



February 28, 2014

TO: Board of Mayor and Aldermen

FROM: Eric S. Stuckey, City Administrator
David Parker, P.E., City Engineer
Paul Holzen, P.E., Director of Engineering
Jonathan Marston, P.E., Engineer III
Carl Baughman, P. E., Traffic Engineer

SUBJECT: **Consideration of a Professional Services Agreement (COF 2013-0184) with Gresham, Smith & Partners to evaluate, recommend and oversee implementation of Adaptive Signal Control Technology (ASCT) in an amount not to exceed \$348,094.50**

Purpose

The purpose of this memo is to provide the Board with information regarding a contract proposal for Adaptive Signal Control Technology (ASCT) services. Gresham, Smith & Partners (GSP), through a consultant interview and selection process, is being asked to evaluate, recommend and oversee implementation of enhanced signal control.

Background

On June 11, 2013, BOMA approved Amendment 1 to COF Contract 2011-0129 (TDOT contract 110291) for the funding of Intelligent Transportation System expansion in the City of Franklin. The portion of the contract allocated to the ASCT project is \$750,000. The City's portion of the project costs is 20 percent, or \$150,000. The ASCT will accommodate changing traffic patterns and ease traffic congestion with the enhancement of traffic signal control equipment and signal timing calculation strategies. The focus area for the project is the Cool Springs area corridors of:

- ☛ Mallory Lane from Liberty Pike to Seaboard Lane
- ☛ Cool Springs Blvd from West McEwen to Marriott East Driveway
- ☛ Carothers Parkway from Liberty Pike to Bakers Bridge Avenue
- ☛ McEwen Drive from West Cool Springs to Carothers Parkway
- ☛ Bakers Bridge Avenue from Mallory Lane to Carothers Parkway
- ☛ Galleria Blvd from Bakers Bridge to I-65 off ramp.

In general, the scope of professional services provided by this contract consists of:

- Task 1: System Engineering Analysis for Adaptive Signal Control Technologies Document
- Task 2: Signal Modifications Design Plans and ASCT Technical Specifications
- Task 3: (a) Construction Engineering and Inspection (CEI)
(b) Before/After Studies of the ASCT

Financial Impact

The proposed contract cost is \$348,094.50, including direct expenses of \$7,075.50 and a sub-consultant cost of \$36,529.20. The balance of \$304,489.80 is GSP labor amounting to 2,534 man-hours or 316.75



HISTORIC
FRANKLIN
TENNESSEE

MEMORANDUM

man-days. The balance of the \$750,000 project funding is to be allocated to two additional contracts for (A) the purchase and installation of detection and other equipment to enable ASCT, and (B) software development, testing and integration into the Franklin TOC.

Recommendation

Staff recommends approval COF Contract 2013-0184 with GSP in an amount not to exceed \$348,094.50.

**CITY OF FRANKLIN, TENNESSEE
PROFESSIONAL SERVICES AGREEMENT
COF Contract No 2013-0184**

THIS PROFESSIONAL SERVICES AGREEMENT ("Agreement") is by and between the City of Franklin, Tennessee, hereinafter referenced as City, and GRESHAM, SMITH & PARTNERS (GS&P), hereinafter referenced as Consultant, who mutually agree as follows:

DECLARATIONS. City desires to retain Consultant to provide engineering, related technical, and other services in connection with City's project hereinafter referenced as Project. The Project is described as follows:

**Engineering Services for Adaptive Signal Control Technology
Implementation and Infrastructure Construction Services**

1. **SCOPE OF SERVICES.** Consultant shall provide engineering and related technical services for the Project in accordance with the Scope of Work. The Scope of Work as found in Attachment A shall be considered as an integral part hereof.
2. Consultant shall be paid on an hourly basis for work performed based on the fee schedule as contained in Attachment B in the Amount Not To Exceed **THREE HUNDRED FORTY-EIGHT THOUSAND, NINETY-FOUR AND FIFTY/100 DOLLARS (\$348,094.50)**. Attachment B shall be considered as an integral part hereof
3. In event of a conflict between this Agreement and the attached document(s), this Agreement shall supersede conflicting terms and conditions.

**The Board of Mayor and Aldermen Approved this Agreement on the
_____ Day of _____ 2014.**

BY: _____
Consultant's Signature
TITLE: _____
Date: _____

BY: _____
Dr. Ken Moore
Mayor
Date: _____

TERMS AND CONDITIONS FOR PROFESSIONAL SERVICES

ARTICLE 1. SERVICES. Consultant will:

- 1.1 Act for City in a professional manner, using that degree of care and skill ordinarily exercised by and consistent with standards of competent consultants using the standards in the industry:
- 1.2 Consider all reports to be confidential and distribute copies of the same only to those persons specifically designated by the City.
- 1.3 Perform all services under the general direction of a senior professional employee, licensed and/or registered in the State of Tennessee, when appropriate.
- 1.4 Retain pertinent records relating to the services performed for a period of seven (7) years following the completion of the work; during this period the records shall be available for review by City at all reasonable times.

ARTICLE 2. CITY'S RESPONSIBILITIES. City, or its authorized representative, will:

- 2.1 Provide Consultant with all information regarding the Project, which is available to, or reasonably obtainable by, the City.
- 2.2 Furnish right-of-entry onto the Project site for Consultant's necessary field studies and surveys. Consultant will endeavor to restore the site to its original condition and shall remain solely liable for all damages, costs and expenses, including reasonable attorneys' fees, for failure to make such restoration.
- 2.3 Designate, in writing, the sole Project representative to coordinate with and direct the Consultant, including all contact information.
- 2.4 Guarantee to Consultant that it has the legal capacity to enter into this contract and that sufficient monies are available to fund Consultant's compensation.

ARTICLE 3. GENERAL CONDITIONS.

- 3.1 Consultant, by the performance of services covered hereunder, does not in any way assume, abridge or abrogate any of those duties, responsibilities or authorities customarily vested in other professionals or agencies participating in the Project.
- 3.2 Consultant shall be responsible for the acts or omissions of any party involved in concurrent or subsequent phases of the PROJECT acting upon written instruction issued by the Consultant.
- 3.3 Neither City nor Consultant may assign or transfer its duties or interest in this Agreement without written consent of the other party. However, nothing in this Article shall prevent Consultant from engaging

independent consultants, associates, and subcontractors to assist in the performance of the Services at Consultant's cost.

3.4 **ALLOCATION OF RISK AND LIABILITY; GENERAL.** Considering the potential liabilities that may exist during the performance of the services of this Agreement, the relative benefits and risks of the Project, and the Consultant's fee for the services rendered, and in consideration of the promises contained in this Agreement, the City and the Consultant agree to allocate and limit such liabilities in accordance with this Article.

3.5 **INDEMNIFICATION.** Consultant agrees to indemnify and hold City harmless from and against legal liability for all judgments, losses, damages, and expenses to the extent such judgments, losses, damages, or expenses are caused by Consultant's negligent act, error or omission in the performance of the services of this Agreement. In the event judgments, losses, damages, or expenses are caused by the joint or concurrent negligence of Consultant and City, they shall be borne by each party in proportion to its own negligence.

3.5.1 **SURVIVAL.** The terms and conditions of this paragraph shall survive completion of this services agreement.

3.6 **LIMITATIONS OF RESPONSIBILITY.** Consultant shall not be responsible for (a) construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the Project unless specifically undertaken in Attachment A, **SCOPE OF SERVICES**; (b) the failure of any contractor, subcontractor, Consultant, or other Project participant, not under contract to Consultant, to fulfill contractual responsibilities to City or to comply with federal, state, or local laws, regulations, and codes; or (c) procuring permits, certificates, and licenses required for any construction unless such procurement responsibilities are specifically assigned to Consultant in Attachment A, **SCOPE OF SERVICES**.

ARTICLE 4. TERMINATION BY THE CITY. The City may terminate this Agreement in accordance with the following terms and conditions:

4.1 **Termination for Convenience.** The City may, when in the interests of the City, terminate performance under this Agreement with the Consultant, in whole or in part, for the convenience of the City. The City shall give written notice of such termination to the Consultant specifying when termination becomes effective. The Consultant shall incur no further obligations in connection with the work so terminated, other than warranties and guarantees for completed work and installed equipment, and the Consultant shall stop work when such termination becomes effective. The Consultant shall also terminate outstanding orders and subcontracts for the affected work. The

Consultant shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The City may direct the Consultant to assign the Consultant's right, title and interest under termination orders or subcontracts to the City or its designee. The Consultant shall transfer title and deliver to the City such completed or partially completed work and materials, equipment, parts, fixtures, information and Contract rights as the Consultant has in its possession or control. When terminated for convenience, the Consultant shall be compensated as follows:

- (1) The Consultant shall submit a termination claim to the City specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the City. If the Consultant fails to file a termination claim within one (1) year from the effective date of termination, the City shall pay the Consultant the amount the City deems the Consultant is due.
- (2) The City and the Consultant may agree to the compensation, if any, due to the Consultant hereunder.
- (3) Absent agreement to the amount due to the Consultant, the City shall pay the Consultant the following amounts:
 - (a) Contract costs for labor, materials, equipment and other services accepted under this Agreement;
 - (b) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the work, and in terminating the Consultant's performance, plus a fair and reasonable allowance for direct job site overhead and earned profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it reasonably appears that the Consultant would have not profited or would have sustained a loss if the entire Agreement would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any;

The total sum to be paid the Consultant under this Section shall not exceed the total Agreement Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

- 4.2 Termination for Cause. If the Consultant does not perform the work, or any part thereof, in a timely manner, supply adequate labor, supervisory personnel or proper equipment or materials, or if it fails to timely discharge its obligations for labor, equipment and materials, or proceeds to disobey applicable law, or otherwise commits a violation of a material provision of this Agreement, then the City, in addition to any other rights it may have against the Consultant or others, may terminate the performance of the Consultant, in whole or in part at the City's sole option, and assume possession of the Project Plans and materials and may complete the work.

In such case, the Consultant shall not be paid further until the work is complete. After Completion has been achieved, if any portion of the Contract Price, as it may be modified hereunder, remains after the cost to the City of completing the work, including all costs and expenses of every nature incurred, has been deducted by the City, such remainder shall belong to the Consultant. Otherwise, the Consultant shall pay and make whole the City for such cost. This obligation for payment shall survive the termination of the Agreement.

In the event the employment of the Consultant is terminated by the City for cause pursuant to this Section and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a Termination for Convenience under this Section and the provisions of Section 4.1 shall apply.

- 4.3 Termination for Non-Appropriation. The City may also terminate this Agreement, in whole or in part, for non-appropriation of sufficient funds to complete or partially complete the Project, regardless of the source of such funds, and such termination shall be on the terms of Section 4.1.
- 4.4 The City's rights under this Section shall be in addition to those contained elsewhere herein or provided by law.

ARTICLE 5. SCOPE OF SERVICES. Consultant shall provide the Services as described in Attachment A, SCOPE OF SERVICES.

5.1 By mutual agreement, this contract and scope can be amended by the parties. The scope and fee for any additional tasks or services under such amendment shall be mutually negotiated and agreed to in writing prior to beginning such additional tasks or services.

5.2 **ENVIRONMENTAL RESPONSIBILITY.**

Where drilling/sampling services are involved, the samples obtained from the Project site are the property of the City. Should any of these samples be recognized by the Consultant to be contaminated, the City shall remove them from the Consultant's custody and transport them to a disposal site, all in accordance with applicable government statutes, ordinances, and regulations. For all other samples, the Consultant shall retain them for a sixty (60)-day period following the submission of the drilling/sampling report unless the City directs otherwise; thereafter, the Consultant shall discard the samples in accordance with all federal, state and local laws.

ARTICLE 6. SCHEDULE.

6.1 **TIME OF THE ESSENCE.** The parties agree that TIME IS OF THE ESSENCE with respect to the parties' performance of all provisions of the Agreement.

6.2 **FORCE MAJEURE.** Neither party will be liable to the other for any delay or failure to perform any of the services or obligations set forth in this Agreement due to causes beyond its reasonable control, and performance times will be considered extended for a period of time equivalent to the time lost because of such delay plus a reasonable period of time to allow the parties to recommence performance of their respective obligations hereunder. Should a circumstance of force majeure last more than ninety (90) days, either party may by written notice to the other terminate this Agreement. The term "force majeure" as used herein shall mean the following: acts of God; strikes, lockouts or other industrial disturbances; acts of public enemies; orders or restraints of any kind of the government of the United States or of the State or any of their departments, agencies or officials, or any civil or military authority; insurrections, riots, landslides, earthquakes, fires, storms, tornadoes, droughts, floods, explosions, breakage or accident to machinery, transmission pipes or canals; or any other cause or event not reasonably within the control of either party.

6.3 Should City request changes in the scope, extent, or character of the Project, the fee and the time of performance of Consultant's services as indicated in Attachment A shall be adjusted equitably.

ARTICLE 7. USE OF DOCUMENTS, DATA.

7.1 All Documents, including, but not limited to, reports, drawings, specifications, and computer software prepared by Consultant pursuant to this Agreement are instruments of service in respect to the Project. Consultant shall retain an ownership and property interest therein (including the right of reuse at the discretion of the Consultant) whether or not the Project is completed.

7.1.1 **USE OF DATA SYSTEMS:** Ownership, property interests and proprietary rights in data systems used by Consultant do not extend to the data created by or supplied to Consultant by the City; all rights to that data (including derivative or hidden data such as metadata) shall vest solely in City at the moment of creation.

7.1.2 **DISCLOSURE OF DOCUMENTS/DATA.** City may be required to disclose documents or data under state or federal law. City shall notify Consultant if a request for data or documents has been made and shall give Consultant a reasonable opportunity under the circumstances to respond to the request by redacting proprietary or other confidential information. Consultant waives any right to confidentiality of any document, e-mail or file it fails to clearly mark on each page as confidential or proprietary. In exchange, Consultant agrees to indemnify, defend, and hold harmless City for any claims by third parties relating thereto or arising out of (i) the City's failure to disclose such documents or information required to be disclosed by law, or (ii) the City's release of documents as a result of City's reliance upon Consultant representation that materials supplied by Consultant (in full or redacted form) do not contain trade secrets or proprietary information, provided that the City impleads Consultant and Consultant assumes control over that claim.

7.2 City-furnished data that may be relied upon by Consultant is limited to the printed copies that are delivered to the Consultant pursuant to Article 2 of this Agreement. Any copyrighted electronic files furnished by City shall be used by Consultant only for the Project as described herein. City's posting or publication of such documents created by Consultant for City shall constitute fair use and shall not constitute an infringement of Consultant's copyright, if any.

7.3 Documents that may be relied upon by City are limited to the printed copies (also known as hard copies) that are signed or sealed by the Consultant. Files in electronic media format of text, data, graphics, or of other types that are furnished by Consultant to City are only for

convenience of City, unless the delivery of the Project in electronic media format has been dictated in Attachment A, SCOPE OF SERVICES. Any conclusion or information obtained or derived from electronic files provided for convenience will be at the user's sole risk.

- 7.4 Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the party delivering the electronic files. Unless stated otherwise herein, Consultant shall not be responsible to maintain documents stored in electronic media format after acceptance by City.
- 7.5 When transferring documents in electronic media format, Consultant makes no representations as to long term compatibility, usability, or readability, of documents resulting from the use of software application packages, operating systems, or computer hardware differing from that as required of, and used by, Consultant at the beginning of this Project.
- 7.6 City may make and retain copies of Documents for information and reference in connection with use on the Project by the City, or his authorized representative. Such Documents are not intended or represented to be suitable for reuse by City or others on extensions of the Project or on any other project. Any such reuse or modifications without written verification or adaptation by Consultant, as appropriate for the specific purpose intended, will be at City's sole risk and without liability or legal exposure to the Consultant or to Consultant's Consultants.
- 7.7 If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- 7.8 Any verification or adaptation of the Documents for extensions of the Project or for any other project will entitle Consultant to further compensation at rates to be agreed upon by City and Consultant.

ARTICLE 8. INSURANCE.

- 8.1 During the performance of the Services under this Agreement, Consultant shall maintain the following minimum insurance:
- a) General Liability Insurance with a combined single limit of \$1,000,000 per occurrence and \$2,000,000 annual aggregate.
 - b) Automobile Liability Insurance with a combined single limit of \$1,000,000 for each person and \$1,000,000 for each accident.
 - c) Workers' Compensation Insurance Coverage A in accordance with statutory requirements and Coverage B, Employer's Liability Insurance, with a limit of \$500,000 for each occurrence.

- d) Professional Liability Insurance with a limit of \$1,000,000 annual aggregate.
- 8.2 Consultant shall add the City an additional insured on all policies unless otherwise prohibited.
- 8.3 Consultant shall, upon execution of this Agreement, furnish City certificates of insurance, which shall include a provision that such insurance shall not be canceled without at least thirty days' written notice to City.
- 8.4 No insurance, of whatever kind or type is to be considered as in any way limiting other parties' responsibility for damages resulting from their activities in the execution of the Project. City agrees to include, or cause to be included, in the Project's construction contract, such requirements for insurance coverage and performance bonds by the Project's construction contractor as City deems adequate to indemnify City, Consultant, and other concerned parties against claims for damages and to insure compliance of work performance and materials with Project requirements.

ARTICLE 9. PAYMENT.

- 9.1 City will pay Consultant for services and expenses in accordance with the Fee Schedule proposal submitted for the Project as part of the Scope Of Services. Consultant's invoices will be presented at the completion of the work or monthly and will be payable upon receipt. Payment is due upon presentation of invoice and is past due thirty (30) days from invoice date. City shall give prompt written notice of any disputed amount and shall pay the remaining amount.
- 9.2 Consultant shall be paid in full for all services under this Agreement, including City-authorized overruns of the Project budget or unforeseen need for Consultant's services exceeding the original Scope Of Services.
- 9.3 **TRAVEL; EXPENSES**
The City shall reimburse reasonable expenses, including travel and meals, when specified in the Scope Of Services, but only in accordance with the City's Travel and Expense Policy and Procedures Manual. The maximum amount will be applied as of the date of travel and as listed in the per diem reimbursement rates on the "CONUS" website developed by the United States General Services Administration, located at www.gsa.gov [click on 'per diem rates' under the 'etools' category].

ARTICLE 10. MISCELLANEOUS PROVISIONS

- 10.1 **EQUAL EMPLOYMENT OPPORTUNITY.** In connection with this Agreement and the Project, the City and the Consultant shall not discriminate against any employee or applicant for employment because

of race, color, sex, national origin, disability or marital status. The City and Consultant will take affirmative action to ensure that contractor used for the Project does not discriminate against any employee and employees are treated during employment without regard to their race, age, religion, color, gender, national origin, disability or marital status. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship.

10.1.1 The Consultant shall insert the foregoing provision in all contracts relating to this Project.

10.2 **TITLE VI – CIVIL RIGHTS ACT OF 1964.** The City and the Consultant shall comply with all the requirements imposed by Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), 49 C.F.R., Part 21, and related statutes and regulations.

10.2.1 The Consultant shall insert the foregoing provision in all contracts relating to this Project.

10.3 **NO THIRD PARTY RIGHTS CREATED.** City and Consultant each binds itself and its successors, executors, administrators, permitted assigns, legal representatives and, in the case of a partnership, its partners, to the other party to this Agreement and to their successors, executors, administrators, permitted assigns, legal representatives and partners of such other party in respect to all provisions of this Agreement. The Services provided for in this Agreement are for the sole use and benefit of City and Consultant. Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than the City and the Consultant.

10.4 **WARRANTIES/LIMITATION OF LIABILITY/WAIVER.** The City reserves all rights afforded to local governments under law for all general and implied warranties. The City does not waive any rights it may have to all remedies provided by law and therefore any attempt by Consultant to limit its liability shall be void and unenforceable.

ARTICLE 11. EXTENT OF AGREEMENT:

11.1 **APPLICABLE LAW/CHOICE OF FORUM AND VENUE.** This Agreement is made under and will be construed in accordance with the laws of the State of Tennessee without giving effect to that state's choice of law rules. The parties' choice of forum and venue shall be exclusively in the courts of Williamson County, Tennessee. Any provision of this Agreement held to violate a law or regulation shall be deemed void, and all remaining provisions shall continue in force.

11.2 ENTIRE AGREEMENT. This Agreement, including these terms and conditions, represent the entire Agreement between City and Consultant for this Project and supersedes all prior negotiations, representations or agreements, written or oral. This Agreement may be amended only by written instrument signed by City and Consultant.

ARTICLE 12. DISPUTE RESOLUTION, BREACH.

12.1 If a dispute should arise relating to the performance of or payment for the services under this Agreement, the aggrieved party shall notify the other party of the dispute within a reasonable time after such dispute arises. During the pendency of any dispute, the parties shall continue diligently to fulfill their respective obligations hereunder. No arbitration or mediation shall be required as a condition precedent to filing any legal claim arising out of or relating to the Contract. No arbitration or mediation shall be binding.

12.2 BREACH. Upon deliberate breach of the Contract by either party, the non-breaching party shall be entitled to terminate the Contract with notice, with all of the remedies it would have in the event of termination, and may also have such other remedies as it may be entitled to in law or in equity.

ARTICLE 13. SURVIVAL.

The provisions contained in this Professional Services Agreement shall survive the completion of or any termination of the Contract, agreement or other document to which it may accompany or incorporate by reference or which subsequently may be modified, unless expressly excepted from this Article upon consent of both parties.



Scope of Work
Implementation of Adaptive Signal Control Technology Services
City of Franklin, Tennessee

I. BACKGROUND

The City of Franklin, as part of the City-wide Intelligent Transportation and Signal System, continues to look at options to improve traffic operations in and around the city. One of the many tools in alleviating traffic congestion, as endorsed by the Federal Highway Agency's (FHWA) Everyday Counts Program, is the implementation of adaptive signal control. Adaptive Signal Control Technology (ASCT) uses real-time data from various placement of vehicle detection devices to adjust signal timing based on demand at a signal and/or along a route.

The Gresham, Smith and Partners (GS&P) team has experience in the planning, design, integration, operation and maintenance of many different ASCT technologies. The GS&P team is to be retained for implementation of the System Engineering, Design, Construction Engineering and Inspection (CEI), and Before/After study services for the City of Franklin's first adaptive signal system, to be provided under an agreement between GS&P and the City.

GS&P shall serve as an independent ASCT consulting resource for the City of Franklin. GS&P shall provide the City of Franklin with said services, moreover as described in Section III, so as to provide the City with existing knowledge and past successful implementations of adaptive signal systems.

Elements of work in this scope shall include a Systems Engineering Analysis for ASCT, Design Plans for the implementation of the necessary hardware and software, Specifications, Estimates, CEI, Before/After studies of the implemented corridors, and fulfilling all necessary TDOT Local Programs design and construction requirements. These services shall be defined on a task basis as outlined in this scope.

II. OBJECTIVES

The objective of this task is for GS&P to provide their ASCT knowledge and skill sets to assist in the further implementation of the City's ITS program and its existing signal system. This includes the successful evaluation, specification, design, construction and integration of an adaptive signal system into the current signal system hardware and software.

The finalized and accepted Systems Engineering Analysis (SEA) document shall evaluate the City's Concept of Operation of the ASCT, which include the needs, goals, objectives and constraints of the ASCT to be implemented on the corridors. It shall also include all System Requirements as defined by the City Stakeholders, and a Verification and Validation plan as necessary to meet all FHWA objectives and requirements of the document. The document shall



also identify the locations that ASCT control will most likely improve traffic travel time and signal delay by corridor and time of day. Existing operation, control software, hardware platforms, and costs associated with ASCT upgrades shall play a pivotal part in determining the appropriate adaptive strategy to be considered for the identified ASCT corridors in the SEA. The SEA shall also outline a deployment plan for the ASCT, highlighting the selected routes on a phased priority basis and noting additional devices needed for the adaptive signal system to work effectively. Various options for the ASCT detection will be evaluated and a recommendation for applicable detection technology will be included in the SEA document.

From the SEA document and requirements, the GS&P team shall develop design plans for intersections identified by the City. The design plans shall show modifications needed to those intersections for the ASCT to function as envisioned, and per the adaptive technology requirements. Design plans shall show any additional detection needed, location of that detection, and any other communication or signal modifications required. The design plans shall be accompanied by a technical specification that outlines the requirements of the adaptive signal detection technology. A separate set of technical special provisions shall be drafted for the ASCT software vendor bid contract to supply, integrate, test and support the functionality that is preferred by the City for ASCT.

Once bids for the ASCT signal upgrades and software have been accepted, the GS&P team shall coordinate with the Contractor and ASCT Vendor for the construction and integration of the complete system. Concurrent with TDOT local programs and FHWA funded projects, the GS&P team shall have a representative onsite during major items of field construction, and shall document and communicate to the City any construction issues that will affect the ASCT operation. The GS&P team shall be present and record all Contractor and Vendor testing and verification of the ASCT for adherence to the design plans and technical specifications. Once integration and testing is complete, The GS&P team shall conduct a Before/After study of the ASCT corridors. This Before/After study shall measure adaptive corridor travel time as well as total intersection delay of a representative sample of intersections on the ASCT corridors.

III. DESCRIPTION OF ENGINEERING SERVICES

PROJECT MANAGEMENT AND COORDINATION

Gresham, Smith and Partners (GS&P) will manage this project for the City of Franklin following all applicable City methods and procedures, as well as following all necessary Local Programs requirements. At the beginning of the project and with the onset of each task, the GS&P team will hold a kick-off meeting with the City of Franklin stakeholders to formulate a clear understanding of the project requirements. This meeting will include discussion of the project scope, schedule, communication protocol, and team organization.

Project progress meetings for these tasks will routinely be conducted either at the City offices or, when appropriate, by teleconference to provide detailed updates on the project status. These meetings will occur as needed, but no less often than monthly. Further reference to these



meetings can be found in the specific task descriptions below. GS&P will prepare agendas for and schedule all meetings with concurrence of the City's Project Manager and will distribute meeting minutes afterward. In addition to the project status meetings, it is anticipated that other periodic meetings may be required between GS&P staff and key City of Franklin staff members.

Monthly status reports will be prepared by GS&P that cover the project progress from one report to the next and will indicate the work completed during the past month. These monthly reports will most often accompany the monthly progress billing.

The staff-hour estimates and negotiations shall be identified on a Task oriented basis. Quality Assurance/Quality Control shall be included for all submittals documents and plans, in accordance with GS&P and City of Franklin policies. QC hours shall be included in the task line item. GS&P's tasks shall include the following services:

- Task 1: System Engineering Analysis for Adaptive Signal Control Technologies Document
- Task 2: Signal Modifications Design Plans and ASCT Technical Specifications
- Task 3: (a) Construction Engineering and Inspection (CEI)
(b) Before/After Studies of the ASCT

PREPARE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTS

Because this project has federal funds, NEPA documents shall be required. The GS&P team shall prepare the necessary documentation for the proposed project to meet the requirements of the National Environmental Policy Act (NEPA). The project is anticipated to be classified as a NEPA C-list Categorical Exclusion (CE). It will require preparation of a C-list CE pursuant to TDOT guidance. The C-list CE will require the preparation of a Purpose and Need Document, coordination with the TDOT Technical Sections, a review of historic structures, and preparation of the C-List CE template documenting that the project meets the criteria outlined in 23CFR771.117(c) and that the project will have no significant effects to the environment. TDOT shall need to approve the C-List CE and retains a copy for their files for this project.

TASK 1: SYSTEMS ENGINEERING ANALYSIS (SEA) FOR ADAPTIVE SIGNAL CONTROL TECHNOLOGIES (ASCT)

The FHWA requires a detailed SEA for ITS and adaptive signal control projects that are federally funded in order to identify the need and expectations for these systems, and to prepare the maintaining agency for the operation that these systems will demand. The GS&P team shall prepare an SEA for the Adaptive Signal Control Technology. The SEA shall contain detail pertaining to the planned ASCT deployments within selected corridors, as chosen by the City and identified below. GS&P shall follow the FHWA Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems draft guidance document, as applicable, in the development of the SEA.



All stakeholders in the ASCT and its integration and operation shall be included in the review and input of the ASCT SEA. The SEA shall include the Concept of Operations for the ASCT, an ASCT system requirements section, and a verification and validation section. The SEA shall identify the needs, goals, objectives and constraints in the Concept of Operations section of the SEA.

Concept of Operation

The Concept of Operations will be prepared through detailed discussions with City staff and other key stakeholders. A one-day workshop will be held in which the stakeholders will document the goals and objectives of the adaptive project, based on City's transportation planning documents and the aspirations and expectations of City officials and staff. The objectives will be compared and ranked using a structured pair-wise comparison technique, providing the team with a basis on which to evaluate objectives against constraints.

Prior to the workshop, the GS&P team will prepare a description of the network and traffic characteristics, and an initial description of limitations of the existing system that should be addressed by adaptive operation. In broad terms, the participants will agree on improvements that are desirable and reasonable in order to overcome the current limitations. The workshop participants will then agree on traffic control strategies that should be applied to achieve the operational objectives on the identified corridors for study.

The constraints that may be applied to the project will be identified, such as limitations on budget, staff resources and capabilities, equipment and schedules. These constraints will be used for trade-off analysis, initially in reviewing the objectives and in a later task reviewing the system requirements. The trade-offs will identify those objectives that cannot be met without relaxing those constraints, and alternatively quantify the cost of relaxing the constraints in order to meet all objectives. Once the trade-off analysis is completed, the user needs will be confirmed. These needs will then drive the selection of system requirements.

Operational scenarios will then be prepared that will describe the situations under which adaptive control will be expected to operate, and the manner in which the system would be expected to respond to the described traffic conditions.

As part of this process, an initial procurement plan will be developed with the City. Alternative procurement approaches, suitable for adaptive signal system procurement, that are consistent with the City's policies and procedures, funding source requirements and FARs will be considered. A recommendation will be prepared of the most suitable procurement process.

While new traffic studies are not included in the SEA scope, GS&P shall evaluate existing traffic data and observe traffic conditions at various times of the day on each corridor. The team shall use existing volume or count data to identify and prioritize the corridors that have high traffic fluctuation. The use of existing system detection as well as the City's central software shall support this task. The corridors identified by the City to be included in Phase 1 are:

- ⌘ Mallory Lane from Liberty Pike to Seaboard Lane
- ⌘ Cool Springs Blvd from West McEwen to Marriott East Driveway
- ⌘ Carothers Parkway from Liberty Pike to Bakers Bridge Avenue



- ⌘ McEwen Drive from West Cool Springs to Carothers Parkway
- ⌘ Bakers Bridge Avenue from Mallory Lane to Carothers Parkway
- ⌘ Galleria Blvd from Bakers Bridge to I-65 off ramp.

System Requirements

Based on the user needs documented in the Concept of Operations, the GS&P team will prepare draft system requirements. Each requirement will be directly related to a user need, which will keep the requirements focused on the operational objectives and thus prevent scope creep. The user needs will be reviewed to ensure there are no “orphans”, therefore ensuring that each need will be supported by at least one requirement. This will avoid the risk of a fully compliant implementation not meeting the project’s objectives.

The draft requirements will be reviewed by the stakeholders in a half-day workshop, during which the applicability of each requirement will be confirmed and details missing from the draft (such as numbers that need to be inserted into the model requirements) will be added. Following the workshop, and based on subsequent completion of detection technology and budget analysis, the requirements will be finalized. While estimates may not be directly included in the SEA document, they will be formulated, presented and discussed for moving forward.

Verification and Validation

Once the Concept of Operations and System Requirements have been defined, the Validation and Verification sections of the SEA can be developed. These sections shall outline the testing of the software for adherence to the requirements that have been defined in the document. These tests shall be conducted as part of the CEI Task 3 of the project with the ASCT* software vendor.

A validation plan will be developed, describing the methods to be used to validate that each objective has been met by the implemented system. This plan will identify the method to be used to validate each objective, the timing of each validation test, the responsible parties, the required budget, an overview of the test procedures to be used, and a proposed schedule for the validation report(s) and other activities measuring the long term goals of the ASCT.

The SEA shall be submitted once as a draft format for review prior to the production of a final document. Task 2, Design Plans and Technical Specifications shall not proceed before the final SEA document is accepted.

TASK 2: DESIGN PLANS AND TECHNICAL SPECIFICATIONS

GS&P shall provide engineering design services for the preparation of the ASCT signal modification project plans and ASCT software technical specifications. GS&P shall develop the design plans under the City of Franklin Transportation & Street Technical Standards, and all other applicable standards as required. For this scope, it is intended that the Plans shall include all signalized intersection layouts on the following corridors, however, it may be determined that not all intersections will require signal enhancements or ASCT software (intersections are not double-counted):



- ⌘ Mallory Lane from Liberty Pike to Seaboard Lane (11 intersections)
- ⌘ Cool Springs Blvd from West McEwen to Marriott East Driveway (6 intersections)
- ⌘ Carothers Parkway from Liberty Pike to Bakers Bridge Avenue (7 intersections)
- ⌘ McEwen Drive from West Cool Springs to Carothers Parkway (2 intersections)
- ⌘ Bakers Bridge Avenue from Mallory Lane to Carothers Parkway (2 intersections)
- ⌘ Galleria Blvd from Bakers Bridge to I-65 off ramp (2 intersections)

GS&P shall submit 50%, 95% and Final plan sets as described in Chapter 9, Signal Design, of the Franklin Transportation & Street Technical Standards. While no new signals will be designed for this project, all applicable standards and guidance in this Chapter will be used for any new detection or devices required for the ASCT. The intersection plan layout sheets shall be derived from existing pdf and CAD drawings supplied by the City from past ITS, signal or intersection improvement projects. Survey and geotechnical data gathering is not included in this scope. The intersection plan layout sheets shall show existing features and detection, along with new detection types and location, as required by the ASCT that is specified. Any other new devices or features required by the ASCT, such as communications, cabling, or other detection, shall be shown on the plans and detail sheets. Detail sheets shall include all requirements for the chosen detection, including notes, manufacturer installation requirements and drawings.

Along with the Design Plans, a Technical Specification shall be written for the ASCT software designated by the SEA. The specification shall include the ASCT software requirements, as well as specifying any additional hardware and central system modifications needed for the ASCT. The Technical Specification shall include ASCT vendor requirements for support and integration of the system, including conditional and final acceptance testing requirements for the ASCT and annual support. The Specifications shall also define required training and documentation desired by the City of Franklin, with input from GS&P on past ASCT training experiences.

It is assumed that two separate bid packages will include all items in this Task of work. The first bid package will be for an ASCT Signal Modification Contract that will utilize an experienced signal installation contractor that will utilize the plans for installation of the required devices. The second bid package shall be for the ASCT software procurement, outlined in the Technical Specification, that will outline the requirements of the adaptive software set forth in the SEA, along with all pertinent testing and support requirements for the successful integration of the ASCT software. Any permit or advertisement fees necessary in the design shall be directly reimbursable to GS&P. GS&P will prepare documents for the two bid packages, which shall include:

- ⌘ Bid documents using standard City of Franklin language, as required
- ⌘ Assist the City of Franklin in advertising and bidding
- ⌘ Attend any pre-bid meetings and be available for questions and clarifications prior to the bid opening
- ⌘ Be present at the bid opening and assist the City of Franklin as requested



Once bids have been received and a bidder selected, GS&P shall assist with submittal and RFI review, under this Task, for compliance to the plans and specifications.

TASK 3: ASCT CONSTRUCTION, PUBLIC OUTREACH AND BEFORE/AFTER STUDIES

The GS&P team shall assist the City during the construction and integration of the ASCT. Main services to be performed by the GS&P team during construction and integration include:

Part A.):

- ⌘ Engineering inspection and oversight during signal modifications, as necessary and in conjunction with the TDOT Local Programs requirements
- ⌘ Public Outreach in the form of a presentation and “high level” explanation document of what to expect from ASCT for general public distribution
- ⌘ Coordinating and performing the conditional and final acceptance testing/verification with the software vendor

Part B.):

- ⌘ Post Design and Construction studies and services including Before/After studies of the ASCT

TASK 3, Part A.) Construction Engineering and Inspection, Public Outreach, ASCT Integration Services

Engineering Oversight and Inspection/Local Programs Documents

The GS&P team shall be required to coordinate Contractor activities with the City and update the City on construction progress. This includes inspection of the signal and detection modifications during major items of construction, scheduling and attending project progress meetings, and addressing field and constructability issues. This task shall include providing detailed meeting minutes, action item logs, Local Programs paperwork as well as all construction submittal and RFI reviews. Applicable construction logs shall be submitted to the City and Contractor. The GS&P team shall also be responsible for reviewing all potential changes in the Contract for compliance with the design.

GS&P shall be responsible for providing an onsite inspector, per TDOT Local Programs requirements, whenever the Signal Modification contractor is onsite and working in the field. Due to the scope of the limited signal modification work, it is expected that Contract time for signal modifications will not exceed 4 – 5 months in duration, with the actual installation days onsite by the Contractor likely not exceed 60 days. For any day the contractor is not onsite, GS&P shall still be responsible for completing necessary logs and Local Programs paperwork and keeping appropriate contract records.



GS&P shall also be responsible for providing technical onsite assistance during the integration activities of the ASCT vendor software Contract. While most of this front end configuration work is expected offsite, it is expected that the ASCT vendor will spend 15 – 20 days onsite in the deployment, testing, adjustment and training that the software contract will require. The GS&P team shall monitor and record the ASCT vendor progress. The team shall document and discuss any issues the team sees in the deployment of the software with both the City and ASCT vendor.

Testing and Training

The GS&P team shall schedule, attend and record all conditional and final acceptance testing on the ASCT project. The GS&P team shall coordinate and approve the testing documents with the Contractor during the submittal process and prior to any testing. The GS&P team shall turn over all testing documents to the City and shall promptly notify the City should any of the tests not pass, as required in the technical specifications and approved testing procedure.

The GS&P team shall also coordinate all training activities and required documentation with the Contractor and City representatives. The GS&P team shall attend and ensure that all training has been delivered to the satisfaction of the technical specifications and the City.

TASK 3, Part B.) Post Design and Construction Services

Before/After studies

The GS&P team shall collect and compile travel time and delay data along the ASCT corridors during the weekday AM, Noon, and PM peak periods, as well as one Saturday mid-day period using existing Timing Plans ("before" conditions). Following implementation and fine-tuning of the ASCT, "after" conditions will be collected for the corridor using the same sampling period and like days as the before conditions. The study shall not be conducted until the system has had ample time to stabilize through fine tuning and Contractor adjustments, as determined by the City and Contractor.

Using the travel time of the ASCT corridors and delay data collected on a sampling of intersections in the field, the GS&P team will develop "before and after" comparisons using the following parameters:

- ⌘ Total travel time
- ⌘ Running time
- ⌘ Stopped time
- ⌘ Average speed
- ⌘ Number of stops
- ⌘ Lane Group Control Delay for 4 Intersections Using 2000 HCM Method
- ⌘ Fuel consumption
- ⌘ Pollutant emissions



Travel time will be measured using the “floating car” method, in which software and a GPS will be used to calculate A to B travel time, average speed, number of stops and duration of stops. Control Delay will be measured on 4 intersections, using the 2000 HCM method in which queues are counted and recorded at a given time interval during the survey period. Because the control delay method is quite extensive and involved, a sampling of intersections, as determined by the City, shall be measured to represent total before/after intersection delay for the project.

Once the before/after study is completed and all costs are calculated, the GS&P team shall prepare the final Before/After Study Report. This report shall outline all the data collected, and shall summarize this data in an executive summary describing the overall review of the ASCT, and any potential savings in both time and money, including benefit to cost ratios.

ITEMS/SERVICES TO BE PROVIDED BY THE CITY:

- ⌘ Existing Systems Engineering documentation
- ⌘ Any existing or known traffic studies, volume summaries and trends from TACTICS, peak hour counts and turning movement studies for intersections in ASCT corridors
- ⌘ Any Phase 1 Corridor CAD drawings from previous ITS/fiber optic installations, maps, aerial photographs and as-built plans of the ASCT area in CAD or other format, as may be available within the normal resources of the City;
- ⌘ Names, addresses, and telephone numbers of points of contact for all stakeholders which may prove useful to GS&P for the completion of these Tasks
- ⌘ Current ITS and Signal Systems Vendor and Software agreements and support services information

SERVICES NOT INCLUDED IN THIS SCOPE

The following items are not anticipated to be required at this time and are therefore specifically excluded from this scope. These services may be added at the City’s request as an additional service.

- ⌘ ITS Architecture Update
- ⌘ Signal Timing Studies
- ⌘ Updated Coordinated Signal Timing Plans
- ⌘ Biological Assessments
- ⌘ Archeological Assessments
- ⌘ Collection of new traffic counts or turning movement studies
- ⌘ Traffic Control Plans (TDOT Standards will be referenced on the final plans)
- ⌘ Utility Relocation Design Services and Plans
- ⌘ Right-of-Way or easement acquisition, exhibits, descriptions or other related services
- ⌘ Survey



Additional services approved by the City will be scoped and billed at the hourly rates shown in the man-hour and fee breakdown.

SCHEDULE:

It is anticipated that the Tasks described in this scope be completed on the following schedule:

Task 1: Draft document of the ASCT SEA shall be submitted no longer than 90 days after the Kick Off meeting for the project, with final version submitted 30 days after receiving City review comments.

Task 2: GS&P shall submit 50% design plans 90 days after final version of the SEA Document has been approved. 95% design plans and draft technical specifications shall be delivered 60 days after the 50% plans review comments are submitted to GS&P. Final design plans and technical specifications along with required bid documents shall be submitted 60 days after receiving the 95% comments from the City.

Task 3: It is anticipated that the Signal Modification Contractor shall be given no more than 120 days to complete the ASCT signal modifications construction, of which a majority will be detector installations. The ASCT software contract vendor shall be given no more than 120 days to complete the configuration, integration and testing of the adaptive signal software after detection installation has occurred. The GS&P schedule is based on hours intended to reflect the Signal Modification Construction Schedule duration of 120 days, and the ASCT software vendor schedule of 120 days. The Before/After studies are independent of the Construction Contract Schedule and are based on past experience of similar Before/After studies, as outlined in the man-hour estimates. Once all Construction, Testing and Training are completed by the Contractor, it is anticipated that a draft Before/After study document be submitted no more than 60 days after Construction Completion, with a final version submitted 30 days after receiving City draft document comments.

City of Franklin Adaptive Signal System

Attachment B - Man-hour fee estimate (DKS)

PIC	PM	DKS				TOTAL HOURS	TOTAL COST
		SR	ENG	TECH	ADMIN		
	4					4	\$1,000.00
	6					6	\$1,500.00
						0	\$0.00
						0	\$0.00
	10	0	0	0	0	10	\$2,500.00
	28		32		4	64	\$11,040.00
	2				2	2	\$500.00
	4				4	4	\$1,000.00
	2		8		10	10	\$1,420.00
	24		36		4	64	\$10,560.00
	2		4		2	6	\$840.00
					6	6	\$960.00
	4		16		2	22	\$3,020.00
	4		16		2	22	\$3,020.00
					0	0	\$0.00
					0	0	\$0.00
					0	0	\$0.00
	70	0	116	0	14	200	\$32,100.00

BI weekly status, Coordination/Collaboration Mtgs. QC review discussions
 Public meetings include any board meetings to attend
 Communications and documenting/addressing concerns

 Interviews w/ stakeholders, Ops and Maint capabilities, Answers to key questions
 Onsite meeting and Reviews- TOC and Cabinets
 Onsite Observations and gathering/analyzing traffic studies & counts
 Review of available ASCT software to goals/objectives/constraints
 Identify via FHWA doc and from above review/info
 Based on ASCT alternatives, detection option review
 Develop an ASCT software/alternatives cost estimate
 Follows requirements - document test for each requirement
 Long term performance measures and O&M plan

TOTAL HOURS PER CLASSIFICATION	TOTAL MANDAYS PER CLASSIFICATION	PERSON-HOUR LABOR RATES	TOTAL LABOR COST				
0	80	0	116	0	14	210	
0.00	10.00	0.00	14.50	0.00	1.75	26.25	
\$250.00	\$250.00	\$190.00	\$115.00	\$90.00	\$90.00	\$90.00	
\$0.00	\$20,000.00	\$0.00	\$13,340.00	\$0.00	\$1,280.00	\$1,280.00	

SUBTOTAL \$34,600.00

EXPENSES

Airfare	2	\$503.00	
Per diem	4	\$66.00	
Accommodation	2	\$122.00	
Ground transportation	2	\$330.00	
Postage/courier	2	\$40.00	
Mileage	80	\$45.20	
Plotting		\$0.00	
			Subtotal
			TOTAL :
			\$1,929.20
			\$36,529.20

TOTAL