

**INFORMATION FOR QUALIFICATIONS
CITY OF MAUMELLE ADAPTIVE SIGNAL SYSTEM
MAUMELLE BLVD.**

**ADVERTISEMENT – REQUEST FOR QUALIFICATIONS (RFQ)
BID NUMBER 2016-08**

NOTICE IS HEREBY GIVEN that the City of Maumelle, Arkansas will receive qualifications and proposals in the office of the City of Maumelle City Clerk's Office, 550 Edgewood Dr., Suite 590, Maumelle, Arkansas 72113 until 4:00 p.m. (Central Standard Time), December 20, 2016 for a Traffic Signal Adaptive Technology System on Maumelle Blvd. for the City of Maumelle.

The intent of this RFQ is for the competitive selection of a professional service to provide consultation, installation, configuration, programming, training, maintenance, operation, integration of hardware and software needed for a Traffic Signal Adaptive Technology System. A complete description of the scope of services for the project, required information for inclusions in the Qualifications statement, and criteria used for rating proposed firms is available on line <http://www.maumelle.org/general-information-64040/bid-postingsrfqs.html>, or by contacting City of Maumelle, Tina Timmons, Maumelle City Clerk.

This is a RFQ only, do not include fee structure or costs. An envelope containing five (5) hard copies of the proposal and one electronic PDF must be sealed and contain the words "Request for Qualifications ASCT Vendor Services - The City of Maumelle's Adaptive Signal Control Technology Implementation – Bid Number 2016-08."

Qualifications must be received at City of Maumelle City Clerk's Office, 550 Edgewood Dr., Suite 590, Maumelle, Arkansas 72113 no later than 4:00 p.m. (Central Standard Time) on December 20, 2016. Qualifications received after that time will not be considered. All qualifications packages must include executed non-collusion affidavit and the non-kickback affidavit.

NOTICE

The City of Maumelle (City) reserves the right to reject any or all qualification packages, to waive irregularities and/or informalities in any qualification package, and to make an award in any manner, consistent with law, deemed in the best interest of the City. Evaluation of the qualification packages will include compliance with qualification specifications.

The City is an Equal Opportunity Employer and complies with the requirements of the Americans with Disabilities Act.

The City of Maumelle (City) complies with all civil rights provisions of federal statutes and related authorities that prohibit discrimination in programs and activities receiving federal financial assistance. Therefore, the City does not discriminate on the basis of race, sex, color, age, national origin, religion, disability, Limited English Proficiency (LEP), or low-income status in the admission, access to and treatment in City's programs and activities, as well as the City's hiring or employment practices. Complaints of alleged discrimination and inquiries regarding the City's nondiscrimination policies may be directed to Michael Watson, Acting Director of Human

Resources – EEO/DBE (Title VI Coordinator), 550 Edgewood Drive, Suite 590, Maumelle, AR 72113, (501) 851-2784 ext. 233, (Voice/TTY 711), or the following email address: mike@maumelle.org.

Also, Contact James Morley, Director of Code Enforcement and Permits – EEO/DBE (ADA/504 Coordinator), 550 Edgewood Drive, Suite 590, Maumelle, AR 72113, (501) 851-2784 ext. 227, (Voice/TTY 711), or the following email address: jimm@maumelle.org. Free language assistance for Limited English Proficient individuals is available upon request. This notice is available from the ADA/504/Title VI Coordinator in large print, on audiotape and in Braille.

PROPOSED TIMETABLE

The following proposed timetable is for planning purposes only. The City of Maumelle will make every attempt to comply with the times and dates set forth in this table, but reserves the right to adjust this timetable as required during the course of the RFQ process. **All interested vendors must submit their contact information to Michael Watson, Mayor, City of Maumelle, and forwarded to his email address; mayor@maumelle.org by November 17, 2016, prior to the Pre-Proposal meeting / conference date so we can share the location and/or call-in information with all interested vendors.**

RFQ Advertised	November 7, 2016
Pre-Proposal Meeting / Conference	November 22²⁴, 2016
Call	
Written Questions Due	November 29, 2016
Final Amendments Issued	December 13, 2016
Receive Final RFQ's	December 20, 2016
Short List Qualified Firms (if necessary)	January 6, 2017⁶
Interview Short Listed Firms	January 16 & 17, 2017⁶
Anticipated Contract Award	-February 20²³, 2017⁶

The Request for Qualification must be received by the City of Maumelle before 4:00 PM (Central Standard Time), December 20, 2016. Qualification packages must be responsive to the requirements of the Request for Qualification. Failure to do so will render the submittals as nonresponsive.

Five (5) hard copies of the Qualification package and one electronic PDF copy must be submitted

to:

**City of Maumelle City Clerk's Office
550 Edgewood Dr., Suite 590
Maumelle Arkansas 72113**

Proposals and Affidavits must be submitted in strict compliance to the instructions included. Upon receipt, the Proposals and Affidavits shall become the property of the City of Maumelle, without compensation to the responding vendors for disposition or usage by the City of Maumelle at its discretion.

INQUIRIES

Any and all questions related to this RFP shall be submitted in writing to the Honorable **Michael Watson, Mayor, City of Maumelle, and forwarded to his email address; mayor@maumelle.org** All questions must be received prior to 4:00 PM (Central Standard Time), November 29, 2016. Any official clarifications, answers or positions given by the City of Maumelle will be issued in the form of a written Amendment and distributed to all proposers.

CITY OF MAUMELLE, ARKANSAS

NON-COLLUSION AFFIDAVIT

I, _____, an authorized agent for _____, concerning a bid, proposal or contract with the City of Maumelle, Arkansas, for _____, and being of lawful age, being first duly sworn on my oath, swear, that this Affidavit is true and correct. Further, I swear that neither I nor the firm, company or corporation or any other employee for whom I am authorized agent in this matter, has not been a party to any collusion among bidders or other competitors in restraint of freedom of competition by any agreement to bid at a fixed price or to refrain from bidding; or with any state, county, city or public works authority official or employee as to quantity, quality or price in this prospective contract; or any other terms of said prospective contract; or with any discussion between other competitors and any official of the awarding agency concerning the exchange of money or other thing of value for special consideration in the letting of this bid, proposal or contract.

Authorized Agent Signature

Subscribed and sworn before me this ____ day of _____, 2016.

Notary Public

My commission expires: _____

CITY OF MAUMELLE, ARKANSAS

NON-KICKBACK AFFIDAVIT

I, _____, an authorized agent for _____, concerning a bid, proposal or contract with the City of Maumelle, Arkansas, for _____, and being of lawful age, being first duly sworn, on my oath, swear that this Affidavit is true and correct. Further, I swear that the work, services or materials as described by this invoice or other billing claim, have been delivered, completed or supplied in accordance with the plans, specifications, orders, requests or contract furnished or executed by the affiant. I further swear that no payment, promise of payment or other valuable consideration, directly or indirectly, has or will be made to any elected official, officer or employee of the awarding agency to obtain payment of this claim, or to procure the contract or purchase order pursuant to which this claim is submitted.

Authorized Agent Signature

Subscribed and sworn before me this ____ day of _____, 2016.

Notary Public

My commission expires: _____

RFO PROCESS INFORMATION

Methodology

Selection for the award of this Adaptive Signal Control Technology (ASCT) vendor services contract is expected to be done in a two-step process. The first step will be to review and evaluate the qualifications and proposals based on how well the ASCT vendor complies with the specifications, system requirements, and the ASCT vendor's explanation of how their ASCT meets those requirements in the system requirements matrix. Past deployments and success of ASCT within the United States and similar in nature, magnitude and complexity to the Maumelle/North Little Rock area will also be taken into account in the selection criteria. The second step will involve short-listing ASCT vendors based on the above criteria and a formal presentation and Question & Answer process, if necessary.

All proposal requirements must be met, or capable of being met by the responding ASCT vendor, or its proposal will be disqualified as being nonresponsive.

Proposal Format

In order to standardize and simplify the qualification statements for comparison and evaluation of the responding ASCT vendors, all submittals must be organized in the manner set forth herein. All information and materials for stating adherence to the specifications and requirements shall be provided under a single cover. The proposal shall be submitted on 8 ½" x 11" paper, double sided.

Section I (2 pages max): Title Page, Letter of Interest. The Title Page should identify the project, the name of the ASCT vendor, name of the ASCT software, and the primary contact including address, telephone number and email address for correspondence.

Section II (5 pages max): This section will state adherence to the technical specifications with specific descriptions and statements for the ASCT and the ASCT vendor compliance with the technical specifications. The description of the ASCT and ASCT vendor statements shall be numbered and referenced to the specific sections of the technical specification of this RFP.

Section III (System Requirements Matrix Form): This section shall state Conformance of the ASCT to each system requirement per the System Requirements Matrix found in this RFP.

'Comply' column: The ASCT vendor shall state if the ASCT complies with each requirement in the following manner:

Y = Fully Compliant with Requirement

N = Not Compliant with Requirement

D = Requirement Under Development & Testing – not currently deployed

‘Vendor Response’; column: A brief response statement shall follow the Compliance “Y, N, D letter” to describe the ASCT compliance, non-compliance, or current development including a date that the requirement will be fully tested and offered with the ASCT software if not currently offered.

‘Verification Method’ column: The ASCT vendor shall state the verification or testing method that shall be used to test each requirement for compliance. The following verification methods shall be stated, with a description of those methods below:

- **Demonstration:** used for a requirement that the system can demonstrate without external test equipment.
- **Test:** used for a requirement that requires some external piece of test equipment (such as logic analyzer and volt meter). The test and required equipment shall be clearly documented in the procedure.
- **Analyze:** used for a requirement that is met indirectly through a logical conclusion or mathematical analysis of a result (e.g., algorithms for calculation of headway, setting of “late” flag, and generation of priority request).
- **Inspection** is used for verification through a visual comparison. For example, quality of welding may be done through a visual comparison against an in-house standard.

Additional information for the System Requirements, including the concept of ASCT operations for the requirements can be found in the full System Engineering Analysis at:
<http://maumelle.org/images/ASCTSystemEngineeringAnalysis.pdf>
~~<http://www.maumelle.org/ASCT-System-Engineering-Analysis->~~

Section IV (2 pages max): Include a project deployment plan that describes the proposed schedule for implementing the ASCT after all necessary vehicle detection has been fully constructed and accepted. The project plan shall include any concurrent activities that can be started during detection installation to lessen the time of ASCT deployment.

Section V (3 pages max): Provide three (3) case histories or recently completed projects of the deployed ASCT software, including direct client/government reference information. The case histories shall include a summary of the before/after studies that were performed including the measurements of effectiveness (MOEs) that were used to measure the performance of the ASCT (for example: travel time, number of stops, total intersection delay, etc.).

The RFP shall be graded based on responses and compliance to these sections and the content of this RFP. The RFP grading shall result in a short-list of ASCT software, as necessary, to move to the next step in the ASCT selection. The short list shall be responsible for a presentation on their software and a Question & Answer session following the presentation. The presentation/interview process shall be no longer than 30 minutes.

DATE: November 2, 2016

**Technical Special Provision for City of Maumelle ASCT RFQ / RFP
AHTD Job No.: 061469, City of Maumelle Contract**

SUBJECT: Technical Special Provision for City of Maumelle ASCT RFP

PROJECT: AHTD Job No: 061469, City of Maumelle Contract 2016-08

The Adaptive Signal Control Technology (ASCT) project has gone through a rigorous Systems Engineering Analysis (SEA) process with Cities of Maumelle and North Little Rock and their stakeholders to identify needs and objectives of the various corridors within the Cities of Maumelle and North Little Rock, and in Pulaski County. The particular corridor identified in this Request for Proposal (RFP), for ASCT is Maumelle Blvd. Those needs and objectives identified in the Concept of Operations portion of the SEA document have been processed into System Requirements of the ASCT for this project and are included herein.

The interested ASCT vendors proposing on this system are required to give true responses to how their adaptive algorithm complies, does not comply, or is in development/testing for each system requirement stated within this RFP Technical Special Provision (TSP) and Requirements Matrix attached to this document. If the ASCT vendor algorithm is in development or testing for any particular requirement, the ASCT vendor shall state timeframes for full deployment of the particular function to meet the requirement.

The ASCT vendor shall adhere to all Arkansas State Highway and Transportation Department (AHTD) standards and specifications, and all City of Maumelle or North Little Rock supplemental specifications and standards, as applicable.

ADAPTIVE SIGNAL CONTROL SOFTWARE

Description. This work shall consist of furnishing, installing, testing and assisting in the maintenance support of Adaptive Signal Control Technologies (ASCT). The ASCT shall consist of a full adaptive signal control software that shall operate at the City of North Little Rock Traffic Engineering building in accordance with requirements set forth in these specifications. The City of Maumelle and Pulaski County have entered into an operation and maintenance agreement with the City of North Little Rock for all signals that are included within the ASCT deployment limits of Maumelle Blvd. The City of North Little Rock (NLR) shall take full responsibility in the operation and maintenance of the ASCT system along Maumelle Blvd., with read-only access rights given to the City of Maumelle and Pulaski County to monitor signals within their boundaries. That Memorandum of Understanding (MOU) is located in Appendix A of this document. For the purposes of this document, ‘stakeholders’ means all parties that have been identified in the ASCT System Engineering Analysis, including but not limited to:

- The City of Maumelle
- The City of North Little Rock
- Pulaski County
- Arkansas State Highway and Transportation Department (AHTD)
- Metroplan MPO
- Federal Highway Administration (FHWA)

Vehicle detection for ASCT will be installed by a signal installation contractor through low bid construction plans. Should the ASCT rely on detection devices that are supplied by the ASCT vendor, the ASCT vendor shall notify the City as such for review and approval of the detection devices that are integral to the ASCT software. The ASCT vendor shall also assist in finalizing vehicle detection construction plans currently being developed by the ASCT design consultant. The ASCT vendor assistance will consist of guiding the final placement and detection technology that adheres to the SEA system requirements while addressing all other requirements needed for the adaptive signal algorithm to operate optimally. These vehicle detection and communications construction plans will be the basis for a low-bid signal installation contractor to furnish and install any additional vehicle detection devices and communications media that are required by the selected ASCT vendor.

The ASCT vendor will be required to start the configuration of the ASCT at various intersections while the low-bid contractor is completing their work. The ASCT vendor will be required to coordinate with the low-bid contractor for any detection zone configuration and field placement needed during their installation of the vehicle detection devices and communications media.

Adaptive Signal Control Software. The adaptive signal control software shall be a commercially available, off-the-shelf, previously installed, tested and proven adaptive control software. The software shall be designed to monitor traffic flows and automatically adjust traffic signal timings on a second-by-second basis to significantly reduce travel time, minimize environmental impact, and provide economic benefits by reducing vehicle stops, and the wasted fuel and time associated with extended stopping. The software shall provide a rapid response to changes in traffic conditions and shall vary signal timing on a “cycle-by-cycle” basis. The software shall be a “real-time” adaptive control system that can change timing strategies with changes in traffic conditions. Changes to green splits, offsets, and cycle lengths shall be made in response to traffic currently approaching or departing an intersection as measured in real-time by vehicle detection that is acceptable to the Cities of Maumelle and NLR as outlined in the requirements.

The software shall be configured either as a centralized system or a field based processing system that requires no central server connection to operate. Any centralized system shall be controlled from the NLR engineering building and through coordination with NLR’s IT department. As such, if required, any centralized software solution shall require its own Microsoft Windows® based central server for control of the adaptive functions and communications. The ASCT Vendor shall be responsible for providing the appropriate servers and SQL Server database software and licensing needed for the adaptive software, if required.

This work also includes integration of the ASCT, training and the maintenance of the system for a period set forth in the requirements. The ASCT vendor shall provide design guidance in any additional detection needed for optimizing the ASCT algorithm within parameters set forth by the Cities of Maumelle and NLR. Acceptable detection types can be found in the System Requirements matrix, but the ASCT vendor shall verify the detection technology with the Cities of Maumelle and NLR to ensure their software solution will work as required. Should the ASCT vendor provide their own detection hardware solution, the ASCT vendor shall coordinate with the Cities for acceptable detection hardware.

The System shall be able to operate with the current signal control software, TACTICS-Marc. The existing software shall still be able to monitor status and upload/download data to the SEPAC controllers in the field. Any variation of this operation and integration to the existing signal system shall be approved by the Cities of Maumelle and NLR.

Selection Criteria. Each response of conformance to the system requirements shall be reviewed and evaluated by the Maumelle Blvd. ASCT stakeholder selection panel. Responses shall be thorough, and shall

clearly state whether the requirement is met in the columns provided. If needed, a document with those responses can be submitted by the ASCT vendor that clearly states each requirement and the response to meeting the requirement in its entirety.

It is likely that a second phase of selection may occur in the form of short-list of ASCT vendors that are asked to present a quick overview of the ASCT vendor's adaptive signal software and their compatibility with the existing system, along with a question and answer session from the selection panel. If needed, the City of Maumelle shall notify the short-listed ASCT vendors after submittals are evaluated, no longer than 21 days after proposal due date. Dates and times for presentations will be coordinated with the ASCT vendor and the City, but shall be no less than 14 days after short-list notification to arrange travel to the City of Maumelle.

Existing System. NLR currently maintains the signals through a system called TACTICS-Marc that is accessed by NLR personnel for the operation and maintenance of the signal system. The ASCT shall not affect the operation of TACTICS-Marc and shall not inhibit upload/download of signal timing parameters, signal controller status or any controller logs currently logged.

The signal controllers consists of Siemens/Eagle M34, M42, M52 EPAC controllers of various firmware versions. The new ASCT system must be able to integrate with the existing signal controllers. No other controllers for ASCT operation shall be installed in the field cabinet without prior approval of the stakeholders. If controller firmware needs to be updated, the ASCT vendor shall be responsible for submitting acceptable firmware versions and any other configuration needs of the ASCT system to the stakeholders. Any firmware upgrade that is needed shall be compatible with the existing TACTICS-Marc system. Should a certain controller type listed in the requirements not be able to work with the ASCT, the ASCT vendor shall present a plan to the stakeholders to ensure the existing controller network remains intact for the stakeholder's review and approval. New controller manufacturers that would place a burden on the maintenance of the existing signal system shall not be permitted. All necessary controller or equipment replacements shall be brought to the attention of the stakeholders prior to price negotiations of this contract.

The traffic signals along the NLR portion of the corridor are currently operating under time-of-day (TOD) control which implements the appropriate traffic signal timing parameters based on time of the day and day of the week. The intersection at Vestal in NLR operates free during the AM peak. This operation has been found to be beneficial to the flow of traffic in the NLR owned section. Coordination has been done for the signals from Northshore Dr. through Crystal Hill Rd. The traffic signals in the City of Maumelle and Pulaski County sections currently operate under 'Free' control, not under any specific timing plan, though timing plans at one time were developed by AHTD. The traffic signals in the project area operated by NLR are connected to the City Traffic Engineering Division through a broadband modem at a master controller at the intersection of Counts Massie and Highway 100 (Maumelle Blvd.). The intersections in the City of Maumelle and Pulaski County are connected through a repeater radio on the Maumelle water tower. Master communications to the local intersections are accomplished through 900 MHz spread spectrum radios operating at 19.2 k baud with a repeater at the Maumelle water tower. These units have been subject to lightning damage, and inconsistent communications to the Maumelle and Pulaski County intersections exist. Under this premise, a new communications system shall be installed with the low-bid detection construction contract using 3G/4G broadband cellular modems for the ASCT intersections.

The ASCT software installed under this Contract must be capable of performing all required functions using IP Ethernet communication protocols and through the cellular communication media being provided by the low-bid contractor, with final configuration the responsibility of the NLR IT department. The ASCT vendor shall ensure all network requirements of the software are properly specified within the low-bid plan set, such as acceptable network configuration and any necessary Ethernet switches or other equipment that may be required.

ADAPTIVE CENTRAL OPERATION & MANAGEMENT SOFTWARE.

The ASCT software shall be under the control of NLR for operation and maintenance with support from the ASCT vendor. If a separate central server(s) is required by the ASCT software provider, it must be provided and connected via a high-speed LAN (10/100/1000 or faster) to the NLR's IT network. Any communications components for proper operation of the server shall be provided by the ASCT Vendor as part of the ASCT installation, and for compatibility to the broadband cellular modem network.

The client interface software shall be installed on Engineering Department PC computers, as designated by NLR personnel. If server and database applications are not required for the ASCT, the ASCT vendor shall describe all components of the system, where data is logged, stored and archived for the maintenance of the system and retrieval of archives.

The System Requirements matrix attached to this TSP shall be the primary document outlining the ASCT system requirements. The ASCT vendor shall answer how they meet each requirement in the space provided, or through a document that they attach that clearly states each requirement and their response to meeting the requirement. This requirements matrix closely follows the needs and objectives identified by the stakeholders. In addition, the following statements further describe the system requirements of the ASCT central operation.

System Computing Architecture. The System shall be a highly customizable traffic management application. The System may be able to be configured for multiple agencies or Departments with varying levels of access privileges for a large-scale Integrated Transportation Management System with varying user profiles.

Operating Systems and Platforms. If required, the operating system for the Central adaptive server shall be submitted by the ASCT vendor and approved by the NLR IT department and stakeholder representatives. Servers of appropriate requirements for the adaptive software to function shall be supplied, integrated and tested by the ASCT vendor and included in the integration cost of the ASCT software. ASCT system clients shall be run on Microsoft™ Windows 64-bit Windows 7 PC's.

Local Area Network and Remote Access. Any physical networking technology supported by Windows 7 that supports the TCP/IP protocol shall be supported. The System shall provide for multiple simultaneous client Users (including remote Users) of the traffic control system application. These Users can connect via a LAN/WAN connection or through a firewalled VPN to the ASCT system. Users, subject to the NLR's security privileges, shall have access to the same ASCT system operations regardless of the type of network connection being used for remote access.

NTCIP Standards Compliance. The National Transportation Communications for ITS Protocol (NTCIP) standards shall comply as required in the Concept of Operations portion of the SEA. The System shall employ any NTCIP communications requirements listed in the ITS Regional Architecture, as necessary and whenever possible. While it is not a direct requirement for the ASCT software to interface the existing system and signal controller using NTCIP, the ASCT vendor shall describe any and all work currently being done to employ NTCIP communications standards within their software or components therein.

Communications with On-Street Equipment. The ASCT System shall provide a flexible control equipment interface.

The System shall provide for local backup operation to reload ASCT configurations in case of failure of the

field processor, system file server, or the communication system. Whenever communication is absent for a particular field processor or to an adjacent controller cabinet, the ASCT shall revert to a 'standby' mode where each controller runs according to its local time-based control (TBC) settings, historical data, ASCT, or free mode, and as outlined in the requirements. The ASCT vendor shall check with the stakeholders for acceptable standby modes of operation.

System Startup and Shutdown. Upon the initial start-up of the ASCT, the System shall run in a monitoring mode to gather necessary detector data prior to operating in adaptive mode. Also, the ASCT system shall be able to accommodate a User-initiated shutdown from a remote location. All data shall be saved and all processes properly closed automatically upon a proper shutdown. The system shall also allow for Emergency Shutdown. Three types of emergencies shall be accommodated by the System with no failure of the ASCT database and operations software:

- a.) Power failure
- b.) Unplanned stoppage of program execution
- c.) Operator observation of improper operation

The ASCT system shall be successfully tested for these types of failures. Should any of these tests fail, the ASCT vendor shall correct the failure by submitting a software problem change request testing form for acceptance by the stakeholder's representatives prior to completing any needed changes to the system operation.

System Failure and Recovery. If the ASCT System detects a non-fatal error within one or more of its processes, either in the field or centrally, it shall alert the operator via an alarm on the operator workstations and make an entry in the System Log. The System shall continue to operate when a non-fatal failure occurs. If the System detects a fatal error within one or more of its processes, it shall attempt to alert the operator via an alarm on the operator workstations and make an entry in the System Log. The ASCT System or processor shall then attempt an orderly shutdown of the System followed by an automatic restart.

System Access and Security. The System shall allow multiple Users to access the System simultaneously from client workstations in the NLR engineering building, from remote locations, and from multiple stakeholder agencies as outlined in the system requirements. The System shall include built-in security features such as unique passwords and privilege levels for different Users, and privileges assigned based on affiliation with a particular jurisdiction or agency.

The System shall support clients that can run on any Windows 7 workstations. Multiple Users with different access privileges shall be able to simultaneously login to the System. Remote access shall be supported via a WAN. Both types of connections require properly configured and functioning Windows 7 User authentication. Once connected and authenticated, the user can use the System as if locally connected.

The System shall allow multiple stakeholder agencies to simultaneously utilize the System without interfering with each other's operations. It may be desirable to restrict access to an entity to members of its owning agency. The application shall achieve this functionality by defining multiple jurisdictional agencies to which Users and entities may be assigned. This allows a User's access privileges to be assigned based on his affiliation with a particular agency.

ADAPTIVE SYSTEM SOFTWARE

General Requirements of the Adaptive System Software. The Full Traffic Adaptive Signal Control Software shall adhere to the following requirements, in addition to the requirements matrix attached to this document. The ASCT vendor shall answer how they meet each requirement in the space provided, or

through a document that they attach that clearly states each requirement and their response to meeting the requirement. The ASCT vendor shall respond to all requirements in the System Requirements matrix and summarize their adherence to the requirements contained within this TSP, and the following:

- a.) The adaptive system shall have the capability to work with video detection and per all technologies listed in the System Requirements matrix.
- b.) The adaptive system must work with the appropriate version of SEPAC intersection signal control software currently used by the signal control agency. All necessary upgrades to the SEPAC software in the field for proper IP communications with the adaptive operation shall be the responsibility of the ASCT Vendor in conjunction with NLR's IT and Traffic staff and shall be paid for in the ASCT integration pay item. Any upgrade to TACTICS-Marc for this firmware update shall also be included in the cost.
- c.) The adaptive system must have the capability to turn on and off by an internal or system scheduler.
- d.) When the adaptive system is activated, the operator must be able to recognize that intersections are under adaptive control so that they do not attempt to send commands to the intersections which are under adaptive control. Status of the intersection must be shown on TACTICS-Marc and any adaptive system client software.
- e.) The adaptive control system shall have been deployed in at least five (5) different municipalities of thirty or more intersections in North America successfully.
- f.) The adaptive traffic system shall maintain a network wide Traffic Model that is continuously updated with real time data. This model data shall be able to be viewed by the system operators and all parameters of the model shall be identified by the ASCT vendor to the satisfaction of the stakeholder representatives.
- g.) The system shall have the capability to modify the ASCT timing parameters as opposed to being limited to fixed timing plans (such as in a traffic responsive operation.)
- h.) The adaptive control system shall allow the traffic engineer to use weighting factors and various strategies to provide a primary arterial the ability to have more green time to allow optimized offsets, or allow side roads to run at a higher saturation.
- i.) The adaptive algorithm shall include optimizers for splits, offsets and cycle calculations. The ASCT vendor shall describe how each optimizer functions and the incremental change of those optimizers
- j.) The system shall be capable of running cycle times of up to 240 seconds, as applicable.
- k.) The adaptive system shall have been proven to operate successfully and improve overall corridor and crossing arterial applications. References will be required for each type of corridor operation and deployment. Adjacent, closely spaced intersections on the side street shall be able to be properly integrated into the main corridor's ASCT system.
- l.) The traffic control server or field device must continually adjust Split, Offset and Cycle time, unless otherwise approved by the stakeholder's representative. Systems that call pre-defined timing plans in response to changing traffic patterns or do not fully control these parameters in local controllers will not be considered as true full adaptive system for this project.
- m.) The system offered shall be of an "off the shelf" system of proven design and operation. Results and case studies from the installed systems should be in the public domain, and completed by independent reviewers. The ASCT vendor shall identify those reports or studies for each of their three identified deployments.
- n.) All Software System training must be offered by an accredited training representative of the ASCT vendor.

Adaptive Detection Requirements. The ASCT vendor shall describe the detection placement that is necessary for the adaptive algorithm to function to the satisfaction of the stakeholder's representative and through approval of the stakeholders. Should existing detection need to be used in conjunction with new ASCT detection, the ASCT vendor shall notify the stakeholders as such for proper operation of their

software. The ASCT vendor shall work with the stakeholder's representative who is performing the low bid construction design plans for placement of that detection.

All adaptive detection shall be 'dual reporting' detection, meaning that the detection shall be connected and configured in the Controller and reporting to the existing TACTICS' Marc system as well as the adaptive algorithm. All data from the detector, such as volume, occupancy and speed, shall be able to be logged and reported out from the ASCT system.

The acceptable scenarios for the detection for the adaptive system are as described in the System Requirements and as below:

- a.) One detector is required per approach of the intersection
- b.) Existing detection shall be used only if advised by the ASCT vendor
- c.) Video detection shall only be allowed at the stop bar.
- d.) Detector information is collected and sent to the central computer or adaptive processor once per second.
OR
- e.) Detectors are integrated into the adaptive algorithm directly. The ASCT vendor shall describe the detection make, model and firmware versions that are acceptable to the algorithm for direct connection

Data Collection Module. Certain validations are required for the ASCT. The adaptive system shall include a module that allows the archiving of all traffic data collected by the system detectors, making it available for off-line analysis and validation of the ASCT. The system can also act as a reference against which to compare current traffic conditions, as well as before/after data for when Adaptive is on or off.

It is desired that the data shall be collected directly from the adaptive software messages and stored in the module's database. Should 3rd party software or central software be needed for collection of this data, the ASCT vendor shall describe what are acceptable means to collect the data and get approval from the stakeholders.

Computer Hardware. The ASCT vendor shall provide all necessary hardware, processors, servers, and peripherals including power and communications cables (Cat 6 cables) necessary for a full and complete adaptive software system.

PC workstations shall not be provided by the ASCT vendor, however, the ASCT vendor shall be responsible for full testing and integration of the ASCT software interface on the NLR Engineering Department provided workstations. The ASCT vendor shall notify the NLR Engineering Department and stakeholders of any necessary hardware or operating system requirements for the PC workstations prior to integration of the system.

Integration Requirements.

General Requirements. The ASCT Vendor shall be responsible for all configuration, integration, testing, and operational training of the Full Traffic Adaptive Signal Control Software and any system components related to the system. Onsite installation and integration shall occur both in the field and at the NLR engineering building. The installation requirements include onsite support for all deployment phases of the adaptive software. The ASCT Vendor will be required to submit an installation and integration plan prior to deploying the adaptive software. The plan shall outline the steps for the cut-over, including any necessary system or communications down time, intersection down time, system turn-on, and back up plans should the adaptive software encounter issues with communications to the existing field devices. All configurations in the database and application software shall be completed and tested prior to system cut-over.

Integration & Configuration. Integration includes both pre-installation as well as onsite work, including inputting the necessary timing parameters and detection configuration into each signal controller, as necessary, for a full and complete adaptive operation.

Although the system can be set up in a bench area and tested prior to delivery, it is the ASCT vendor's responsibility to be onsite at all times during the installation, configuration, and turn-on of the system. Remote access to the system for the installation, configuration, and turn-on shall not be allowed, however, remote tweaking of non-critical components of the adaptive system shall be acceptable. The stakeholder's representative and the stakeholders shall determine what components the ASCT vendor will be onsite and which can be worked on remotely.

The ASCT vendor shall observe traffic operation and conditions both before and after adaptive turn on and make the appropriate adjustments. The ASCT vendor shall make the necessary adjustments at all periods of the day, including AM Peak, AM Off-peak, PM Off-peak, and PM peak. The ASCT vendor shall also be responsible for the weekend operation of the adaptive system after turn-on. This will require onsite weekend work. Since portions of the corridor produce high weekend traffic variations, due to businesses in the area, it is important that technicians are onsite during weekend turn-on to make the appropriate adjustments for weekend traffic.

Installation and the subsequent adjustments of adaptive parameters shall be during fully loaded, daily traffic conditions of the corridor. This period is defined as during the K-12 school year, dry weather conditions, and typical work week conditions. Weekend conditions for onsite adaptive parameter adjustments shall be during a typical, non-holiday weekend with dry weather conditions.

Testing. The ASCT vendor shall be responsible for verification testing of all components, servers and software for each system requirement outlined in the system requirements matrix. The ASCT vendor shall submit a verification testing document, or Acceptance Test Plan (ATP) prior to configuration and implementation of the system. This testing document shall be reviewed and approved by the stakeholders and their designated representative prior to system installation. The ATP shall address every system requirement and label the method in which each system requirement will be tested.

The ATP shall state each system requirement and expected outcome of the test, so it can be verified that the software is working as specified. The ATP is meant to exercise the entire adaptive system, including any provided hardware necessary for operation.

The outcome of each verification shall be recorded as one of the following:

- Complied
- Partially complied, with a statement of acceptable supplementary testing
- Failed, verification procedure to be repeated

The ATP shall use one or more of the following methods. Each ATP testing procedure shall clearly state which method(s) are to be used on the testing document.

- ***Demonstration:*** used for a requirement that the system can demonstrate without external test equipment.
- ***Test:*** used for a requirement that requires some external piece of test equipment (such as logic analyzer and volt meter). The test and required equipment shall be clearly documented in the procedure.

• **Analyze:** used for a requirement that is met indirectly through a logical conclusion or mathematical analysis of a result (e.g. algorithms for calculation of headway, setting of “late” flag, and generation of priority request).

• **Inspection** is used for verification through a visual comparison. For example, quality of welding may be done through a visual comparison against an in-house standard.

The ATP shall be conducted in the presence of the stakeholder’s designated representative in the NLR Engineering Building. Each test requirement shall be signed off on as ‘pass’, ‘fail’ or ‘incomplete’. All failed or incomplete tests shall either be retested, or submitted in a written summary explaining why the testing requirement could not be completed as written in the ATP. Upon receipt of the final ATP and explanation summary, the stakeholder’s representative shall determine if the ATP was satisfactorily completed, or if some of the requirements will need to be retested prior to system acceptance.

Full documentation and print of the final ATP will be prepared by the ASCT vendor to the satisfaction of the Engineer and shall include all system requirements and additional requirements stated herein. A record shall be maintained of each verification in the ATP, the outcome of the verification recorded, and the record signed by the ASCT vendor’s verifier and stakeholder’s representative.

Upon a successful and approved acceptance testing, the project shall be deemed ‘Conditionally Approved’, and a 30-day Burn-in period shall start.

Burn-In. The 30 day burn-in period applies to all software provided under this ASCT Contract. Once tested and accepted, the City of North Little Rock shall take over operation of the software system and run it for 30 days. Should any system requirement not work to the NLR’s satisfaction during this burn-in period, it is the ASCT vendor’s responsibility to correct or address the software to bring it into compliance with the software specification and ASCT system requirements. This burn-in period shall start once the system is 100% in place and all parts have passed conditional acceptance testing. Once successfully passed, the maintenance period shall start.

Training. The ASCT vendor shall conduct onsite training sessions for the Full Traffic Adaptive Signal Control Software. For each training session type, the ASCT vendor shall submit a syllabus to the stakeholder’s representative for approval, prior to scheduling the meeting. These training sessions shall consist of:

- a.) **Manager’s Operation and Configuration Training** – This training shall review the PC client-based operation and configuration parameters of the Full Adaptive Signal Control Software. All Graphic User Interfaces (GUI’s) of the client interface shall be reviewed in this training, with special attention to the adaptive configuration and parameters (timing data) and database modifications. The trainer shall discuss all parameters in the timing and configuration data sheets/GUI’s, which data is acceptable to change, and by what increment it should be changed. At the end of this training, operations staff shall be able to understand the different operating modes of the adaptive software, how to turn the modes on/off, and which operational parameters can be adjusted, as well as the increments they should be adjusted for appropriate operational changes to the system and database. The detailed operation of the software shall also be shared with the managers, with specific attention to detailed reporting features, and troubleshooting techniques. The intended audience for this training is traffic engineers and advanced (high level) system operators/technicians. This training shall adhere to the System Requirements length of training, and as approved by the stakeholders.
- b.) **Operators/Maintainers Monitoring, Reporting and Troubleshooting Training** – This training shall review the PC/Server/Processor/Controller relationship, the general GUI and screen outputs of the system, general troubleshooting and reporting techniques, and what information should be logged and monitored

on a day to day basis. Reporting and monitoring features of the adaptive software shall be reviewed with “hands-on” training by the attendees. Each attendee shall be able to pull reports from the system and be able to monitor necessary functioning of the adaptive software, and identify errors or issues for the Manager or Timing Engineer to address. Training shall provide guidance related to, and examples of, appropriate record keeping for the ASCT system operation. Forms and Reporting features should be specifically discussed, as well as frequency of reporting. Should there be problems with the adaptive system, the attendees shall know general troubleshooting tips, and how to start, stop and restart the system and the server/client interface. This training shall adhere to the System Requirements length of training, and as approved by the stakeholders.

- c.) Theory of Adaptive Operation Training – This training shall review the specific operational theory behind the adaptive software and algorithms principles. The training shall be specific as to the inputs needed for the algorithm to function, including detection data collected, controller data used, etc. and the resulting output values used for the adaptive function. The intended audience for the training is traffic signal engineers and signal engineering technicians that have been through either the Operators or Managers training. This training shall adhere to the System Requirements length of training and as approved by the stakeholders. This training can be combined with one of the two trainings above, as seen fit and approved by the stakeholders that are to be in attendance.

The ASCT vendor shall provide all training materials, including operator and maintenance manuals, ‘quick tips’ sheets, and written instructions for the attendees for each training module. These materials shall be in a neat, bound and tabbed format for easy and quick identification of the necessary sections. All training courses shall be coordinated with the stakeholders prior to scheduling. Each course or session shall be on successive days, but shall not run concurrent to each other. Each type of training shall be scheduled with the appropriate personnel, as determined by the stakeholders. Training shall be Monday through Thursday only, and shall not be scheduled on a City of Maumelle or NLR recognized holiday.

Support. After the successful and accepted 30-day Burn-In period, the ASCT vendor shall provide a support period on the Full Traffic Adaptive Signal Control Software from the date of final acceptance and successful Burn-In of the ATP, and as outlined in the system requirements. The support shall include two (2) one-week long onsite visits, to be used by the NLR Engineering Department at any time during a warranty year, as well as unlimited phone, email and remote support of the adaptive software and related components. Telephone and email support shall be available 24 hours per day, seven days a week. Remote Access Support shall be available during normal business hours, Monday through Friday from 8 am to 5 pm Central Standard Time and Central Daylight Time (as applicable), excluding recognized City of Maumelle and/or NLR holidays.

Method of Measurement.

Full Traffic Adaptive Signal Control Software. The full Adaptive Traffic Signal Control Software shall be measured on a per intersection basis (each). The per intersection cost shall include all man hours associated with the setup, pre-configuration of adaptive parameters, onsite controller upgrades, onsite deployment, fine tuning, and testing of the intersection adaptive signal control operational parameters. The cost of each intersection shall also include adding it to the central database, as required, including central system intersection graphics, full communication configuration, detector setup and monitoring capability of the intersection. The configuration and implementation of each intersection of adaptive control shall be measured by each intersection fully completed, deployed and tested, however, each adaptive intersection shall not be measured as complete until each intersection on an adaptive section, or corridor, has been completed and the adaptive software is running as a corridor or section-wide adaptive signal system. The measurement will be for the quantity of intersections indicated in the plans. The City of Maumelle reserves the right to add or delete intersections, at their discretion. The additional quantity of intersections that may be added shall not exceed 10 additional intersections and shall be paid per the unit price.

ASCT integration shall be measured on a lump sum basis. This pay item shall be for the installation and configuration of the components of the ASCT, such as the client workstation software, central servers, database software and associated licensing for database software (as required), as well as all other operating systems and software needed for the ASCT to function as specified for a full, complete central operating system for adaptive signal control. This pay item shall include assistance from the ASCT vendor to provide guidance and acceptance on the final placement of the vehicle detection design plans being developed by the existing ASCT design consultant. This pay item also includes all training activities outlined in the requirements matrix and in this special provision, as well as the testing components of the central servers and software, as required.

The ASCT vendor shall submit a schedule of software implementation including onsite installation and integration tasks. The schedule shall show significant software deployment timelines and milestones, including delivery, turn-on, testing, and training for a full and complete system deployment. The schedule shall show a date for Conditional Acceptance, which shall be the date at which all intersections have been configured, integrated and running full adaptive signal control at all intersections to the approval of the stakeholders. Conditional Acceptance testing shall not commence until all adjustments to the adaptive operation have been made by the ASCT vendor to the satisfaction of the stakeholders. The schedule shall be reviewed and approved by the stakeholders and their representative. The schedule shall estimate and incorporate the vehicle detection installation, and all ASCT vendor activities that will be needed and coordinated during that detection installation.

Basis of Payment.

The pricing for each pay item, provided for reference only, as described herein shall be negotiated with the City of Maumelle after selection of the ASCT vendor has been determined. Pricing of these pay items shall not be required nor submitted with the proposal documents provided by the ASCT vendor, and is not a determinant in selection of the ASCT system. The ASCT vendor will be required to negotiate costs of these items with the City of Maumelle. An estimate of these pay items will be required after selection has been made in order to begin negotiations of these costs. Should price negotiations fail, the City reserves the right to throw out the ASCT selection and award to the next ranked ASCT vendor, or discontinue the contract altogether.

Adaptive signal control intersection software, measured as prescribed above, will be paid for at the contract unit price bid per each intersection, and for full deployment and configuration of all central system software, modules and necessary companion hardware and software for the intersection; which price shall be full compensation for integration, configuration, testing and training, and all other materials, equipment, labor, tools and incidentals necessary to complete the work in accordance with the contract documents.

ASCT integration, measured as prescribed above, will be paid for at the contract unit price bid per lump sum, and for full deployment and configuration of all central system software, modules and necessary companion hardware and software for the central control and operation; which price shall be full compensation for integration, configuration, testing and training, and all other materials, equipment, labor, tools and incidentals necessary to complete the work in accordance with the contract documents.

Payment will be made under:

- ASCT Integration - lump sum
- Intersection Adaptive Traffic Signal Control Software - per each