



**Baltimore Metropolitan Council**

**REQUEST FOR PROPOSALS FOR**

**BMC Regional Travel Demand Model Update:  
Development of Synthetic Population Generator**

**Due Date:**  
September 3, 2010  
4 p.m. EDT

**Submit Proposals to:**  
Baltimore Metropolitan Council  
ATTN: Birat Pandey, PE  
2700 Lighthouse Point East, Suite 310  
Baltimore, MD 21224  
E-mail: [bpandey@baltometro.org](mailto:bpandey@baltometro.org)  
Fax: 410-732-8248

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## I. INTRODUCTION

The Baltimore Metropolitan Council (BMC) is soliciting proposals from firms, joint ventures, and /or partnership (hereinafter referred to as “Consultant”) to develop a Synthetic Population Generator module in the framework of a phased Activity-Based Model development plan. This module is intended to replace socio-economic disaggregation model currently utilized by the BMC for its trip-based four-step regional travel demand model. The deliverables will be produced for use with the Cube Voyager modeling software (latest version).

This project is a part of BMC’s constant transportation model enhancement endeavor to improve the region’s travel behavior analysis tools. It is also motivated by the need to develop a new transportation model system that could better support evaluating a wider range of regional policy initiatives. This project is a step forward within the context of an envisioned larger effort to develop a new activity-based travel demand modeling system.

This Request for Proposals (RFP) describes the purpose of this project, the required scope of services, the consultant selection process, and the information that must be included in the proposal. Failure to submit information in accordance with the RFP requirements and procedures may be cause for disqualification.

## II. BACKGROUND

The Baltimore Metropolitan Council (BMC) is a private, nonprofit organization committed to identifying regional interests and developing collaborative strategies through plans and programs which will improve the quality of life and economic vitality throughout the region. Its Board of Directors includes the Mayor of Baltimore City, the County Executives of Anne Arundel, Baltimore, Harford and Howard counties, and a Carroll County Commissioner.

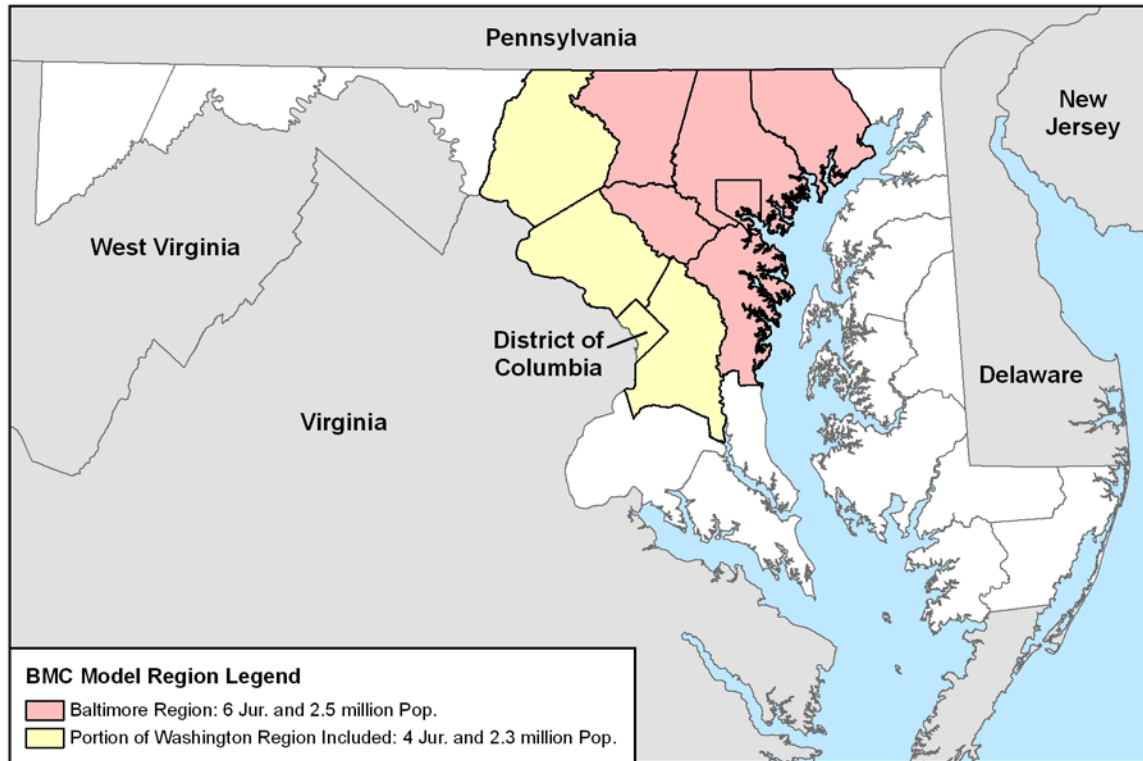
The Baltimore Regional Transportation Board (BRTB) is the designated Metropolitan Planning Organization (MPO) for the Baltimore region. It consists of designated representatives from Baltimore City, Anne Arundel County, Baltimore County, Carroll County, Harford County, and Howard County, plus the City of Annapolis, the Maryland Department of Transportation, the Maryland Department of the Environment, and the Maryland Department of Planning. It is responsible for coordinating transportation planning endeavors in the Baltimore region and is funding this project through the Unified Planning Work Program.

The work of BMC staff includes regional transportation planning and analysis, economic and demographic research, air and water quality programs, emergency preparedness and public safety, computer mapping applications, building permits data system, cooperative purchasing, and rideshare coordination. In addition, BMC staff provides technical support to the BRTB.

BMC is responsible for maintaining the transportation model for Baltimore region area that includes the member jurisdictions in the state of Maryland: Baltimore City, Anne Arundel County, Baltimore County, Carroll County, Harford County, Howard County and

City of Annapolis. In addition to the BTRB MPO area, BRTB transportation model includes four additional jurisdictions outside, but adjacent to the MPO area. They include: Washington, DC, Montgomery County, Prince George's County and Frederick County in Maryland (see Exhibit 1). These four counties outside MPO area are included only as a part of BMC travel demand modeling area because of significant interaction with the Baltimore region.

**Exhibit 1: Transportation Modeling Area**



The Baltimore Region Travel Demand Model is a four-step trip-based model. This model runs under TP+ software, published by Citilabs. The model simulates travel by persons, vehicles, and transit users in the Baltimore region as well as portions of adjoining jurisdictions in the Washington region. This model underwent a major overhaul in 2006 with validation year 2000, and is designated as BMC Travel Demand Model Version 3.3

The Version 3.3 model utilizes the software package TP+ and is based on 1,463 Transportation Analysis Zones (TAZs), of which 1,151 are within the Baltimore region, 270 in the Washington region, and 42 at external stations.

BMC staff is currently updating the Version 3.3 model for revalidation against 2008 observed data. The revalidation included recalibration of model components based on observed data for the year 2008 including household survey and onboard passenger survey

### III. PURPOSE OF REQUEST FOR PROPOSAL

This Request for Proposal (RFP) seeks bids from qualified Consultants to develop a synthetic population generator model that best matches both household and persons attributes of the model area. BMC is seeking to identify and select an outside independent organization to perform activities listed below.

- Project management plan and project initiation
- Data source identification, collection, review and analysis
- Model framework and model specification development
- Model estimation, calibration and validation
- Model application or model software development
- Model sensitivity testing
- Model documentation
- Training and technical support
- Replacement of current trip-based model socio-economic disaggregation model

The remainder of the document provides additional information that will allow a service provider to understand the scope of the effort and develop a proposal in the format desired by BMC.

### IV. PROJECT SCOPE OF WORK

Below outlined is a preliminary scope of services, list of tasks and deliverables that are envisioned for this project. The consultant is encouraged to suggest modifications to these tasks that would facilitate a successful work program. The methodology to accomplish each task will be agreed upon prior to initiating the work.

#### **General Requirements**

It is anticipated that the selected consultant will be experienced in activity-based model development and application. BMC current regional travel demand model utilizes the software package TP+/Cube-Voyager. Consultant should be familiar with the TP+/Cube Voyager modeling software package. BMC wishes to maintain its model in this TP+/CUBE Voyager platform and will strongly disfavor any proposal which will introduce proprietary (“black box”) software. Model application developed outside TP+/CUBE-Voyager platform should be open-source software.

## **Goals and Objective**

The goal of this project is to develop a synthetic population generator model in the context of a future Activity-Based Model. The objective of the project is to develop a model that best matches both household and person attributes of the model area. The overall objective of this effort is to improve travel demand model by providing superior inputs to the travel demand (Trips or Tours or Activity) estimation model.

## **Project Tasks Description**

Below outlined are the six major tasks of this project. Before initiation of the each task, the consultant will develop a memo outlining work plan, work approach and work schedule including responsibilities of team members. The Consultant will work with BMC staff to finalize the work plan. The methodology to accomplish each task will be agreed upon prior to initiating the work.

### **Task 1. Project Management and Project Initiation**

This task ensures that there is direction and coordination during the course of this project between BMC staff and the Consultant. This task will also further describe the scope of the services; define the formats for all memos, reports, graphics, mapping and other operation procedure of the project.

**Task 1.1- Project Management Plan:** The Consultant will prepare project management plan that outlines the project production work plan and quality control procedure for each task. The consultant will set up a detailed project schedule with key milestones and prepare and submit monthly progress reports, task based invoices, and billings.

**Deliverable:** *Project management plan, project schedule, monthly progress reports, invoices and billings.*

**Task 1.2- Project Initiation:** The consultant will provide a workshop at BMC focused on its proposed modeling approach and model data needs during the initial kickoff meeting. The Consultant will also outline both short and long term implications of its suggested modeling approach in terms of software and hardware requirements as part of a phased Activity-Based model development plan prospect. BMC staff and the Consultant will work together to review the Activity-Based modeling methodologies and identify regional transportation modeling needs.

**Deliverable:** *Technical memo that outlines the project management plan for project execution and the model development methodology details.*

## **Task 2. Data Identification, Collection and Review**

The Consultant will identify and outline the model data needs. In this task BMC staff and the Consultant will work together to identify data sources, collect available data, and review the integrity of the available data for the model development process.

### ***Deliverables:***

- *Technical memo that outlines the data required for model development, data collection plan, and the data evaluation criteria*
- *Database for Synthetic Population Generator Model development task*

## **Task 3. Synthetic Population Generator Model Development**

The Consultant will develop synthetic population generator model that best matches both household and persons attributes of the model area population estimates. Before initiation of this task, the Consultant will develop a white paper of its proposed Synthetic Population Generator Model focusing on model development procedure and model deployment.

***Task 3.1- Model Design Specification and Model Estimation:*** The Consultant will establish model structure, define model specification and estimate model parameters.

### ***Deliverables:***

- *Technical memo that outlines the proposed model structure, model specification and model estimation procedure. The memo should define the model strength and limitation including technical details that would provide guidance for future model updates and adjustments*
- *Synthetic Population Generator Model*

***Task 3.2- Model Application/Software Development:*** In this task BMC staff and the Consultant will work to design model application framework. The Consultant will develop model application code to implement the developed model. The developed application should have Graphical User Interface (GUI) format and sufficiently user-friendly for a novice model applier for model operation. The application code should include sufficient information to understand the model computation. The developed model application will also include a procedure to confirm model input data integrity and to generate standard model outputs summary reports.

### ***Deliverables:***

- *Technical memo describing the proposed implementation framework, model operation and maintenance procedure, minimum coding skills required for model maintenance and adjustment*
- *Synthetic Population Generator Model implementation code or model software*

**Task 3.3- Model Calibration and Model Validation:** In this task BMC staff and the consultant will work together to establish model validation targets. The consultant will calibrate and validate developed model to the latest available data.

***Deliverables:***

- *Technical memo describing data, procedure, criteria, targets and results of model calibration and validation task*
- *Validated Synthetic Population Generator Model*

**Task 3.4- Model Sensitivity Test:** In this task BMC staff and the Consultant will work together to perform model sensitivity test for two scenarios. BMC staff and the Consultant will work together to develop criteria and attributes for evaluation for model sensitivity test.

***Deliverable:*** *Technical memo outlining sensitivity testing scenarios, testing criteria, and attributes for evaluation. This memo will also report on the results of its sensitivity testing analysis, model sensitivity, and model performance.*

**Task 4. Model Documentation**

The Consultant will write a technical report documenting data processing and data sources, developed model and the model development process as outlined under Task 3. The report should also outline the model's strengths and limitations, including recommendations for a possible future modeling framework in the context of phased Activity-Based Model development plan.

***Deliverable:***

- *Draft technical report in electronic format.*
- *Five hard copies and one electronic copy of the final technical report*

**Task 5. Replacement of Existing Socio-Economic Disaggregation Model**

In this task, the Consultant will work with BMC staff to incorporate the newly developed synthetic population generator to replace existing socio-economic disaggregation model currently utilized in BMC regional travel demand model. The consultant will work with BMC staff to make necessary adjustment for this swap.

***Deliverables:***

- *Technical memo documenting the model replacement methodology*
- *Replace existing socio-economic disaggregation model by the developed synthetic population generator*

**Task 6. Provide Training and Technical Support**

The consultant will train BMC staff on the use of the newly developed modeling capabilities and procedures. Documentation of the process will also be provided.

Consultant will remain available for technical support for a period of six months following final delivery of the product.

## V. CONSULTANT QUALIFICATIONS

The BMC is seeking consultant(s) who have experience with the following:

- Activity-Based Model research, development and application
- TP+ and Cube Voyager software
- Baltimore region transportation system

## VI. PROPOSAL CONTENT

The proposal should consist of two separate parts: (1) a Technical Proposal; and, (2) a Cost Proposal (in a sealed envelope). The technical proposal should be limited to (15) pages in length, exclusive of professional resumes, cover sheets, table of contents, dividers, printed on one side and single spaced. It shall meet, at a minimum, the following requirements; proposals not meeting these requirements will be rejected. Elaborate covers and binders are strongly discouraged.

### **Technical Proposal**

The Technical Proposal should contain the following:

- *Cover Letter* – signed by an executive with authority to commit the proposing firm and stating the period for which the proposal is valid.
- *Work Program* – A discussion of each task to be undertaken, how it will be performed and the products to be produced. Proposers may add or subdivide the tasks as necessary to fully describe their approach to the work. An overall schedule of work should be developed.
- *Experience and Qualification* – Please list your qualifications with regard to the selection criteria identified in this RFP. Your summary should contain: (a) the information on projects of similar nature that you or your firm has completed, including brief descriptions, dates, and names of contact persons. Please include links to relevant work if possible, and (b) the resumes of proposed project manager and key team personnel.
- *Project Management* – Designation of a project manager and the responsibilities of the manager. Note that the resulting contract will require commitment of the specified staff. An outline showing estimated hours by each staff member by task shall be provided.
- *DBE Participation* – The program for assuring the maximum opportunity for participation by Disadvantaged Business Enterprises (DBEs) in accord with BMC's goals shall be presented. See the section of MANDATORY STATEMENTS for statement of DBE participation goals.
- *Other Information* – Any other material that the proposer wishes to provide.

## **Cost Proposal**

The Cost Proposal should be composed of two parts: Project Budget and Affidavits and Certifications.

- *Project Budget.* The proposed amount of funding available is \$100,000. Regarding this budgeted amount, the following questions should be answered:
  - Is this amount sufficient to complete the tasks outlined in this RFP?
  - If the answer to question #1 is yes, what will be the cost for you to complete this project?
  - If the answer to question #1 is no, state your proposed total cost, and also identify those tasks which you will be able to complete for the above-mentioned sum which will produce a useable product.
  - Provide your price quote as a fixed price in United States dollars. The price quote shall include the number of labor hours and cost by staff member and total hours and cost estimated for each task. Direct costs shall be itemized by category (e.g., travel, per diem, printing and reproduction, etc.) for the entire project. The contract type is anticipated as fixed price with partial payments paid based on task completion.
- *Affidavits and Certifications* – An original signed copy of Proposal Affidavit attached at the end of this RFP shall be included in the Cost Proposal.

## VII. SUBMISSION OF PROPOSAL

All respondents shall submit **5 copies** of their technical proposal and one copy of their cost proposal, the latter being in a sealed envelope, to:

Baltimore Metropolitan Council  
Attn: Birat Pandey, PE  
Senior Transportation Modeler/Engineer  
2700 Lighthouse Point, Suite 310  
Baltimore, MD 21224-4774

The proposal must be received by BMC no later than 4:00 p.m. Eastern Daylight Time on Friday, **September 3, 2010**. Allow adequate time for mail or other carrier delivery. Proposals arriving after the deadline will not be accepted. Please direct any questions to Birat Pandey by e-mail: [bpandey@baltometro.org](mailto:bpandey@baltometro.org) before Friday, August 20, 2010. Official answers to questions will be posted to the BMC web site ([www.baltometro.org](http://www.baltometro.org)) by Tuesday, August 24, 2010.

**Please note that the BMC anticipates relocating its offices in mid September, although a specific move date has not yet been determined. Proposers should keep abreast of BMC's activities related to the move through the BMC's website, which will provide new contact information when the move is complete.**

The BMC will not pay for the development and submission of proposals in response to this RFP. The BMC reserves the right to reject any proposals without cost or detriment to the BMC. The Consultant shall not make changes in the specifics put forth in a proposal, including staff participation, without the prior written consent of the BMC.

## VIII. TENTATIVE SCHEDULE

RFP Issued:	Wednesday, August 4, 2010
Proposals Due:	Friday September 3, 2010 @ 4:00 p.m. EDT
Consultant Selection:	Thursday, September 30, 2010
Start of Work:	October 2010
Completion of Work:	June 2011

## IX. CONSULTANT SELECTION CRITERIA

All proposals will be evaluated on the basis of technical merit and proposed cost. This is not a low-bid procurement. BMC staff will conduct the evaluation of proposals. Technical merit includes work program and approach, as well as staff experience and qualifications. The proposed amount for the contract is estimated to be **\$100,000** in value, but the BMC is willing to consider bids greater than this amount if proposals can document the need for a higher price. Teaming is permissible but the contract will be with a single prime contractor.

The BMC reserves the right to negotiate with one or more respondents selected on the basis of the initial technical merit and proposed cost. Respondents may be asked to make personal appearances to provide additional information on proposals.

## X. MANDATORY STATEMENTS

### **Public Information Act Notice**

Respondents should give specific attention to the identification of those portions of their proposals they deem to be confidential, proprietary information, or trade secrets and provide any justification why such materials, upon request, should not be disclosed.

### **Disadvantaged Business Enterprise Notice**

Disadvantaged business enterprises (DBEs) are encouraged to respond to this solicitation. It is the intent of the BMC that certified minority business enterprises and sub-contractors be given the opportunity to submit proposals to this RFP and will not be subject to discrimination on the basis of race, color, sex, or national origin in consideration for an award.

### **Disadvantaged Business Enterprise Subcontract Participation Goal**

The Baltimore Metropolitan Council hereby notifies all respondents that in regard to any contracts entered into pursuant to this advertisement; MBEs and WBEs will be afforded full opportunity to submit expressions of interest in response to this notice and will not be subject to discrimination on the basis of race, color, sex or national origin, in consideration for an award.

It is the goal of the BMC that certified businesses participate in all federal-aid contracts.

A DBE subcontract participation goal of twenty percent (24.5%) of the total contract amount has been established for this procurement. Proposers must make a good faith effort to meet this goal. All offers submitted in response to this RFP must include a statement specifying the Maryland Department of Transportation (MDOT) has certified the DBE or DBEs utilized to meet this requirement. If the DBE has not been certified by MDOT but has been certified by other state transportation agencies receiving federal funding, the name of the agency should be included in the proposal. The BMC reserves the option to accept this certification in lieu of MDOT certification.

**Required Terms and Conditions**

The following terms and conditions are required in contracts executed by the BMC.

- 1) Parties to the Contract
- 2) Scope of the Contract
- 3) Compensation and Method of Payment
- 4) Non-Hiring of Employees
- 5) Disputes
- 6) Maryland Law Prevails
- 7) Non-Discrimination in Employment
- 8) Contingent Fee Prohibition
- 9) Multi-Year Contracts Contingent Upon Appropriations
- 10) Termination for Default
- 11) Termination for Convenience
- 12) Delays and Extensions of Time
- 13) Liquidated Damages
- 14) Suspension of Work
- 15) Retention of Records
- 16) Compliance with Laws
- 17) Truth in Negotiation Certification
- 18) Contract Affidavit
- 19) Insurance Coverage

**XI. PROPOSAL AFFIDAVIT**

**A. (ANTI-BRIBERY AFFIRMATION) I HEREBY CERTIFY THAT**

(1) I am the (title) \_\_\_\_\_ and the duly authorized representative of (vendor) \_\_\_\_\_ and that I possess the legal authority to make this Affidavit on behalf of myself and the vendor for which I am acting.

(2) Except as described in paragraph 3 below, neither I, nor to the best of my knowledge, information, and belief, the above vendor, nor any of its officers, directors, or partners, nor any of its employees directly involved in obtaining contracts with the State or any county, bi-county, multicounty agency or subdivision of the State has been

convicted of, or has pleaded nolo contendere to a charge of, or has during the course of an official investigation or other proceeding, admitted in writing or under oath acts or omissions committed after July 1, 1977, which constitute bribery, attempted bribery, or conspiracy to bribe under the provisions of Article 27 of the Annotated Code of Maryland or under the laws of any state or federal government.

(3) State "none" or, as appropriate, list any conviction, plea or admission described in paragraph 2 above, with the date; court official, or administrative body; and the sentence or disposition, if any: \_\_\_\_\_.

(4) I ACKNOWLEDGE THAT this Affidavit is to be furnished to the Procurement Officer, and may be furnished to the Attorney General pursuant to Sections 16-201, et seq., of the State Finance and Procurement Article of the Annotated Code of Maryland. I acknowledge that if the representations set forth in this Affidavit are not true and correct, the Council may terminate any contract awarded and take any other appropriate action.

**B. (NON-COLLUSION AFFIRMATION) I HEREBY FURTHER AFFIRM THAT** neither I nor, to the best of my knowledge, information and belief, the above firm nor any of its other representatives I here represent have:

(1) Agreed, conspired, connived or colluded to produce a deceptive show of competition in the compilation of the bid or offer being submitted herewith;

(2) In any manner, directly, or indirectly, entered into any agreement, participated in any collusion to fix the bid price or price proposal of the bidder or respondent herein or any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the within bid or offer is submitted.

**C. (PROCUREMENT AFFIRMATION) I HEREBY FURTHER AFFIRM THAT**

(1) Neither the above business nor, to the best of my knowledge, information, and belief, any officer, controlling stockholders, partner, principal, or other person substantially involved in the contracting activities of the business has in the past five (5) years: (a) been convicted under state or federal statute of a criminal offense incident to obtaining or attempting to obtain or performing a public or private contract, fraud, embezzlement, theft, forgery, falsification or destruction of records, or receiving stolen property; (b) been found civilly liable under state or federal antitrust statutes for acts or omissions in connection with the submission of bids or proposals for a public or private contract; (c) been convicted of any violation of a state or federal antitrust statute; (d) been convicted under the provisions of Title 18 of the United States Code for violation of the Racketeer Influenced and Corrupt Organizations Act, 18 USC Section 1961 et seq.; or (e) the Mail Fraud Act, 18 USC Section 1341 et seq., for acts arising out of the submissions that would constitute grounds for conviction or liability under any statute described above. Also, the undersigned vendor was not founded or established or is not operated in a manner designed to evade the application or defeat the purpose of the Debarment Regulations, COMAR 21.08; is not currently suspended or debarred pursuant to COMAR 21.08 or by the action of any other public entity; and is not a successor, assignee, subsidiary, or affiliate of a suspended or debarred business.

(2)

(a) If the affirmation described in subsection (1) cannot be given and debarment proceedings have not been instituted against the business pursuant to COMAR 21.08, indicate the reasons why the affirmation cannot be given, including any conviction or admission described in subsection (1), above, with the date, court and sentence or disposition, if any; the name(s) of the person(s) involved, and their current positions and responsibilities with the business; the activity specified in COMAR 21.08 in which each person was involved; and the details of the person's participation in the activity, including the name(s) of an entity involved and the person's positions and responsibilities with the entity. (Attach additional sheets as necessary.)

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(b) If the affirmation described in subsection (1) cannot be given, and debarment proceedings have been instituted against the business pursuant to COMAR 21.08, indicate the status of such proceedings.

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**I ACKNOWLEDGE THAT** this Affidavit is to be furnished to the Procurement Officer and may be distributed to units of: (1) the State of Maryland; (2) counties or other subdivisions of the State of Maryland; (3) other states; and (4) the federal government. I further acknowledge that this Affidavit is subject to applicable laws of the United States and the State of Maryland, both criminal and civil, and that nothing in this Affidavit or any contract resulting from the submission of this bid or proposal shall be construed to supersede, amend, modify or waive, on behalf of the State of Maryland or any unit of the State of Maryland having jurisdiction, the exercise of any statutory right or remedy conferred by the Constitution and the laws of Maryland in respect to any misrepresentation made or any violation of the obligations, terms and covenants undertaken by the above firm in respect to (1) this Affidavit, (2) the contract, and (3) other Affidavits comprising part of the contract.

**I DO SOLEMNLY DECLARE AND AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE CONTENTS OF THIS AFFIDAVIT ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF.**

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Affidavit)