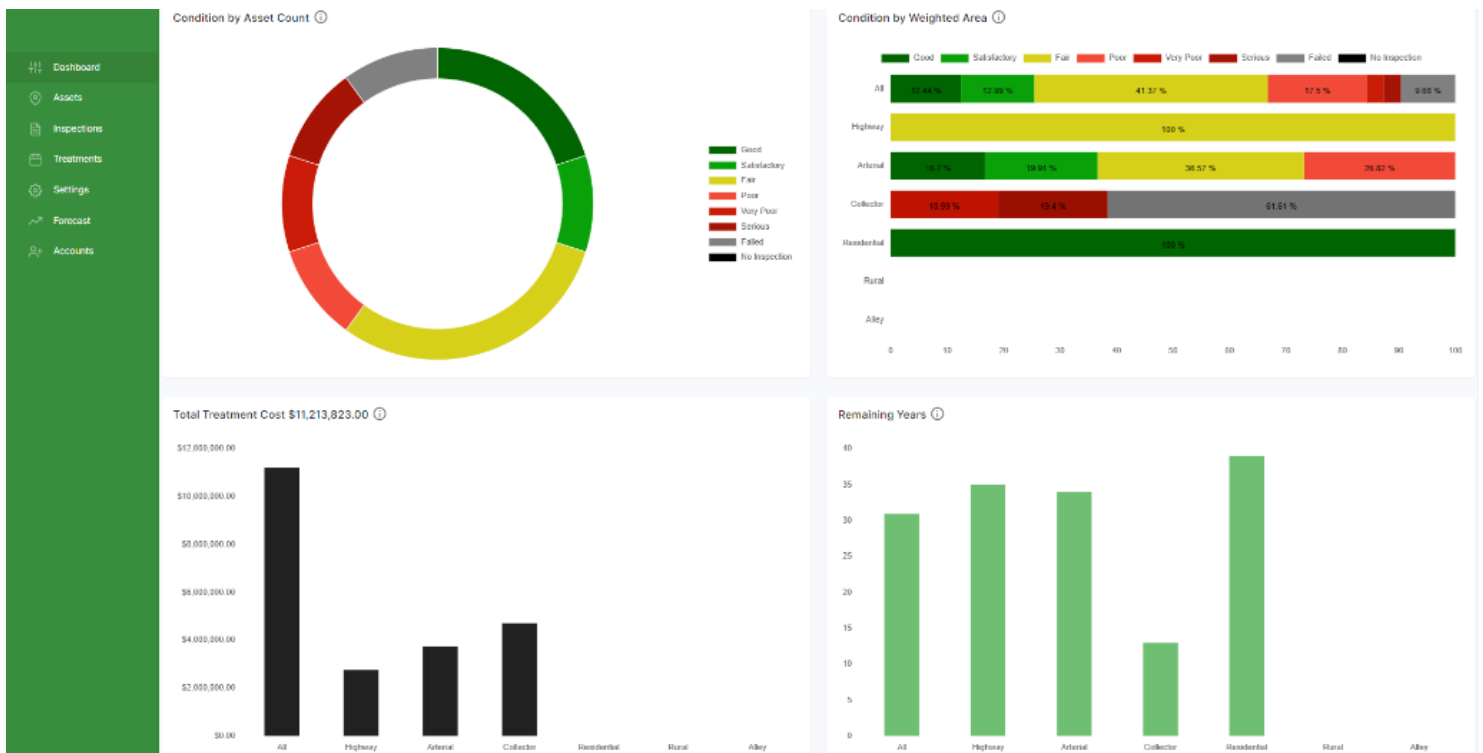
AtlasView Pavement Management Software – Executive Dashboard View

FEE PROPOSAL

Our fee proposal for the 2023 Pavement Management System Update Project is a **lump sum/fixed fee not-to-exceed $107,120.**

If the City would like to procure the value-added Optional services included in our proposal, the fee to provide these Optional services is **$16,400**.

Activity	Lump Sum
Pavement Data Collection	$63,920
Data Processing, Reporting, and Delivery	$44,160
Subtotal	**$108,080**
OPTIONAL- Pavement Data Viewer (PDV) 3-year Subscription	$7,300
OPTIONAL – AtlasView Pavement Management System Implementation with 1-year Subscription to PMS Software	$9,100
Optional Task Subtotal	**$16,400**
Total	**$124,480**