SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION

ITEM 1801-03: **Approving the Selection of Michael Baker International as Consultant for the Automated Pavement Condition Data Collection Study**

PROPOSAL

At its January 16, 2018 meeting, the SJTPO Technical Advisory Committee recommended that the Policy Board approve the selection of Michael Baker International, with subconsultant Rowbear Consulting (DBE), for the Automated Pavement Condition Data Collection.

BACKGROUND

The Request for Proposal (RFP) for the technical study was issued on October 30, 2017. With the request, SJTPO was seeking qualified firm(s) to is to collect, process, and map pavement condition data on approximately 260 miles of municipal roadway in the City of Vineland. The Notice of Availability of Requests was sent to 206 contacts.

A total of eight (8) proposals were received on November 29, 2017. Proposals were reviewed and scored by the TAC-designated Consultant Selection Committee with representatives from SJTPO, City of Vineland, SJTA, and Atlantic County. Proposals were evaluated cost-blind, based on the technical approach, firm and staff qualifications, and DBE participation. Scores for each reviewer were converted to a rank, which was then averaged amongst all reviewers with **Michael Baker International** emerging as the top-ranked firm. For this technical study, Michael Baker International is partnering with subconsultant Rowbear Consulting, a DBE firm.

The scope of work and associated project cost was reviewed in consultation with City of Vineland with a conference call held between SJTPO, Vineland, and the consultant to discuss scope options. Of the two scope options, Option B was selected. The proposed cost is **$51,000.00**, with 13.38% DBE participation. The contract end date will be June 30, 2019.

If this contract is awarded, the SJTPO DBE/ESBE participation rate for FY 2018 would be 17.9% (including other previously approved consultant efforts). The attached resolution authorizes the Executive Director to negotiate minor revisions to the scope of work and fee to best advance the goals and intent of the project.

This study is to be funded through Task 18/405 Automated Pavement Condition Data Collection in SJTPO's UPWP for FY 2018 with $55,021 in available budget.

Original

Technical Proposal for Automated Pavement Condition Data Collection Pilot Project

Submitted to:
South Jersey Transportation Planning Organization

Laser Crack Measurement System (LCMS) is National Center for Asphalt Technology (NCAT)-certified

Panoramic Camera and GPS Antenna

LiDAR Sensors and Cameras

Cameras

GPS Antenna

360° Panoramic Imagery

GPR

Pavement Assessment

LiDAR Point Cloud

ACCURATE

REPEATABLE

DEFENSIBLE RESULTS

Mapping the Nation's Infrastructure

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Ground Penetrating Radar (GPR)

Distance Measuring Instrument
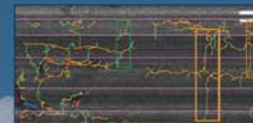
November 29, 2017

South Jersey Transportation Planning Organization

Submitted by:
Michael Baker International, Inc.

Michael Baker INTERNATIONAL

November 29, 2017

Andrew Tracy, Transportation Engineer
South Jersey Transportation Planning Organization
782 South Brewster Road, Unit B6
Vineland, New Jersey 08361

Re: Proposal for Automated Pavement Condition Data Collection Pilot Project

Dear Selection Committee:

Michael Baker International, Inc. (Michael Baker) is pleased to respond to this solicitation to collect, process, and map pavement condition data on approximately 260 miles of municipal roadway in the City of Vineland, New Jersey. As you will see from our response, the Michael Baker team is uniquely qualified and very well positioned to carry out the project tasks with a high degree of efficiency, quality, and professionalism. Having performed numerous projects of similar size and scope, our team possesses the skills & experience that are directly relevant to this work, and we bring an element of staff continuity that will provide SJTPO and the City of Vineland with the utmost level of communication throughout the duration of the project. With a history of over 30 years working in the State of New Jersey, our team will provide SJTPO and the City of Vineland with the following benefits:

Readily Available In-House Services: Michael Baker will provide ample capacity, and a well-established team of pavement and technology subject matter experts that will contribute to completing this project on time, within budget, and to SJTPO's expectations. With over 125+ technical staff members residing in our Hamilton, New Jersey office, we have the ability to leverage a broad range of knowledge from a multitude of local team members, who will be supported by the expertise of our nationally recognized leaders in the field of pavement management, asset management, and Geospatial Information Technology (GIT). Together, our team possesses the knowledge and capabilities to address each aspect of the scope items outlined in the Request for Proposals (RFP), and can provide all services in-house. This translates to a smoother experience for SJTPO and the City of Vineland in terms of streamlining communication, as well as having a reliable quality control process that is recognized and implemented across the company.

State-of-the-Art Equipment: Michael Baker has taken a very proactive approach in our efforts to continuously research and develop new and innovative ways to provide quality services to our clients. This commitment to innovation is evidenced by the investment that the firm has made—and continues to make—in our ever-expanding fleet of advanced mobile (aerial & terrestrial) data collection systems that support our asset management implementation services. Our team has worked locally, and on a national level, with transportation and public works organizations, on a wide variety of infrastructure asset data collection projects, and we possess a keen understanding of how to effectively process and manage the large volumes of data that are generated by the various scanners, cameras, and navigation systems that are part of our mobile collection platform(s). With continued investment in state-of-the art technology, we have positioned ourselves to provide clients with a unique blend of engineering, surveying and geospatial technology services that are unprecedented in our industry today.

Strength of Team: Michael Baker has the distinct advantage of presenting a highly cohesive team to SJTPO and the City of Vineland that has years of experience working together on similar projects. Project Manager Kenneth Contrisciane and Quality Manager Justin Furch recently worked together on bringing the Morris County Data Collection and Pavement Management System (PMS) Project to a successful completion. Our LCMS team assembled for this project is a group of reliable professionals with a track record of working together, and successfully delivering projects, on time, and within budget, to facilitate your project's pavement inventory and analysis needs. Michael Baker has teamed with Rowbear Consulting P.C. (Rowbear) to offer you a multifaceted and talented team of professionals for this project. Rowbear will specifically support the GIS development task with their mapping expertise. The services and support provided by Rowbear will exceed the DBE/ESBE goal of 12.44% for the project.
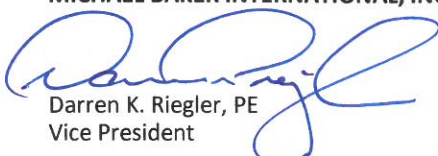
We acknowledge our review of SJTPO's Standard Contract Agreement and request the following two changes:

- Section 4: (R) Indemnification. Line 1 Delete "and shall defend"
- Section 4: (R) Indemnification. Line 7 Add "reasonable" before "charges for attorneys"

We appreciate this opportunity and look forward to working with SJTPO and the City of Vineland. Please do not hesitate to contact me at 609-807-9502, or our Project Manager, Kenneth Contrisciane, at 609-807-9551, if you have any questions or require any additional information.

Sincerely,

MICHAEL BAKER INTERNATIONAL, INC.

Darren K. Riegler, PE
Vice President

NARRATIVE

Project Understanding

Michael Baker International, Inc. (Michael Baker) has teamed with Rowbear Consulting, P.C. (Rowbear) for the Automated Pavement Condition Data Collection project. Our team has carefully reviewed the RFP and understands the following project goals:

- Pilot a low-cost automated pavement data collection method to provide subregions with data needed to make informed programing decisions;
- Collect pavement condition data on approximately 260 centerline miles of municipal roadways in the City of Vineland;
- Provide IRI data and additional data (optionally) in an electronic format;
- Link GIS data provided in the RFP to collected pavement condition data and deliver in an Esri ArcGIS 10 format;
- This project is providing the ground work to implement the Federal Highway Administration (FHWA) Every Day Counts "Pavement Preservation" initiative.

We have created a comprehensive technical approach and aligned our team's resources based on these project goals. **Our LCMS processing task lead, Dr. Vahid Ganji, was part of the team that a developed the standard methodology of using IRI as a measure to test for the ride quality of new pavement construction for NJDOT.** In addition, our team's considerable depth of knowledge of automated pavement data collection processing and data integration will aid the City of Vineland in the creation of a comprehensive pavement program to support current and future pavement preservation goals. The Michael Baker team has a full understanding of the pavement data collection and evaluation process within the State of New Jersey with experience at the state, county and municipal levels. Michael Baker is also specialized in pavement engineering and design services and has been performing statewide pavement engineering services for NJDOT under four consecutive three-year term agreements. This experience with statewide pavement evaluation and design gives the Michael Baker team unique expertise and familiarity with New Jersey pavement material performance, prediction models, and rehabilitation techniques.

Rowbear will be providing expertise and support for the GIS-related tasks and deliverables. Michael Baker and Rowbear have teamed successfully together for many years on NJDOT's Data Maintenance and Warehouse project among others.

Our project team has thoroughly reviewed the RFP and has assembled the following well-thought, innovative and technically sound approach to allow for a successful project delivery, including optional added-value deliverables at SJTPO's discretion.

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Technical Approach

Michael Baker's technical approach leverages our team's extensive experience with similar automated pavement data collection projects and capability to provide an innovative and cost-effective 'One-Van' solution for the data acquisition effort (detailed in Task 2). We have streamlined our post-processing and QA/QC effort as a result of past successful project experience. This will allow our team to provide optional added value project deliverables to the City of Vineland and SJTPO, at a low cost, in alignment with key project goals.

Key Innovations

- ✓ **Integrated 'One Van' Data Collection Solution** – Michael Baker proposes to collect pavement information using our own state-of-the-art mobile data collection vehicle that features an integrated Laser Crack Measurement System (LCMS) that can conduct inventory at posted roadway speeds.

- ✓ **KML Deliverable** – As an option, we can provide pavement condition data with linked pavement and panoramic ROW imagery, in a KML format, to provide maximum portability, and encourage wider use. The KML format is an international standard by the Open Geospatial Consortium, Inc. (OGC) used to display geographic data.

Key Efficiencies

- ✓ **Alternative Inventory Strategy** – Understanding that a key project goal is to identify a low-cost data collection solution, we offer an alternative approach of inventorying roadways in one direction on unclassified (local) roads. This approach aligns with the current FHWA Highway Performance Monitoring System (HPMS) Field Manual guidelines and would offer significant cost savings while still providing ample data to conduct network-level pavement analysis.

- ✓ **Project Delivery System** – Michael Baker has built and continuously refines post-processing methods and applications to process and deliver high-quality pavement condition data in a variety of standardized formats. As a result, we can provide optional added-value deliverables such as detailed pavement distress-specific information, a Pavement Condition Index (PCI) and pavement imagery in addition to IRI.

- ✓ **New Jersey Based** – Our core project team is based in New Jersey and has a long history of working together to successfully deliver on similar projects across the state. Over the past 20 years, we have inventoried, processed and delivered data on thousands of miles of roadways in New Jersey to support various transportation programs at the state, county and local levels. We know New Jersey.

The Michael Baker team has aligned our Technical Approach into three (3) tasks as recommended in the RFP, tailoring them based on our deep level of knowledge and experience in work with projects similar in nature. Our Technical Approach includes two alternatives for the inventory and optional added value project deliverables. A summary of project deliverables for each alternative can be found at the end of the Narrative section.

Task 1: Project Coordination

To initiate the project, a kickoff meeting will be held between the Michael Baker team, appropriate SJTPO and City of Vineland staff to review the schedule, budget, key milestones, deliverables and other administrative items. This project kickoff meeting will be held at Vineland City Hall and include a high-level review of the technical approach and methodologies being proposed for the project. During this meeting, specifics on the pavement data collection and analysis to be employed will be reviewed and discussed. Also, the Michael Baker team will collect inventory supporting documentation, including the latest GIS representations of Vineland's roadway network. Upon the commencement of the data collection and processing effort, the Michael Baker team will hold a draft deliverable meeting at the City to reconfirm project deliverables and formats. Our project manager will provide project status

updates every two weeks to the SJTPO project manager via email. The Michael Baker team will provide SJTPO and the city with meeting minutes within one week of project meetings.

Project management tasks will also be conducted during this task. In accordance with Michael Baker's project management standards, "Project Management – The Baker Way," the Michael Baker team's Project Manager will develop a Project Management Plan (PMP) that will serve as a manual that clearly defines the process in which the project will be managed. This PMP will be a collection of pertinent information required to successfully manage the project. The PMP will also facilitate a standard process for planning the successful execution of this project and include plans for staffing, communications, quality assurance and quality control. Internal controls are in place at Michael Baker that require project managers to monitor and report on various aspects of the project, such as budgets, milestones and quality reviews. Adjustments will be made to the project plan as necessary to mitigate project risks.

The following activities will be included in this project management task:

- Supervision/scheduling
- Daily staff assignments and task monitoring
- Monitoring of the project schedule and budget
- Periodic QA/QC review
- Project billing and status reports - including progress reports and supporting materials

Task 1 Deliverables:
- ✓ Meeting agenda and minutes for Project Kickoff and Draft Deliverable meetings
- ✓ Up to eight (8) progress updates provided every two weeks via email
- ✓ Monthly invoices

Task 2: Pavement Condition Data Collection

Pavement Data Collection

The Michael Baker team firmly understands the project goal of providing a low-cost, automated pavement data collection method that can be replicated on future projects across the SJTPO region. As such we propose to use our integrated 'One-Van' solution which consists of a mobile collection platform that combines a multitude of technologies and capabilities. This modern method for pavement data collection is an alternative to the standard visual inspection and field interpretation of pavement conditions that can produce inconsistent and inaccurate results when not performed properly. Distinct advantages of the automated data collection process include:

- **Consistent results** – Conditions are measured in a consistent manner with our Laser Crack Measurement System (LCMS). Our LCMS has been NCAT certified, passing the rigorous certification program that requires data be collected, processed and delivered with a high level of accuracy and repeatability.
- **Safety** – The automated data collection vehicle is capable of performing field inventory at posted speed limits while the operators remain safely in the vehicle during collection. Visual pavement condition assessment may require operators to stop and exit the vehicle during collection depending on the assessment type.
- **Efficiency** – Automated data collection can be performed in a fraction of the time and cost required by a visual assessment.
- **Permanent Records** – Unlike manual distress survey, automated downward and windshield imagery data will create historic data that can be accessed anytime to extract additional data, use for project level information, or confirm the data.

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- **Quality Control** – Automated data collection produces inventory artifacts (such as images and cracking details) that can be confirmed and verified both in-office or through on-site inspection.

Michael Baker's mobile inventory vehicle includes the following technologies:

- Pavemetrics Laser Crack Measurement System (LCMS):

  o 3D pavement imaging for automated detection of pavement distresses, such as cracks, potholes, raveling, rutting, faulting, drop-off, and macrotexture

  o Pavement ride quality, grade, cross slope, curvature, and lane width

  o Meets the minimum precision and bias requirements of a Class 1 profiler in accordance of ASTM E950

- Optech Lynx Mobile Mapper SG1 (LiDAR)

  o Mobile LiDAR data collection, 1.2 million points/second

  o Four (4), 5MP cameras (front left, front middle, front right, rear middle)

  o Ladybug 360-degree camera

- Geophysical Survey Systems, Inc. (GSSI) SIR 30 Ground Penetrating Radar (GPR)

  o Pavement thickness
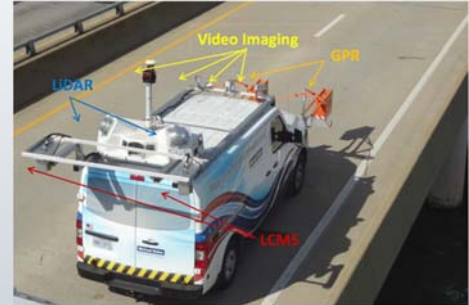
Each of these systems can be turned on or off independently during data collection as needed. For this pilot project, we propose using the LCMS system to perform the automated pavement data collection. Additionally, our van will be configured to capture panoramic images along the inventory areas, so a right-of-way (ROW) perspective can be provided.

Michael Baker's LCMS equipment uses advanced hardware and software technologies to automate the process of capturing visible and detectable surface pavement distresses including raveling and weathering, transverse cracks, longitudinal cracks, alligator cracks, potholes, patches, sealed cracks, rutting and drop-offs, as well as surface macrotexture and ride quality. Other roadway features that are tagged and recorded include longitudinal and transverse slopes, roadway curvature, lane width, pavement surface type, bridge decks, and pavement markings. The Michael Baker team has developed post-processing procedures to turn this highly-detailed data into useable information products, such as classified pavement distresses, Pavement Condition Index (PCI), Surface Condition Index (SDI), and IRI. This process is performed on a network-level, providing reliable and consistent results that can be customized based on the specific project needs and local pavement conditions. Michael Baker has employed this method of data development on numerous projects, including Morris County Pavement Inventory, Mercer County Pavement Inventory and NJDOT NHS Pavement collection.

To maximize SJTPO's return on investment, we recommend performing inventory on one lane in one direction for local streets (classified as 'UNCLASSED' roads in the shapefile provided in the RFP). One lane in both directions will be inventoried for the higher order class roads (data will be inventoried in the right-most travelled through lane on roads that consist of multiple lanes). Views of the full pavement ROW would be provided through processed panoramic images. This proposed inventory methodology will reduce the cost of the data collection

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effort while still producing sufficient data to conduct a network-level analysis for prioritizing pavement resurfacing projects. We have included provisions for both the full inventory and our recommendation in this proposal.

We have reviewed the shapefile provided in the RFP and estimate data collection to consist of 319 lane miles if inventoried as recommended above. The table below shows a breakdown of the estimated centerline miles, inventory mileage with data collected on both directions of local roads (Option A) as requested in the RFP, and our recommended approach of collecting data on one direction of local roads (Option B):

Road Classification	Centerline Miles	Option A (Both Way on Locals)	Option B (One-Way on Locals)
Unclassified	191	372*	191
Minor Collector	35	70	70
Minor Arterial	20	40	40
Major Collector	9	18	18
TOTAL MILES	**255**	**510**	**319**

* Approximate 10 miles of local roads in Vineland are one-way according to NJDOT SLD information

We have found that on-street parking on narrower local roads, like those typically found in denser areas (such as Vineland), can impact the line of vehicle travel which in turn effects data collection and quality. Since our sensitive LCMS equipment can capture and report data across a full 4m lane width, significant vehicle wander into the centerline around parked vehicles and other obstacles can result in the duplication of distress data if inventoried in both directions. This is another factor to support our recommendation to collect pavement data on one direction of local ('unclassified') roads (Option B).

It should be noted that the Michael Baker team is extremely knowledgeable in New Jersey roadway data collection, having inventoried and continually maintaining basic roadway attribute information for nearly all public roadways in the state for NJDOT and other counties through various projects. Additionally, the Michael Baker team has recently inventoried Cumberland County roadways for NJDOT in 2015/2016 as part our NJDOT Data Warehouse Maintenance project, and can leverage this knowledge and experience to increase efficiency during the data collection effort.

To effectively perform accurate data collection that is representative of true pavement conditions at the time of inventory, air temperatures should be above 35°F and the roadway surface must be dry, generally free of debris. As such, our team recommends preforming inventory in early spring 2018 after roads are clear and generally free of salt and sand that may have been applied as part of the city's winter weather treatment program. Ideally data collection would occur soon after a scheduled street sweeping program when roads would be effectively clean and free of debris. Our team will work with the city in the mission planning effort to best align the inventory schedule with other planned street maintenance activities. Assuming that data collection can be conducted and completed by end of March 2018 (weather and road conditions permitting), our team is committed to meeting the project deadline of May 30, 2018.

Data Processing

The Michael Baker team has developed efficient LCMS post-processing procedures to translate this highly-detailed data into useable information products. This process is performed on a network-level, providing reliable and consistent results that will be configured based on the specific project needs and local pavement conditions. Our experienced team has built and continues to improve upon our streamlined data processing and project delivery system with focus on innovation, quality and efficiency. As such, this will allow our team to deliver several

optional added value data products in addition to the requested IRI information. Some custom-built key components of our pavement data processing solution include:

- <u>Field Data Checker</u> – An application used by our field crews to validate the integrity of raw inventory data generated from the LCMS. This tool provides crews with immediate feedback, saving time and cost if recollection is required.

- <u>LCMS Data Loader</u> - Streamlines the loading and verification of processed field data into the project database.

- <u>Distress Selector</u> - Some surface distress information is not obtainable through the automated pavement surface distress identification process. As such, we have developed the Distress Selector application which provides the capability to manually capture and classify additional distresses from 3D pavement imagery beyond the current functionality of the LCMS.

Distress Selector Application

- <u>QC Tool</u> - This tool allows for the QA/QC of imagery as well as checks on the classifications, extents, and quantities of pavement distresses that have been identified by the LCMS.
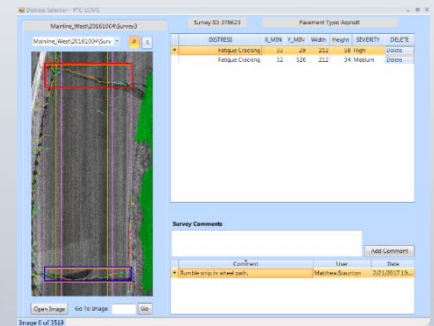
As part of Option B, Michael Baker will leverage the Distress Selector tool described above to extract roadway patches that require manual identification. Other distresses that can be extracted include rigid pavement distresses such as split slabs, corner cracks, spalling, etc. While the Michael Baker team understands that these types of distresses are not part of the IRI requirements as stated in the RFP, we have the capabilities to add additional distress information that is not available through automated data collection while still leveraging the base data provided by the LCMS system. This method allows manual collection to align directly with automated data collection to provide consistent results and streamline the post-processing effort.

Our team will post-process raw pavement field data using the LCMS automated pavement distress identification software. In addition to IRI, we are capable of detecting and/or extracting the following features with the combined LCMS processing software and Distress Selector application:

- **Asphalt Surfaces:** Alligator Cracking, Bleeding, Block Cracking, Depressions, Edge Cracking, Joint Reflection Cracking, lane/shoulder drop off, Longitudinal and Transverse Cracking, Patches and Utility Cuts, Railroad Crossing, Rutting, Weathering and Raveling.

- **Rigid Surfaces:** Buckling, Corner Breaks, Divided/Shatter Slab, Faulting, Joint Seal Damage, Lane/Shoulder Drop-off, Linear Cracking, Patching and Utility Cuts, Pumping, Punch-out, Railroad Crossings, Shrinkage Cracking, and Spalling

While our system is capable of collecting this level of detailed pavement condition data, we will be focusing on providing cracking percent, rutting, faulting, crack classification (alligator, block, transverse and longitudinal), potholes and patching.

Our team has previously developed a database schema specifically designed to handle post-processed LCMS data and output pavement information into various formats and common standards (in addition to IRI) such as the Federal Highway Administration (FHWA) Highway Performance Monitoring System (HPMS) data submission standards, ASTM D6433 distress specifications and various other client-specific standards. Michael Baker has been continuously supporting NJDOT since 2008 with their federal HPMS reporting needs, and is extremely familiar and experienced with the growing HPMS reporting requirements. Additionally, we have recently initiated a project with Camden County which includes conducting a network-level pavement condition inventory to produce data in alignment with NJDOT's Surface Distress Index (SDI).

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While IRI is an indicator of pavement performance, this data point alone is generally not sufficient to formulate the basis of a network-level pavement management and\or maintenance program. The overall roughness of a road can be caused by one or more types of distresses; each which may require a different type of pavement treatment and/or rehabilitation. It is our recommendation that a more comprehensive pavement management program is implemented by including a wider range of pavement condition information. As such, our team proposes delivering the following pavement distress data in addition to IRI as part of Option B (see *Summary of Project Deliverables* section at the end of Narrative section):

- HPMS Equivalent Reporting Items
  - Cracking Percent
  - Faulting
  - Rutting
- ASTM D6433 Items
  - Transverse & longitudinal cracking
  - Alligator & block cracking
  - Potholes
  - Patches

These data items above will be summarized and aggregated to road sections as arranged in the RFP shapefile as part of this option. Severity and extent for each ASTM D6433 item specified above will be reported in accordance to the ASTM D6433 standards. Additionally, as part of Option B, we propose to generate a Pavement Condition Index (PCI) for each road section using the PAVER™ (formerly MicroPaver™) pavement management system application which is based on ASTM D6433 standards. The PCI is a numerical rating of general pavement condition that ranges from 0 to 100; with 0 being the lowest score (condition) and 100 being the highest. The standard PCI rating scale is as follows:

Condition	PCI Score
Good	100 – 86
Satisfactory	85 – 71
Fair	70 – 56
Poor	55 – 41
Very Poor	40 – 26
Serious	25 – 11
Failed	10 - 0

As part of this process, the Michael Baker team will prepare and configure our internal PAVER™ application to produce and deliver a segment-based and network-level PCI report in MS Excel format.

In addition to the pavement condition data items described above, our team will also provide the following informational items:

- Date of data collection
- Average collection speed
- Inventory direction (N, E, S, W, Both)

Pavement condition data will be provided in an Excel spreadsheet or similar format and delivered electronically.

Task 2 Deliverables:
✓ Field data collection on one of the following:

  o Option A - Both directions of the roadway network **or**;

  o Option B - One direction on unclassified (local) roads, and both directions on higher order roads

✓ Roadway IRI data associated with the City of Vineland's roadway network in MS Excel (or similar) format

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Optional Added Value Deliverables (Option B):
- ✓ Pavement distresses including cracking percent, rutting, faulting, transverse\longitudinal cracking, alligator\block cracking, potholes and patching associated with the City of Vineland's roadway network in MS Excel (or similar) format
- ✓ A PCI rating for each roadway segment, in MS Excel (or similar) format

Task 3: GIS

The Michael Baker team has unmatched knowledge and experience in collecting roadway-specific field data across the state of New Jersey and linking roadway data to GIS networks to provide useful information products. Our Michael Baker team has been the 'go-to' team for roadway data collection and processing services for NJDOT's Straight Line Diagram (SLD) and related data maintenance programs since the late 1990's. Over that time, we have developed several techniques and tools to check the completeness and accuracy of processed field data related specifically to linear roadway networks. With the help of these existing processes, our experienced GIS team will carefully align and link processed pavement distress data (developed during Task 2) with the city's GIS roadway network. This new and complete GIS dataset will be provided in an Esri ArcGIS 10 compatible format.

We have elected to leverage the technical expertise and experience of Rowbear Consulting, P.C. (Rowbear) to support this task. Michael Baker and Rowbear have teamed successfully on similar projects including NJDOT's Data Maintenance and Warehouse project.

In addition to collecting pavement condition information, the LCMS also generates 3D images of the pavement surface with highlighted areas of distresses, which will be delivered in addition to panoramic ROW imagery. These downward facing roadway images, which represent approximately 26 linear feet of pavement surface, will be processed and delivered as a GIS layer and KML format for geo-locating each image, providing another value-added deliverable as part of Option B, if selected. The KML format would allow non-core GIS staff to view pavement condition data and imagery through Google Earth, allowing for greater flexibility and wider usability. Having performed photo processing for millions of roadway images nationwide, the Michael Baker team has the experience and knowledge to generate geospatial data layers to support the City of Vineland's GIS needs.

Task 3 Deliverables:
- ✓ Pavement distress data linked to the City of Vineland's GIS roadway network in and Esri ArcGIS 10 compatible format
- ✓ Two (2) sets of downward facing 3D pavement images delivered on an external hard drive:
  - ○ One set with no overlay of pavement distresses
  - ○ One set with overlay of pavement distress
- ✓ One (1) set of panoramic ROW images in JPG format delivered on an external hard drive

Optional Added Value Deliverables (Option B):
- ✓ Linked downward facing pavement images and panoramic ROW images and associated pavement condition data in KML and Esri ArcGIS 10 compatible format

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Summary of Project Deliverables

Below is the summary of our proposed deliverables based on the two options detailed in our technical approach.

Deliverables	Option A RFP Approach	Option B Added-Value Approach
Field Data Collection		
Inventory on both directions of entire roadway network (@520 miles)	✔	
One-direction inventory on locals, both directions on higher order roads (@320 miles)		✔
Project Management & Deliverables		
Task 1 Project Coordination deliverables	✔	✔
IRI data in electronic format	✔	✔
Individual distress data (HPMS & ASTM D6433) in electronic format		✔
3D Pavement Imagery (with and without distress overlays)	✔	✔
ROW Panoramic Images	✔	✔
Pavement Condition Index (PCI) on road sections		✔
IRI data linked to GIS network	✔	✔
Individual distress data and PCI linked to GIS network		✔
KML deliverable with linked pavement and ROW images		✔

STAFFING PLAN

The Michael Baker team was assembled to bring together highly qualified and dedicated individuals with extensive experience in automated data collection, pavement engineering and GIS processing throughout the country, with a focus in New Jersey. Our long-standing commitment to New Jersey state, MPO, county and local transportation organizations has helped build a reputation of successfully delivering the most challenging projects over the past 20 years. The Michael Baker team is excited about the opportunity of continuing work with the SJTPO on this important pilot project in conjunction with the City of Vineland.

Our team's proposed **Project Manager, Kenneth Contrisciane** (Kenny), is an experience GIS project manager and transportation system integrator in our Hamilton, NJ office. Kenny has served as the technical lead related to Michael Baker's Laser Crack Measurement System, which is integrated with an Optech Lynx SG-1 Light Detection and Ranging (LiDAR) system. As Michael Baker's LCMS technical lead, Mr. Contrisciane has developed the core data processing framework that translates raw data from the LCMS system into various formats, include the native PAVER ™ pavement management system XML format. His LCMS project technical experience includes a variety of clients including Morris County (New Jersey), Mercer County (New Jersey), the Dallas-Fort Worth Airport, and City of Indio (California).

In addition to serving as Michael Baker's LCMS technical lead, Kenny also has experience with GPS data collection and processing, GIS database development and design, and programming. With this knowledge, Ken has served as the post processing task manager on several projects including the Mississippi Statewide Roadway Inventory, New Jersey County Sidewalk Inventory and the El Paso County, Colorado Feature Asset Inventory project (all which used a video-based inventory technology solution). Kenny also spent 16 months in New Hampshire, serving as field coordinator for the New Hampshire Statewide Physical Feature Survey. He also has been involved with numerous data collection and maintenance projects including New Jersey's Automated Straight Line Diagrams (SLD) project and NJDOT's Local Road Inventory and Maintenance Management projects.

Kenny will receive executive-level support in the administration of this contract. **Darren Riegler, P.E., Principal-In-Charge**, has extensive experience in the transportation industry and is a Vice President and Operations Manager of Michael Baker's New Jersey operation.

Justin Furch, MCTS, will serve as the QA/QC manager. Mr. Furch is a Senior Database Administrator, Lead Software Developer, and the Geospatial Information Technologies (GIT) Department Manager for the Hamilton, NJ office. His management role includes software development, GIS mapping, and field inventory staff.

Stephen Clancy, PSM, PLS, GISP will provide oversight of the field crew, mobile data collection vehicle and overall pavement condition inventory effort. Mr. Clancy is a licensed Professional Surveyor and Mapper, as well as a Certified GIS Professional. He has an extensive background in Geographic Information Systems, LiDAR, GPS and traditional surveying and mapping. In addition to serving in various capacities in surveying and GIS related activities, Mr. Clancy also has many years of university teaching experience in the fields of Geomatics, Photogrammetry and GIS. Mr. Clancy has a diverse and broad background in the Geospatial Sciences and is charged with the technical management and operational oversight of Michael Baker's Mobile LiDAR and LCMS systems.

Vahid Ganji, PhD, PE will oversee the LCMS post-processing efforts of the project. Dr. Ganji has 21 years of experience in pavement evaluation, pavement design, and pavement management. Dr. Ganji developed the methodology based on IRI for ride quality of pavement constructions for NJDOT. He has also extensive experience in nondestructive testing of pavements at project level, and network level, as well as bridge decks including FWD, GPR, High-Speed Profilers, International Roughness Index (IRI) Measurements, Dynamic Cone Penetrometer (DCP), automated pavement distress survey using LCMS, Impact-Echo (IE) and Spectral Analysis of Surface Waves

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(SASW), Infrared Thermography (IR), rebar cover measurement, Electromagnetic Induction (EM), and Half-Cell. Dr. Ganji has published numerous papers in peer-reviewed journals.

Marikit Jimenez from Rowbear Consulting (ESBE) will serve as our lead GIS Specialist for the project and primarily be tasked with linking and verifying inventoried pavement condition data to the city's GIS network. Over the past several years Ms. Jimenez has worked with Michael Baker on the NJDOT's Straight Line Diagram program and Data Warehouse and Maintenance project as a GIS technician. She is experienced in the ArcGIS program suite and is proficient in database maintenance, data development, spatial editing, map creation, and field data collection and processing. **With Rowbear's support, our ESBE utilization for the project as proposed will be a minimum of 13.13%.**

Our staffing plan below details estimated hours (broken down by task) of our proposed team along with key staff members and average availability to successfully complete the project.

Staff Name	Title	Project Coordination	Pavement Condition Data Collection	GIS	Total Hours	Avg. Staff Availability
		1	2	3		
Michael Baker International, Inc.						
Ken Contrisciane	Project Manager	18	2	7	27	50%
Justin Furch	Quality Manager	2	0	4	6	25%
Stephen Clancy	Fleet Supervisor	0	8	0	8	25%
Vahid Ganji	Pavement Engineer	8	4	7	19	25%
Joel Wilson	Database Administrator	0	2	0	2	25%
Jillena Yeager	GIS Specialist	12	10	8	30	30%
Field Processing Staff	Field Processor	0	68	0	68	50%
Michael Baker International, Inc. Subtotal		**40**	**94**	**26**	**160**	**-**
Rowbear Consulting, P.C. (ESBE Firm)						
Marikit Jimenez	GIS Specialist	0	0	72	72	75%
Rowbear Consulting, P.C. (ESBE Firm) Subtotal		**0**	**0**	**72**	**72**	**-**
Sub-Total Hours		**40**	**94**	**98**	**232**	

Key Staff – resume provided

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PROJECT SCHEDULE

Below is our proposed schedule of project milestones, deliverables and key meetings. This schedule assumes a Notice to Proceed date of February 7, 2018 and that the Michael Baker team will receive comments from SJTPO and/or the City of Vineland within two (2) weeks of draft deliverable submissions. Project status updates to the SJTPO project manager will be provided every two weeks via email beginning two weeks after the project kickoff meeting.

Deliverable \ Milestone	Day	Proposed Due Date	Comment
Notice to Proceed	0	2/7/2018	Assumes consultant selection date in January 2018.
Project Kickoff Meeting	14	2/21/2018	Hold onsite at Vineland City Hall two weeks after NTP.
Field Data Collection	52	3/31/2018	This proposed schedule represents the latest date field data collection must be completed by to meet the project completion date of May 30, 2018. Field data collection schedule is dependent on permittable road and weather conditions. Data collection will be scheduled earlier if permissible.
Draft Deliverable Meeting	84	5/2/2018	To be held onsite at Vineland City Hall 4 weeks after the completion of field data collection. Allows for the processing of Task 2 and Task 3 draft deliverables.
Draft Deliverable Comments	98	5/16/2018	Allows for 2-week draft stakeholder draft deliverable review.
Final Project Deliverables	112	5/30/2018	Allows for 2-week to prepare final Task 2 and Task 3 deliverables.

ID	Deliverable \ Milestone	Start	Finish
1	Notice to Proceed (Day 0)	2/7/2018	2/7/2018
2	Project Kickoff Meeting	2/21/2018	2/21/2018
3	Mission Planning & Mobilizion	2/22/2018	3/12/2018
4	Field Data Collection	3/13/2018	3/30/2018
5	Draft Data Processing	4/1/2018	5/1/2018
6	Draft Deliverable Meeting	5/2/2018	5/2/2018
7	Draft Deliverable Comments	5/16/2018	5/16/2018
8	Final Data Processing	5/17/2018	5/29/2018
9	Final Project Deliverables	5/30/2018	5/30/2018

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Original

Cost Proposal for Automated Pavement Condition Data Collection Pilot Project

Submitted to:
South Jersey Transportation Planning Organization

Laser Crack Measurement System (LCMS) is National Center for Asphalt Technology (NCAT)-certified

Panoramic Camera and GPS Antenna

LiDAR Sensors and Cameras

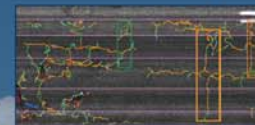GPS Antenna

Cameras

360° Panoramic Imagery

GPR

Pavement Assessment

LiDAR Point Cloud

ACCURATE

REPEATABLE

DEFENSIBLE RESULTS

Mapping the Nation's Infrastructure

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Ground Penetrating Radar (GPR)

Distance Measuring Instrument

November 29, 2017

South Jersey Transportation Planning Organization

SJTPO

Submitted by:
Michael Baker International, Inc.

Michael Baker
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November 29, 2017

Andrew Tracy, Transportation Engineer
South Jersey Transportation Planning Organization
782 South Brewster Road, Unit B6
Vineland, New Jersey 08361

Re: Cost Proposal for Automated Pavement Condition Data Collection Pilot Project
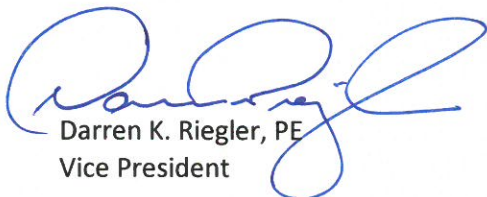
Dear Selection Committee:

Michael Baker International, Inc. (Michael Baker) is enthusiastic about the opportunity to provide consulting services for the Automated Pavement Condition Data Collection Pilot Project in response to the RFP dated October 30, 2017.

All proposed key staff were chosen based on the extensive relevant experience and value they will bring to the SJTPO and the City of Vineland. Subconsultant Rowbear Consultants, P.C. (Rowbear) has been selected to support the Michael Baker team on this effort providing GIS services. The services and support provided by Rowbear will exceed the 12.44% DBE/ESBE goal. The proposed staff will be used in the performance of the contract and will be available for assignment to the project as of the anticipated contract start date through its anticipated completion.

Please note that our cost proposal includes pricing for two project alternatives as described and detailed in our Technical Proposal. We appreciate this opportunity and look forward to working with SJTPO and the City of Vineland. Please do not hesitate to contact me at 609-807-9502, or our Project Manager, Kenneth Contrisciane, at 609-807-9551, if you have any questions or require any additional information.

Sincerely,

MICHAEL BAKER INTERNATIONAL, INC.

Darren K. Riegler, PE
Vice President

COST PROPOSAL

We are pleased to submit our attached cost proposal for the Automated Pavement Condition Data Collection Pilot Project for SJTPO in conjunction with the City of Vineland. We have carefully tailored our technical approach to allow for flexibility in providing the services and deliverables that best meets the needs of SJTPO and the City of Vineland with cost and project goals in mind. As such, we have devised two cost options in alignment with our technical approach; Option A (RFP Approach) which aligns directly with RFP deliverables and Option B (Added-Value Approach) which includes added-value deliverables while performing inventory in one direction on local roads as detailed in Task 2 of our Technical Approach. Below is the summary of cost options and deliverables provided for each:

Deliverables	Option A RFP Approach	Option B Added-Value Approach
Field Data Collection		
Inventory on both directions of entire roadway network (@520 miles)	✔	
One-direction inventory on locals, both directions on higher order roads (@320 miles)		✔
Field Data Collection Sub Total	$24,806	$15,439
Project Management & Deliverables		
Task 1 Project Coordination deliverables	✔	✔
IRI data in electronic format	✔	✔
Individual distress data (HPMS & ASTM D6433) in electronic format		✔
3D Pavement Imagery (with and without distress overlays)	✔	✔
ROW Panoramic Images	✔	✔
Pavement Condition Index (PCI) on road sections		✔
IRI data linked to GIS network	✔	✔
Individual distress data and PCI linked to GIS network		✔
KML deliverable with linked pavement and ROW images		✔
Project Management & Deliverables Sub Total	$27,194	$35,561
Total Project Cost	**$52,000**	**$51,000**

Attached herein is the detailed cost proposal for each option.

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OPTION B - Added Value Approach
Total Costs

	Michael Baker International, Inc			Rowbear Consultants (DBE)			ODC's	Total Costs
	Direct Labor	Overhead	Profit/Fee	Direct Labor	Overhead	Profit/Fee		
Task 1 - Project Coordination	$ 2,213.48	$ 3,130.75	$ 534.42	$ -	$ -	$ -	$ 234.80	$ 6,113.45
Task 2 - Pavement Data Collection	$ 5,315.21	$ 7,517.82	$ 1,283.30	$ -	$ -	$ -	$ 15,439.31	$ 29,555.64
Task 3 - GIS	$ 3,202.70	$ 4,529.90	$ 773.26	$ 2,386.80	$ 3,960.89	$ 477.36	$ -	$ 15,330.91
Totals	$ 10,731.39	$ 15,178.47	$ 2,590.98	$ 2,386.80	$ 3,960.89	$ 477.36	$ 15,674.11	$ 51,000.00

SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION

RESOLUTION 1801-03:   Approving the Selection of Michael Baker International as Consultant for the Automated Pavement Condition Data Collection Study

WHEREAS, the South Jersey Transportation Planning Organization (SJTPO) is the Metropolitan Planning Organization (MPO) designated under Federal law for the southern region of New Jersey including Atlantic, Cape May, Cumberland, and Salem Counties; and

WHEREAS, the Fiscal Year 2018 SJTPO Unified Planning Work Program includes Federal Highway Administration planning funds for this project; and

WHEREAS, the Notice of Availability of Requests was sent to approximately 206 contacts on October 30, 2017; and

WHEREAS, the Request for Proposal (RFP) announcement and supplemental materials were also posted on the publicly accessible SJTPO website; and

WHEREAS, eight (8) proposals were received; and

WHEREAS, the SJTPO Technical Advisory Committee endorsed the consultant selection committee with representatives from SJTPO, City of Vineland, SJTA, and Atlantic County, who reviewed and evaluated the proposals in accordance with SJTPO's published criteria; and

WHEREAS, the Consultant Selection Committee recommends Michael Baker International in association with Rowbear Consulting serving as the Disadvantaged Business Enterprise (DBE) firm; and

WHEREAS, the SJTPO TAC, at their January 16, 2018 meeting, endorsed the recommendation of the Consultant Selection Committee;

NOW THEREFORE BE IT RESOLVED, that the Policy Board of the South Jersey Transportation Planning Organization hereby approves the above selection for the Regional Signal Timing Initiative Study, with a maximum fee of $51,000.00 and 13.38% DBE participation; and

BE IT FURTHER RESOLVED, that the Policy Board authorizes the Executive Director to execute scope of work and cost modifications to the original contract amount, provided that funding is available.

BE IT FURTHER RESOLVED, that the Policy Board requests that the South Jersey Transportation Authority execute the appropriate contractual arrangements with the consultant on behalf of the SJTPO.

Certification

I hereby certify that the foregoing is a correct and true copy of a resolution adopted by the Policy Board of the South Jersey Transportation Planning Organization at its meeting of January 29, 2018.

_____
, Secretary/Treasurer