Memorandum
Public Works Department

ROCK ISLAND
ILLINOIS

To: City Manager
Subject: Pavement Inventory Condition Survey
Date: May 31, 2013
Number: 2013-101

Attached is a proposal with Engineering & Research Int'l, Inc. (ERI) for professional engineering services to conduct the pavement Inventory Condition Survey. The Engineering Division solicited qualifications from engineering firms for the survey and ERI was selected and approved by the City Council at their April 1, 2013 meeting.

The Pavement Inventory Condition Survey evaluates the condition of the City's streets and assigns them a pavement condition index (PCI) value between 0 and 100. The Public Works Department utilizes a streets PCI value to help determine if there is a need for maintenance, resurfaced or reconstructed. Streets rated above 55 are considered good to excellent (maintenance), a rating of 40-54 is fair to good (resurfacing) and below 40 is failed to poor (reconstruction). The survey was last updated in 2008.

ERI proposes to provide their engineering services at an estimated total cost of $136,110.

Recommendation

The Public Works Department recommends that the City Council approve the attached proposal for engineering services from Engineering & Research Int'l, Inc. in the amount of $136,110 and authorize the City Manager to execute the contract documents.

Vendor: Engineering & Research Int'l, Inc. (ERI)
Contract Amount: $136,110.00

Fund:	101	General Fund	($85,000.00)
Department:	616	Municipal Services	
Cost Center:	041	Administration	
Object Code:	53102	Engineering Services	
Project:	1994	Pavement Inventory	
Grant:	223	Gaming	
Fund:	101	General Fund	($51,110.00)
Department:	616	Municipal Services	
Cost Center:	041	Administration	
Object Code:	53102	Engineering Services	
Project:	1994	Pavement Inventory	

Requisition Number: R 003990

Submitted by: Randall D. Tweet, Public Works Director
Michael J. Kane, P.E., City Engineer

Approved by: Thomas Thomas, City Manager

May 31, 2013
ERI Ref. No: ERI354.CORI.001

Engineering & Research Int'l, Inc.
1401 Regency Drive East
Savoy, Illinois 61874 USA
217-356-5945 (Phone)
217-356-6347 (Fax)
eri@erikuab.com
www.erikuab.com

Justin Johnson
Assistant City Engineer
City of Rock Island
1309 Mill Street
Rock Island, IL 61201

Subject: Agreement for "Pavement Inventory Field Inspection Services"

Dear Mr. Johnson,

ERES International Inc., d/b/a Engineering and Research Int'l Inc. (ERI), is very excited to be selected as the consultant to provide the "Pavement Inventory Field Inspection Services" for the City of Rock Island.

A formal proposal was submitted to the City on April 03, 2013 which was presented in two parts: Technical Proposal and Cost Proposal. The Technical Proposal includes the technical approach for conducting Automated Pavement Condition Survey and Development of Pavement Management System (PMS) for approximately 170 centerline miles. The Cost Proposal includes the itemized costs for the completion of proposed data collection and delivery tasks.

The cost of the proposed services will not exceed the estimated cost without prior authorization from the City. If the City can be flexible with the project schedule such that we can do the data processing in our slow season then ERI can transfer the cost saving to the City. We estimate that this cost saving can range from 10 to 15% of the total cost of the project.

If this proposal is acceptable to you, please complete and sign both copies of the agreement and return one copy to our office. We thank you for this opportunity to work with you. If you have any questions, please call our office at (217) 356-5945.

Sincerely,
Engineering & Research International, Inc.

Abbas A. Butt, Ph.D., P.E.
President

Accepted by,
City of Rock Island

_____
Name

_____
Title

_____
Date

Enclosure: ERI Proposal Dated April 3, 2013
Terms and Conditions

Proposal For

Pavement Inventory Field Inspection Services

Prepared For:

ROCK ISLAND
ILLINOIS

City of Rock Island
1309 Mill Street
Rock Island, IL 61201

Prepared By:

Engineering & Research Int'l, Inc.
1401 Regency Drive East, Savoy, IL 61874
Ph: (217) 356-5945 Fax: (217) 356-6347
eri@erikuab.com www.erikuab.com

April 3, 2013

Engineering & Research Int'l, Inc.
1401 Regency Drive East
Savoy, Illinois 61874 USA
217-356-5945 (Phone)
217-356-6347 (Fax)
eri@erikuab.com
www.erikuab.com

April 03, 2013
ERI Ref. No: ERI1750.CORI.002

Justin Johnson
Assistant City Engineer
City of Rock Island
1309 Mill Street
Rock Island, IL 61201

Subject: Proposal for "Pavement Inventory Field Inspection Services"

Dear Mr. Johnson,

ERES Int'l Inc., Engineering and Research Int'l Inc. (ERI), is pleased to submit our proposal in response to the City of Rock Island's request for proposal for "Pavement Inventory Field Inspection Services".

The proposal is presented in two parts: Technical Proposal and Cost Proposal. The Technical Proposal includes the technical approach for conducting Automated Pavement Condition Survey and Development of Pavement Management System (PMS) for approximately 170 centerline miles. The Cost Proposal includes the itemized costs for the completion of proposed data collection and delivery tasks.

The cost of the proposed services will not exceed the estimated cost without prior authorization from the City. If the City can be flexible with the project schedule such that we can do the data processing in our slow season then ERI can transfer the cost saving to the City. We estimate that this cost saving can range from 10 to 15% of the total cost of the project.

Thank you for your consideration. Should you have questions or comments, please do not hesitate to contact me at (217) 356-5945. We look forward to working with you.

Sincerely,
Engineering & Research Int'l, Inc.

Abbas A. Butt, Ph.D., P.E.
President

TABLE OF CONTENTS:

A. TECHNICAL PROPOSAL

1. Project Description

The City of Rock Island is seeking the technical services of a professional engineering firm to collect pavement condition data for the City's roads. The City identified approximately 170 centerline miles. The City street map is shown in **Figure 1**. The inspection data collected on the city roads will be entered into the City's New MicroPAVER™ database.

It is our understanding the City has already collected the pavement condition data during previous surveys in August 2003, 2008 and minor revisions in 2009 and the data has been entered into the City's MicroPAVER™ database. ERI's review of the City's existing database indicated significant errors with the data and the quality of the data is questionable. ERI will attempt to bring this data into the new database if it would not interfere with the quality of the new data being collected as part of this study.

2. Project Objective

The project objective is to provide to the City a fully operable, state-of-the-art solution that allows the City to determine existing pavement conditions, predict future pavement conditions, predict financial needs, and identify and prioritize pavement maintenance and rehabilitation (M&R) projects.

3. Scope of Work

The overall project scope of work is summarized below:

- Meet the City's staff to discuss the technical issues presented in the proposal, the project approach and work schedule.
- Obtain all the background data related to the City's roads under the scope of this study including the existing MicroPAVER database, GIS Map showing the roads linked with the MicroPAVER, City streets map, City streets that are not included in the current MicroPAVER database and the design/ construction/ maintenance history data, etc.
- Review the data, break the street network into management sections if needed and prepare field maps to carry out the distress survey.
- To conduct visual inspection of approximately 170 centerline miles of the City's roads using the Pavement Condition Index (PCI) procedure outlined in the American

Society for Testing and Materials (ASTM) standard D6433-11 Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys

- Develop a New MicroPAVER™ database for the City of Rock Island.
- Develop a comprehensive PMS program for the City based on the analysis of the data contained in MicroPAVER™.

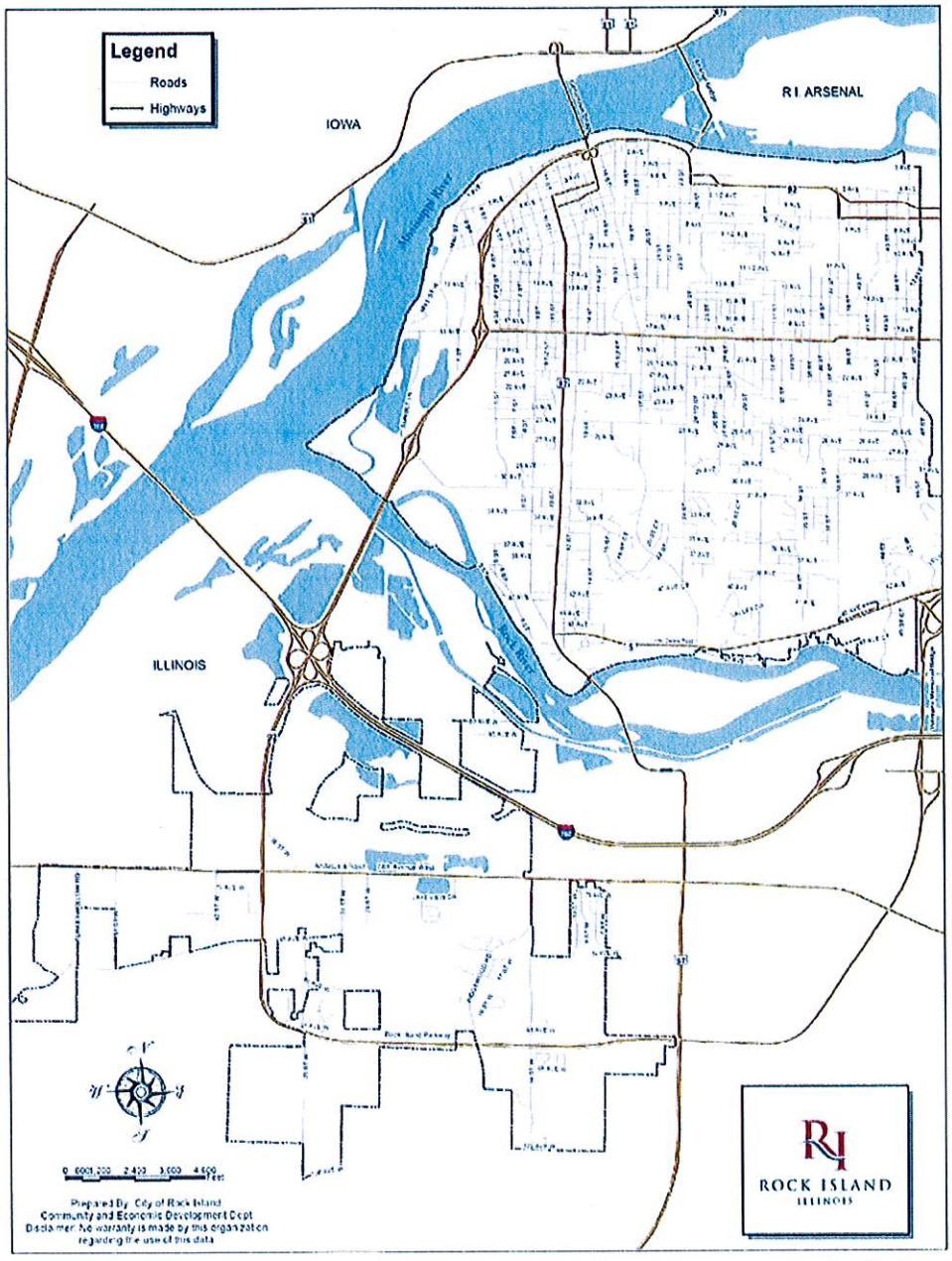

Figure 1: City Street Centerline Map

4. Project Approach

To achieve the objectives of this study, ERI has developed a comprehensive project approach for the City's Pavement Management Program which is shown in **Figure 2**. This project approach will be modified with the help of City staff before the start of the project. The project approach includes the following tasks:

Task 1: Project Development

The project scope and the work plan to complete the various project tasks will be discussed with the City for approval. The project development task will also include the following activities:

- Project management
- Progress meetings with the City staff

Task 2: Background Data Collection

A considerable amount of basic pavement data is incorporated in the development of short and long range maintenance and rehabilitation programs, and budgets. The following background data would be collected with the help of City staff:

- The City's GIS Shape files and Auto CAD pavement infrastructure map
- List of roads included in each jurisdiction
- The City's current maintenance and rehabilitation design policies
- As-built drawings for roads (if available)
- Construction and maintenance history data for the City roads
- Traffic count map for the City roads (if available)
- Recent M&R cost data based on local practices (if available)
- A copy of existing MicroPAVER™ database.
- Any other relevant data.

Task 3: Records Review

The data collected under **Task 2 (Background Data Collection)** will be reviewed by ERI staff. After a thorough review of records, any additional data required will be obtained from the City.

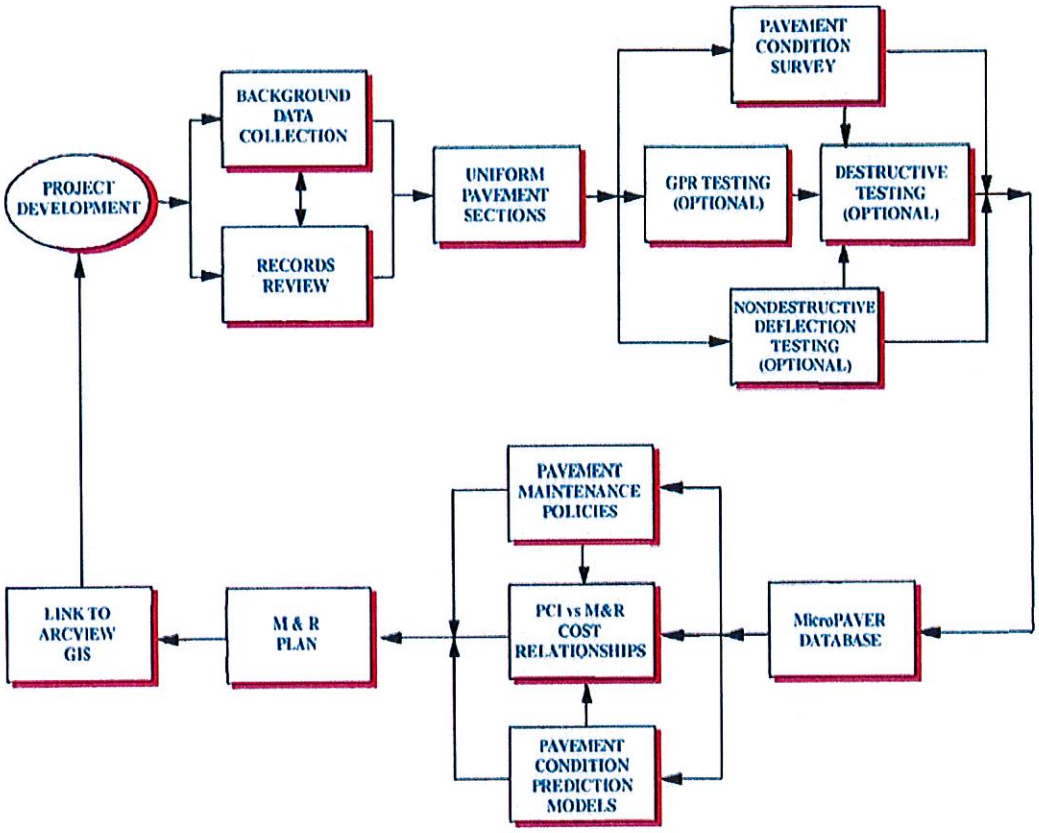

Figure 2: Project Approach

Task 4: Uniform Pavement Sections

Pavement network identification encompasses the division of all pavement components into discrete management units. These management units form the foundation for subsequent pavement inspections and the development of effective maintenance and rehabilitation (M&R) programs. The pavement network identification will be carried out whenever it is required for the pavement sections included in this study. Using the data available from **Task 2** on pavement use, surface type, structure, construction history, pavement rank, and traffic patterns, the network will be divided into uniform pavement sections.

Task 5: Pavement Condition Survey

Automated Distress Survey:

ERI owns and operates an Automated Distress Survey (ADS) unit that simultaneously collects pavement condition, GPS, and digital image data streams. ERI's data collection vehicle shown in **Figure 3** will be used to collect the surface condition data. The ADS vehicle can also be used to collect a high-resolution, digital imagery inventory (Right of Way Imaging) of the City's road network for the subsequent asset inventory and extraction process, if needed.

The sub-system collects the highest quality images – Forward and Downward Images (minimum resolution 4071x3981 dpi) of any system in the market today. These high-resolution images are captured and taken back to the office for rating via removable hard drives. Typically the right of way imaging is acquired to extract the asset features that exist on the roadway; however, for the purpose of this project, ERI will utilize these images to assist the raters to understand the overall condition of the pavement section being surveyed when quantifying the distresses from the pavement images. Each image is tagged with a GPS coordinate to facilitate easy linkage to the City's GIS. We have the ability to store the digital image format (i.e. JPG, TIF, etc.) during data processing.

The downward imaging system is composed of two high resolution linescan cameras and laser illuminators that are configured to image up to 4m transverse road sections with 1mm resolution at posted speeds. The dual linescan cameras and laser lighting system produce crisp, high resolution images of the road, in which cracks as small as 1mm can be detected and rated. The image system was designed to increase the contrast and visibility of both small longitudinal and lateral road cracks.

This particular configuration offers several advantages as compared to more traditional imaging techniques. The most important feature of the system is that this optical configuration increases the visibility of even the smallest cracks by using the incident illumination angle of the laser to cause the cracks to project shadows.

All data is collected and stored in real-time on the onboard computer. Based on our stringent QC process, field data is verified on-site, before the original data is removed from the portable hard drive, and is forwarded to the office for processing and long-term backup purposes. The pavement imagery is then processed visually, to accurately identify and quantify the surface distress manifestations throughout the survey.

Figure 3: ERI's Automated Digital Imaging Acquisition System

ERI's Imaging Workstation as show in **Figure 4** was designed specifically for pavement surface distress analysis, using digital image data collected by the ADS vehicle. The Imaging Workstation provides an efficient means of managing and maintaining distress rating data, and allows users to synchronize images from multiple cameras. ERI has six (6) such Imaging Workstation setups which are network ready in ERI's office in Savoy, IL. Out of these six workstations one workstation is assigned as a server which has a custom built CPU to hold up to four (4) 2TB SATA external hard drives. The rest of the five workstations are the client stations which can communicate with the server simultaneously. Such setup allows six raters to work concurrently. ERI also has another server which has a custom built CPU to hold up to four (4) 2TB SATA external hard drives.

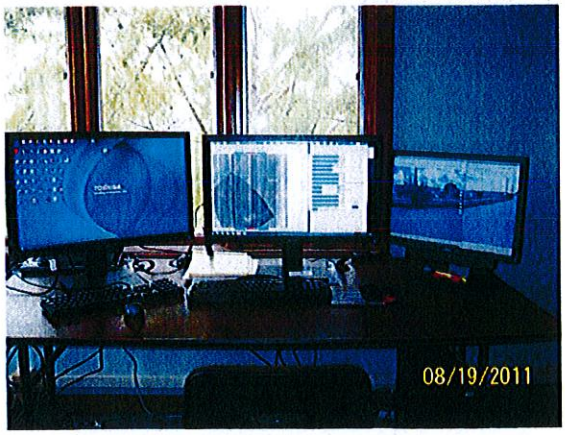

Figure 4: ERI's Imaging Workstation

The Imaging Workstation expedites the distress rating process with built-in tools to assist in distress analysis and measurement. Users can categorize, rate, measure, and save all pavement distress information, and export in several formats.

Each surface distress is evaluated on the basis of two components: severity and extent. Severity is defined as 'How bad is the defect?' in terms of the width or degree of wear associated with the condition. The second component evaluates the extent or 'How much is there?' in terms of the quantity of the surface the distress covers.

For the purpose of this project ERI will survey 25% of the images as per ASTM D6433-11 distress survey requirements. ERI's staff includes trained technicians, ensuring the highest quality and objectivity in distress ratings and interpretations.

All manual and automated distresses identified will be reviewed by an engineer according to the Quality Control / Quality Assurance plans.

Task 6: Nondestructive Deflection Testing (Optional)

This is an optional task that can be very helpful in identifying the uniform pavement sections and in the development of pavement performance prediction models.

The maximum deflection (D0) obtained from nondestructive deflection testing (NDT) data is a good indicator of the overall roadway condition, and is a function of the foundation support, the upper pavement layer thicknesses, the pavement strength, and the applied loads. In general, for any given thickness, higher D0 values indicate a weaker pavement, and variability of the pavement structure can be observed by viewing the longitudinal profile of the maximum deflections along the length of a pavement section.

Therefore, NDT can be used to help in identifying uniform pavement sections, classifying pavements by relative strength for prediction models, and identifying maintenance and rehabilitation needs based on the structural analysis of the pavement sections. ERI's KUAB FWD is shown in **Figure 5**.

Figure 5: ERI's KUAB FWD used for NDT Testing

Task 7: Ground Penetrating Radar (GPR) Testing (Optional)

This is an optional task that can be very helpful in verifying / supplementing the pavement layer thickness information obtained from the City's records.

GPR data can be used to identify the uniform pavement sections, and determine the pavement layer thickness information within each uniform pavement section. ERI's GPR system is shown in **Figure 6**.

Figure 6: ERI'S GSSI GPR System

Task 8: Destructive Testing (Optional)

This is an optional task that can be very helpful in verifying / supplementing the pavement layer thickness information obtained from the City's records and GPR data (if collected). The limited destructive testing can be conducted by taking cores from the existing pavements.

Task 9: MicroPAVER™ Database

MicroPAVER™ is a pavement management system program developed by the U.S. Army Corps of Engineers. The pavement condition distress data collected will be transferred to the MicroPAVER™ pavement inventory program. The PCI will be calculated for each surveyed sample unit within the defined uniform pavement section.

Task 10: Pavement Maintenance Policies

Pavement maintenance policies that address localized preventive, localized safety and global preventive maintenance and rehabilitation (M&R) requirements will be developed. The localized preventive maintenance policy is applied to pavement sections in sound condition. The localized safety policy is applied to deteriorated pavement sections. The global preventive maintenance policy is applied to pavement sections showing no sign of structural distress or to pavement sections having insignificant fatigue damage over the design period. These maintenance policies will be entered into the City's MicroPAVER™ database.

Task 11: Pavement Condition Prediction Models

Knowledge about the future condition of the pavement is required for inspection scheduling, life cycle costing, benefit analysis and budget optimization. Pavement condition prediction models will be developed based on PCI, NDT (if conducted), pavement structure and construction history data. These prediction models will be entered into MicroPAVER™.

Task 12: PCI vs. M & R Cost Relationships

The relationships between PCI vs. localized preventive maintenance cost and PCI vs. M&R cost will be developed based on the local M&R cost data. These relationships will be entered into MicroPAVER™.

Task 13: Road Maintenance Management Program

The objectives of the road maintenance management program is to assess maintenance needs, evaluate rehabilitation strategies and treatments, establish estimated costs for maintenance and repair and recommend the order of priority for phasing work.

The road maintenance management program will be designed to maintain the pavement network in a good to excellent condition at the minimum cost. Field experience and research have clearly shown that the most cost-effective M&R strategy is to maintain pavements in good condition.

The road maintenance management program will be developed based on pavement condition inspections, pavement maintenance policies particularly developed for the City, pavement condition prediction models and PCI vs M&R cost relationships. The project location maps will be prepared based on the order of priority for phasing work.

Task 14: Geographic Information System (GIS)

The road maintenance program will be displayed using ArcGIS. Using GIS, the City Staff will be able to see the information contained in the PMS database graphically.

Task 15: Final Project Summary Report

A final project summary report detailing the methodology will be submitted to the City.

B. PROJECT SCHEDULE

ERI has prepared a tentative project schedule as shown in **Table 1**. A detailed project schedule will be provided to the City within one (1) week from the date the contract is awarded. The schedule as shown will provide the proposed data collection, analysis and delivery tasks for this project.

C. COST PROPOSAL

The Cost Proposal includes the lump sum costs and itemized costs for the completion of proposed data collection and delivery as shown in **Table 2**.

TABLE 1: PROJECT SCHEDULE

TASK #	TASK NAME	MONTH 1				MONTH 2				MONTH 3				MONTH 4				MONTH 5				MONTH 6			
		Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4	Week1	Week2	Week3	Week4
1	Project Management																								
2	Background Data Collection																								
3	Records Review																								
4	Uniform Pavement Sections																								
5	Pavement Condition Survey (Manual)																								
	Pavement Condition Survey (Automated)																								
	* Includes Data Collection and Data Reduction																								
6	Non Destructive Testing (Optional)																								
7	Ground Penetrating Radar Testing (Optional)																								
8	Destructive Testing (Optional)																								
9	MicroPAVER™ Database																								
10	Pavement Maintenance Policies																								
11	Pavement Condition Prediction Models																								
12	PCI vs. M & R Cost Relationships																								
13	Road Maintenance Management Program																								
14	Geographic Information System (GIS)																								
15	Final Project Summary Report																								

C. COST PROPOSAL

Table 2: Cost Estimate for Automated Pavement Condition Survey And Development of A PMS (For approximately 340 Lane Miles) For The City of Rock Island, IL

	Employee Classification	Project Manager	Project Engineer	Survey Technician	Total Hours	Total Salary Cost	Description of Reimbursable Expenses Item		Total Reimbursable Expenses	Total Cost
	Salary Rate	$170.00	$90.00	$50.00			Unit	Rate		
	Project Element	Hours	Hours	Hours						
1	**Task 1: Project Development**	24	24	8	56	$6,640.00				$6,640.00
	Mobilizations (Lump sum cost per mobilization)						2	$350.00	$700.00	$700.00
2	**Task 2: Background Data Collection**	4	16	8	28	$2,520.00				$2,520.00
3	**Task 3: Records Review**	4	40	8	52	$4,680.00				$4,680.00
4	**Task 4: Uniform Pavement Sections**	12	40	8	60	$6,040.00				$6,040.00
	Hours	44	120	32	196					
	Salary	*$7,480.00*	*$10,800.00*	*$1,600.00*		*$19,880.00*				
	Total Cost									$20,580.00
5	**Task 5: Automated Condition Survey**									
	Mobilization (198 miles one way @ $5.00/mile)						390	$5.00	$1,950.00	$1,950.00
	Pavement Condition Survey Using Automated Vehicle (340 lane miles @ $115.00/mile)						340	$115.00	$39,100.00	$39,100.00
	Data Reduction (25% of Images)	16	119	375	510	$32,180.00				$32,180.00
	Image Data Delivery, if needed						2	$300.00	$600.00	$600.00
	Hours	16	119	375	510					
	Salary	*$2,720.00*	*$10,710.00*	*$18,750.00*		*$32,180.00*				
	Total Cost									$73,830.00
	Task 6, 7 & 8: Optional Services									
	FWD, GPR and Coring Testing	0	0	0	0	$0.00				$0.00
	Hours	0	0	0						
	Salary	*$0.00*	*$0.00*	*$0.00*		*$0.00*				
	Total Cost									$0.00
9	**Task 9: MicroPAVER™ Database**									
	Creation of MicroPAVER™ Database, GIS and Data Transfer and PCI Calculation	24	80	24	128	$12,480.00				$12,480.00
	Hours	24	80	24	128					
	Salary	*$4,080.00*	*$7,200.00*	*$1,200.00*		*$12,480.00*				
	Total Cost									$12,480.00
10	**Task 10: Pavement Maintenance Policies**	8	8	0	16	$2,080.00				$2,080.00
11	**Task 11: Pavement Condition Prediction Models**	8	8	0	16	$2,080.00				$2,080.00
12	**Task 12: PCI vs. M&R Cost Relationships**	8	8	0	16	$2,080.00				$2,080.00
13	**Task 13: Road Maintenance Management Program**	32	16	0	48	$6,880.00				$6,880.00
14	**Task 14: Geographic Information Systems (GIS)**	12	48	0	60	$6,360.00				$6,360.00
15	**Task 15: Final Project Summary Report**	32	40	0	72	$9,040.00				$9,040.00
	Mobilizations (Lump sum cost per mobilization)						2	$350.00	$700.00	$700.00
	Hours	100	128	0	228					
	Salary	*$17,000.00*	*$11,520.00*	*$0.00*		*$28,520.00*				
	Total Cost									$29,220.00
	GRAND TOTALS									
	TOTAL HOURS	184	447	431	1,062					
	TOTAL SALARIES	*$31,280.00*	*$40,230.00*	*$21,550.00*		*$93,060.00*				
	TOTAL COST								*$43,050.00*	*$136,110.00*

It is assumed that the City will provide all traffic control when necessary.
It is assumed that the City will provide all necessary clearances to perform the work.
The actual quantities will be reviewed with the City and adjusted as needed. The quantities (and resulting costs) may therefore be adjusted to fit the actual needs for the City's PMS.
All costs are based on an assumed quantity of approximately 340 lane miles of pavement

Engineering & Research International, Inc.

1401 Regency Drive East • Savoy, Illinois 61874 U.S.A.
Telephone: (217) 356-5945 • Fax: (217) 356-6347
E-mail: eri@erikuab.com • Web: www.erikuab.com

Contract
GENERAL CONDITIONS
Engineering Research Int'l, Inc.
Engineering Services

ITEM 1. Scope of Work
Engineering Research Int'l. Inc. (ERI) shall perform services in accordance with an "agreement" made with the "client". The agreement consists of ERI's proposal, Standard Fee Schedule, and these General Conditions. The "client" is defined as the person or entity requesting and/or authorizing the work, and in doing so, client represents and warrants that he is duly authorized in this role even if performed on behalf of another party or entity, in which case the other party or entity is also considered as the client. The acceptance of ERI's proposal signifies the acceptance of the term of this agreement.

The fees for services rendered will be billed in accordance with the Standard Fee Schedule; unit rates for services not covered in the Fee Schedule or elsewhere in the agreement can be provided. The standard prices proposed for the work are predicated upon the client's acceptance of the conditions and allocations or risks and obligations described in the agreement. The client shall impart the terms of this agreement to any third party to whom client releases any part of ERI's work. ERI shall have no obligations to any party other than those expressed in this agreement.

ITEM 2. Site Access
The client will provide for the right-of-access to the work site. In the event the work site is not owned by the client, client represents to ERI that all necessary permissions for ERI to enter the site and conduct the work have been obtained. While ERI shall exercise reasonable care to minimize damage to the property, the client understands that some damage may occur during the normal course of work, that ERI has not included in its fee the cost of restoration of damage, and that client will pay for such restoration costs.

ITEM 3. Utilities
In the performance of its work, ERI will take all reasonable precautions to avoid damage to underground structures or utilities, and will rely on utility locator services to correctly identify their buried service lines, and on plans, drawings or sketches made available and provided by the client. The client agrees to hold ERI harmless and indemnify ERI from any claims, expenses or other liabilities, including reasonable attorney fees, incurred by ERI for any damages to underground structures and utilities which were not correctly and clearly shown on the plans provided to ERI or otherwise disclosed by the client or utility locator service. ERI will be responsible for ordering the utility locator services only if expressly set forth in the scope of the proposal.

ITEM 4. Hazardous Materials and Conditions
ERI's work shall include visual observations, laboratory analysis, and physical testing of subsurface water and soil samples obtained by intrusive sampling of the subsurface, for the purpose of detection, quantification or identification of hazardous substances or constituents present, if any, within the defined scope of its services. As such, ERI does not create, generate, transport or at any time own or store hazardous materials in the performance of its work. The client will take possession of and be responsible for the proper disposal of all hazardous materials including, but not limited to, samples, drilling fluids and cuttings, decontamination and well development fluids and used disposable protective gear and equipment.

Prior to the start of services, or at the earliest time such information is learned, it shall be the duty of the client, or other involved or contacted parties, to advise ERI of any known or suspected undocumented fills, hazardous materials, by-products, or constituents, and any know environmental, geological and geotechnical conditions which exist on or near any premises upon which work is to be performed by ERI employees or subcontractors or which in any other way may be pertinent to ERI's proposed services.

ERI shall hold confidential the business and technical information obtained or generated in performance of services under this agreement and identified in writing by the client as "confidential". ERI shall not disclose such information except if such disclosure is required by governmental statute, ordinance, or regulation for compliance with professional standards of conduct for public safety, health and welfare concerns, or for protection of ERI against claims or liabilities arising from performance of its services.

ITEM 5. Unanticipated Hazardous Materials
The discovery of unanticipated hazardous materials, or suspected hazardous materials, may require that special and immediate measures be exercised to protect the health and safety of ERI site personnel and/or the public. ERI may at its option and on the basis of its judgement and opinion, exercise such precautions to complete the project, or terminate further work on the project. In either case, the client will be notified as soon as possible, and the client agrees to bear all reasonable and equitable cost adjustments, if any, associated with such measures taken.

ITEM 6. Standard of Care
ERI will perform the services under this agreement in accordance with generally accepted practice, in a manner consistent with the level of care and skill ordinarily exercised by members of this profession under similar circumstances. No other warranties implied or expressed, in fact or by law, are made or intended in this agreement. The client recognizes that subsurface soil and groundwater conditions can vary between sampling points and with time, and that the interpretation of data, and opinions and recommendations made by ERI are based solely on obtained data. Such limitations can result in a redirection of conclusions and interpretations where new or changed information is obtained. In this regard, ERI makes no representations or guarantees that the points selected for sampling are in any way representative of the entire site.

ITEM 7. Technical Methodology and Protocol
The field of civil engineering and associated technologies, guidelines, regulations and practices are in a constant mode of change and development. Variations and inconsistencies exist amongst the guidelines, regulations and standards of various governmental agencies and other recognized authorities; this necessitates that judgement be applied in the selection of methods and procedures implemented in the performance of work in the this field. ERI will select generally accepted methods and procedures it considers appropriate to accomplish the intended and understood purpose of its services within the scope of this agreement, and the client signifies concurrence with these methods and procedures by acceptance of this agreement. In the event other methods or procedures are preferred by the client or considered more appropriate, a written description or designation of these must by provided prior to execution of this agreement.

ERI may utilize the services of a subcontracted analytical laboratory for related testing, and possibly other types of subcontractor services, as necessary to complete the project. ERI will strive to select a subcontractor which is generally accepted and recognized in their respective industry, but shall assume no responsibility for claims or losses arising from the negligence or errors and omissions of the selected entity. The client may specify a laboratory or other subcontractor of client's choice for the required services by providing such written instructions to ERI at any time prior to performance of work, subject to acceptance of any increased costs which may result from such selection.

ITEM 8. Limitations of Liability
The client agrees to limit ERI's liability to the client and all parties claiming through the client or otherwise claiming reliance on ERI's services, allegedly arising from ERI's professional acts or errors and omissions, to a sum not to exceed the lesser of ERI's fees for the services performed on the project, or $25,000.00, provided that such claims are not attributable to ERI's gross negligence or intentional misconduct. In this latter event, the limit of liability will be increased to $25,000 less any applicable insurance amount covering alleged damages or claims. In no event shall ERI or any other party to this agreement, including parties which may have or claim to have a direct or indirect reliance on ERI's services, be liable to the other parties for incidental, indirect, or consequential damages arising from any cause.

ITEM 9. Insurance and Indemnity
ERI represents that the company maintains general liability and property damage insurance coverage considered adequate and comparable with coverage maintained by other similar firms, and that ERI's employees are covered by Workman's Compensation Insurance. Certificates of insurance can be provided to the client upon written request. ERI shall not be responsible for any loss, damage, or liability beyond the insurance limits and conditions. ERI agrees to indemnify the client from and save client harmless against any loss, damage, or liability stemming from acts of gross negligence by ERI. Except as expressly set forth in Item Nos. 8 and 9, the client agrees to hold ERI, its officers, directors, agents, and employees, harmless from any claims, suits or liability including but not limited to attorney fees, costs of settlement and other incidental costs, for personal injury, death, illness, property damage or any other loss, allegedly arising from or related to ERI's performance of work.

ITEM 10. Modifications
This agreement and all attachments pursuant to this agreement represent the entire understanding between the parties, and neither the client nor ERI may amend or modify any aspect of this contract unless such alterations are reduced to writing and properly executed by the parties hereto. These terms and conditions shall supersede all prior or contemporaneous communications, representations, or agreements, and any provisions expressed or implied in the request for proposal, purchase order, authorization to proceed, or other contradictory provisions, whether written or oral.

ITEM 11. Payment
Invoices for performed work will be submitted monthly for services rendered the prior month and/or upon completion of said services, payable within 30 days of invoice date. The fees quoted are based upon an expected timely payment. An interest charge of 1.5% per month will be added to delinquent charges; however, ERI at its option may terminate its services due to clients failure to pay when due. In the event of termination of services prior to completion, client shall compensate ERI for all services performed prior to and for such termination.