Proposal to Provide Professional Engineering Services for updates of the TMS Configuration Report and Traffic Signal Design and Operations Guide For the City of Stockton PW1522
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Redefining Mobility
Cover Letter

June 29, 2020

Jeffrey Aube
City of Stockton Public Works Department
22 E. Weber Avenue, Room 301
Stockton, Ca 95202-1997


Dear Mr. Aube and Project Selection Committee,

Advanced Mobility Group (AMG) is pleased to provide the City of Stockton with the attached proposal to provide professional engineering services for updates to the Stockton Traffic Management System Configuration Management System Configuration Report and Traffic Signal Design and Operations Guide. We have highly qualified staff that have come together to form a specialized consulting firm with expertise in project/program management (PPM), strategic planning, technology facilitation, traffic engineering and system management, and are poised to provide exceptional service to the City in support of this exciting project.

Our group of industry leaders harness innovative transportation engineering technologies to “redefine mobility” and improve the quality of life in our communities. We have been integrating traffic signal control systems to improve safety and efficiency for over 25 years. We provide expertise in strategic planning, traffic engineering, traffic signal system, signal timing, system integration, data analysis, and construction support for signal and other transportation systems, and recommend operational improvements.

I, Joy Bhattacharya, PE, PTOE, will manage the project and I bring over 25 years of experience in Plans, Specifications and Estimates (PS&E) design, traffic operations, and ITS. I have been involved with traffic signal systems implementation, modification, and operational improvements of over 1,000 traffic signals in California. I will be supported by a team of professionals who has extensive experience with implementation of traffic signal design, strategic planning, network, and communications design in California.

The following are highlights of our proposal and reasons why we think that we are qualified to perform the needed services for the City of Stockton:

**We know Stockton’s traffic management system.** Over the years, our staff and I have worked on numerous projects in the City of Stockton including fiber design, traffic signal design and adaptive signal system evaluation and design projects. Through this project experience, we have thorough understanding of the City’s TMS and traffic signal design guidelines.

**We are an objective advisor** – Our team does not sell any transportation products, software, or hardware. We always provide unbiased advice to City in selected the best fit system, which aligns with the City’s needs and requirements.
Traffic Management Systems Expertise: As part of the on-call traffic engineering services, we are working with City of Concord and City of Hayward to prepare their ITS implementation plan. This plan will create a roadmap for the cities, to consolidate their existing traffic control systems into a single system and provide standard guidelines for the traffic signal and communication network components. AMG staff have extensive experience in adaptive traffic control systems and Automated Traffic Signal Performance Measures (ATSPM) systems.

Traffic Signal Design and Signal Timing Experts: We have extensive experience in traffic engineering, traffic signal design, traffic analysis/simulation modeling, traffic signal timing, knowledge of national industry standards, Caltrans standard specifications and plans and CA MUTCD standards. Our staff has worked on over 1000 traffic signal design/modification projects for various cities in California providing, planning, design, and implementation services. Our staff provides signal timing updates for over 200 intersections every year.

Deep Understanding of Systems Engineering: The real challenge with systems engineering is not the functioning individual parts but ensuring that all parts work together as one holistic system that meets the design and operational goals. AMG provides system integration expertise to bring together the numerous components of equipment, control systems, and data management. In addition to systems engineering process, we follow Agile Engineering and Scrum Methods to monitor and control systems quality and progress as where the work is related to software configuration and development.

Innovative Transportation Solutions: We bring in expert technical knowledge and service for every aspect of traffic signals, transportation systems, Adaptive traffic control systems, Connected Autonomous Vehicles (CAV), Integrated Corridor Management (ICM), Advanced Traffic Management Systems (ATMS) and Smart Cities Initiatives. AMG is a leader in the research and application of leading innovative transportation solutions and the design and deployment of ITS systems.

System and Network Expertise: Our team has multiple experts who are very familiar with the USDOT, FCC, and NTIA requirements as related to DSRC, 4G/5G, and other wireless communications as well as SAE, IEEE, FTA, NEMA, and NTCIP standards related to traffic signals, cameras, AVs, transit vehicles, and Connected Vehicles (CVs) to traffic signals, and other ITS equipment and infrastructure.

Fiber Optic Design Expertise: The AMG team provides fiber optic designs that are reliable, expandable, maintainable, and efficient. AMG staff can design high capacity fiber optic networks such as 10 Gigabit per seconds (Gbps) base to 100 Megabit per seconds (Mbps) for various transportation and transit solutions. AMG staff can assist with IP, VLAN tag, assignments, and IP Scheme preparations.

GoMentum Station Testing Facility: AMG is the program manager for the GoMentum Station, the nation’s largest secure testing facility for connected and autonomous vehicles. AMG can facilitate field demonstrations and testing of recommended TMS components including but not limited to traffic control system, traffic signal controller and ethernet switch and sub system components that are not currently used by City. AMG can leverage on its AAA signal lab facility (V2X lab) at GoMentum Station for the testing and field demonstration.
AMG does not have any conflict of interest with the City and AMG will exercise reasonable care and diligence to prevent any actions or conditions that could result in a conflict with the best interest of the City.

As Vice President of AMG, I am authorized to negotiate and contractually bind AMG. Should you have any questions or require additional information, please do not hesitate to contact me. My contact details are below:

Joy Bhattacharya, PE, PTOE
Vice President, Advanced Mobility Group (AMG)
415-688-0024
joy@amobility.com

We are excited about this project and we look forward to providing the City of Stockton with excellent service.

Sincerely,

Joy Bhattacharya, PE, PTOE
Vice President, Innovative Transportation Solutions
3003 Oak Rd., Suite 100, Walnut Creek, 94597
415.688.0024 | joy@amobility.com
Executive Summary

The City of Stockton is seeking a professional engineering consultant to update the City’s Traffic Management System (TMS) Configuration Report and Traffic Signal Design and Operations Guide. The objective of this project is to establish principles and guidelines to allow the City to follow when upgrading the City’s TMS and designing and operating traffic signals.

AMG understands the nature of work required to accomplish the goals and objectives of this project and is well prepared with the skills and technical expertise required. We have knowledge of the existing TMS including the sub-systems and communication infrastructure, future trends in TMS, life cycle and functionality of various components of TMS, systems engineering process and agile methods in planning and designing TMS, issues and challenges in transitioning from the legacy systems, and potential funding sources to implement the changes.

To accomplish the goals and objectives of project, AMG’s approach to the project are four-fold; 1) Seek project stakeholders’ input to discover all components of the existing TMS and understand the issues, gaps, and needs. We propose to accomplish this in a workshop setting. 2) Follow a systems engineering process with inclusion of agile and scrum methods to plan and design an upgraded TMS to trace back to the needs of the system 3) Core to edge considerations that will include all components of the TMS, and 4) Effective project management and quality control methods to bring it all together.

As an added value, AMG will facilitate field demonstrations and testing of recommended TMS components including but not limited to traffic control system, traffic signal controller and ethernet switch and sub system components that are not currently used by City by leveraging its AAA signal lab facility at GoMentum Station for the testing and field demonstration.

We have provided a detailed project team description, project understanding, approach, work plan, project experiences, references, level of effort, project schedule for your review in the following sections. A separate cost proposal is included as directed in the RFP for City’s consideration.

With an estimated start date of October 2020, the project is scheduled to be completed in less than 9 months. A two-week City review period was considered for all the deliverables. We are flexible with the schedule and we can expedite the project as needed to meet City’s project delivery timeline.
Project Team

Advanced Mobility Group (AMG) is a California Corporation and certified Small Business Enterprise (SBE), established in 2018 to provide specialized innovative transportation services to our clients. Our group assists with disruptive technologies to empower the private and public sector in early adoption of proven advanced transportation solutions and intelligent infrastructure.

AMG is staffed by a 30-member team with offices located in Walnut Creek and San Francisco. Our engineering professionals serve public sector clients throughout California and have performed key work on projects across the nation.

Our team of transportation professionals offer a wide range of services that address clients’ needs throughout the duration of a project’s life cycle from planning to operations and maintenance – including permitting assistance, programming, public engagement, conceptual and final design, schedule analysis, technical services, procurement services, project delivery, construction support, dispute/claims resolution, systems integration, revenue generation, and ongoing infrastructure management.

Each of us is skilled in traffic engineering, new technologies, traffic signal system design, implementation/integration, and construction phases of the project. Our professionals enjoy what they do and assist communities in which we live, work, and play. We consider ourselves an extension of your staff in the field and in the office.

INNOVATIVE TRANSPORTATION SOLUTIONS
At AMG, we apply ITS technology to the transportation infrastructure to manage and improve the reliability and efficiency of the transportation network. The AMG SMT has the capacity to provide expert technical service for every aspect of ITS, CAV, ICM/ATMS and Smart Cities initiatives. AMG is a leader in the research and application of leading innovative transportation solutions and the design and deployment of ITS systems.

✓ Transportation Technologies
✓ Connected and Autonomous Vehicles
✓ Smart Cities
✓ Operation and Maintenance
✓ ITS Strategic Planning
✓ Center to Center Communication

✓ Integrated Corridor Management
✓ Active Traffic Management Systems
✓ System Integration
✓ Traffic Engineering
✓ Adaptive Ramp Metering
✓ Parking Management Systems

✓ Advanced Traffic Signal Systems
✓ Mobility as a Service
✓ Transit Planning Services
✓ Advanced Public Transportation System
✓ Transportation Modeling
✓ Data/Mobility Management Center
Key Personnel

We have carefully assembled a team of professionals with in-depth knowledge, qualifications, and successful experience providing consulting services similar in nature to the required scope of services. We bring a high level of commitment, enthusiasm, and background expertise to meet the requirements for providing these services to you. The team will be led by our proposed Project Manager, Joy Bhattacharya, PE, PTOE, a licensed Professional Engineer in the State of California. In addition to Joy, our proposed team includes Habib Shamshkhou, Vasavi Pannala, Kasra Behbahani, Shahin Sotoudeh, Chris Higbee, Shruti Shrivastava as key staff. Collectively, these professionals have managed and successfully delivered multiple advanced technology projects in California. These projects include Automated Traffic Signal Performance Measures (ATSPM) systems, Adaptive traffic signal systems (evaluation, planning and implementation), traffic signal design, traffic signal timing, Traffic Operation Center design and operations, ITS Strategic Plan, ICM, Express Lanes, Technology and ITS applications, Transit Systems, Systems Management, Systems Integration, Communication Systems, GoMentum Station and CAV programs.

Current project assignment and projected availability for the project’s duration is provided in the table followed by brief staff bios. We understand that continuity of staff is critical to successfully complete this project.

**AMG has the capacity to add more support staff as needed.**
Key Staff highlights are included below, and full resumes of all staff shown in the organizational chart are included in Appendix C.

**Habib Shamskhou | Principal in Charge + QA/QC**
- Recognized authority on emerging advanced technologies in transportation
- CAV Program Director
- Extensive technology base, coalition, and consensus building experience
- Delivered several fully operational systems integration ATMS in 30 years
- MS, Transportation Engineering-Polytechnic Institute of New York
- BS, Civil Engineering – New Jersey Institute of Technology

**Joy Bhattacharya, P.E., PTOE | Project Manager**
- 25 years of experience in PS&E design, traffic operations, ITS, and Adaptive Responsive Traffic Signal Systems
- Leading the industry in innovative transportation solutions
- Responsible for signal timing upgrades through PASS program, for more than 400 signals, spanning 17 local jurisdictions, including Caltrans coordination
- In-depth experience in the development, design, and implementation of various engineering strategies in major metropolitan areas
- Extensive knowledge in City of Stockton systems – Adaptive traffic control signal systems, fiber optics design and signal design

**Vasavi Pannala, P.E. | Signal Design Lead**
- Proven track record of delivering projects on time and within budget
- Technical experience includes traffic operational analysis, traffic signal and lighting design, Intelligent Transportation Systems planning and design, and systems engineering and integration
- Extensive experience in Systems Engineering, Systems Integration, and ITS Implementation Plans
- MS, Transportation Engineering, West Virginia University, Morgantown; BS, Civil Engineering, Andhra University, India

**Shruti Shrivastava | Traffic Signal Control Systems and Signal Timing Lead**
- Traffic Operational Analysis
- Traffic Signal Coordination
- Adaptive Traffic Control Systems
- MS, Engineering from Rutgers, State University of New Jersey, USA
- BS, Civil & Environmental Engineering, Sardar Patel College of Engineering, India

**Chris Higbee, PE | Traffic Signal Design Lead**
- Experience in Complete Street design and implementation, traffic calming, parking and traffic impact and congestion management
- Expertise in roadway design, traffic signal design, streetscape improvements, signing and striping
- Experience in several computer programs including AutoCAD Civil 3D
- BS, Civil Engineering - California Polytechnic State University, San Luis Obispo
### Kasra Behbahani | Systems and Network Communications Lead
- Concept of Operations & Systems Engineering Management Plans
- Systems Integration & Testing
- CV/AV Technology
- System Designs, Specifications & Validation Plans
- C2F & C2C Communications & Transportation Management Centers
- BS, Computing and Information Systems, University of London, London, United Kingdom

### Shahin Sotoudeh | CV/SAV Lead
- Development of first SAV Pilot Program in California
- AV Planning, Policy, Legislation and Regulatory Agency permits
- AV System Testing & Operations
- Concept of Operations, Requirements Development, and SEMP
- BS, Applied Mathematics in Computer Software, Azad University of Tehran, Iran

### Shel Leader | Communications Subject Matter Expert
- Extensive ITS, Communication and Program Management experience
- Recognized authority in FCC licensing
- Fiber optic communication networks and wireless communication systems
- 10 GigE fiber backbone and Core system network systems
- Significant work experience merging legacy and new technologies
- BS Degree Program, Journalism/Radio-TV, Temple University

### STAFF CURRENT COMMITMENTS AND AVAILABILITY

<table>
<thead>
<tr>
<th>Staff / Role</th>
<th>Current Commitments</th>
<th>Availability %</th>
<th>Role, Years w/ Firm</th>
<th>Current Commitments</th>
<th>Availability %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habib Shamskhou PIC</td>
<td>AAA/GoMentum Station, CCTA PPM/511 Project Various Consulting</td>
<td>10%</td>
<td>Chris Higbee, PE</td>
<td>City of Perris Signal Design Various Signal Design Various on-call</td>
<td>40%</td>
</tr>
<tr>
<td>Joy Bhattacharya PE, PTOE Project Manager</td>
<td>Several on-call with various cities AAA/GoMentum Signal Lab</td>
<td>35%</td>
<td>Kasra Behbahani Systems and Network Communications Lead</td>
<td>CCTA SAV Project CCTA PPM/511 Project</td>
<td>50%</td>
</tr>
<tr>
<td>Vasavi Pannala PE Project Delivery Lead</td>
<td>ECCTA Bus Route Redesign Various Consulting</td>
<td>60%</td>
<td>Shahin Sotoudeh CV/SAV Lead</td>
<td>CCTA SAV Project CCTA PPM/511 Project AAA/GoMentum</td>
<td>40%</td>
</tr>
<tr>
<td>Shruti Srivastava Traffic Control System and Signal Timing Lead</td>
<td>19th Avenue Improvements Downtown San Mateo Parking Various on-call</td>
<td>50%</td>
<td>Shel Leader Communications Subject Matter Expert</td>
<td>Various projects in Bay Area for FCC/Licensing and as Communication advisor</td>
<td>10%</td>
</tr>
</tbody>
</table>
**Project Understanding**

The City of Stockton’s Public Works Traffic Engineering Division is responsible for the City’s TMS that includes traffic signal management, video monitoring, automated traffic volume counts, video detection, information dissemination and ethernet and serial communication on Fiber Optic. The City is planning to revamp its TMS, including upgrading the central management systems and traffic signal controllers, communication equipment, camera system, and designing a new Traffic Management Center (TMC). As the City is moving out to a new City Hall building, it is beneficial for the City to have a TMS Configuration Report with a detailed System Design planned out and ready to implement to ensure a smooth and painless transition.

In addition to the TMS upgrades, the emerging new technologies in ITS, and the updates in the CA MUTCD have prompted the City to update its Traffic Signal Design and Operations Guide.

Through this locally funded project, the City is seeking consultant services to update the City’s TMS Configuration Report and Traffic Signal Design and Operations Guide. The following are outcomes of the project with the objective of establishing principles and guidelines for the City to follow when upgrading its TMS and designing and operating traffic signals.

1. **TMS Configuration Report**
   a. Evaluate and design a TMS that:
      i. Consolidates existing traffic control systems into one or two systems
      ii. Efficient and user-friendly from core to edge
      iii. Decommissions the Bosch matrix
      iv. Is scalable and valid without major upgrades
   b. Include a robust communication network design
   c. Allows City personnel to effectively operate and manage all components of the TMS
   d. Includes a smooth transition plan.

   e. Establish standard traffic signal designs for the City
   f. Allows staff to maintain and operate the traffic signals

**EXISTING SYSTEM**

A detailed knowledge of the existing conditions is important to conduct a system evaluation. Currently, the City is operating 303 traffic signals and four types of traffic control systems: TACTICS/SEPAC, TransSuite/D4, SCOOT, and Insync. The TMS also includes sub-systems such as Velocity, Opticom, Weigh-in-Motion, and Vantage Live. The City
also maintains about 295 analog CCTV cameras tied to a Bosch matrix and the Verint video management system. Both traffic communication and the video system are riding on an extensive fiber optic network, which is either City owned or leased from AT&T.

We understand that the current camera system has scalability issues. Siemens (M60/M62) controllers have high fail rates when compared to a more stabilized 2070 controller running D4. Switches are unmanaged resulting in putting the controllers into flash. The city currently has both analog cameras, which works well for both public works and police department, but the system is at the end of its life. The City currently utilizes Verint Nextiva video management system, but it is understood that the City is favorable to changing all the cameras to IP camera and considering other video management system. AMG also understands that the TACTICS/SEPAC traffic control system works well in the current setting, however since field controllers and backend system needs to be compatible, AMG would take a holistic view to recommend an integrated system for the City. In addition, City wants to be prepared for the future, including preparing the infrastructure for CAV and 5G implementation. City would want to continue with the current fiber infrastructure for communication but envisions using 5G for redundancy and other innovative applications.

CHALLENGES + OPPORTUNITIES

**Operational Issues** | For the integration of various sub-systems with the new backend central traffic management system to happen, the existing sub-systems need to be compatible with the central traffic management system software. Interoperability will be the key issue in addressing the operational challenges.

**Data Sharing** | AMG will assist City to establish information sharing agreements and protocols with San Joaquin County Public Works, and Caltrans District 10, San Joaquin RTD, to ensure traffic and mobility information flows freely in support of the regional programs.

**Quickly Evolving Technology and Implementation of Relevant Hardware/Software** | We keep pace with a fast-changing marketplace for services and vendors. New and emerging technologies need thorough vetting for viability as vendors will always oversell their technology.

**Physical Integration** | Ensuring that all systems are thoroughly tested, and all necessary integration and system management and operations components are in place and compatible with legacy systems. All systems testing can be performed at the largest test bed in the US.

**Funding** | Recognizing innovation improves the transportation system and sustainability goals; funding agencies continue to provide new funding opportunities for innovative projects. City has secured CMAQ funding, but AMG will assist the City to identify and pursue funding opportunities earmarked for advanced technology and innovation.

PROJECT APPROACH

The AMG team will follow a multi-phased technical and management approaches to accomplish the goals and objectives of the project while considering the challenges that might be encountered. The following principles will guide our approach to update the City’s TMS Configuration Report and Traffic Signal Design and Operations Guide.
Project Stakeholders Input

Project of this nature cannot be done in a silo. Our approach to this project will be a collaborative effort with the project stakeholders. AMG will hold couple of workshops to provide an overview of the future directions of ITS. This would assist the City to create a futuristic vision for the City. In addition, we will engage with stakeholders to identify issues with the current system and the needs for the future TMS. This would ensure a holistic planning and design of the TMS.

Systems Engineering Process

AMG will use systems engineering process in the evaluation of TMS components. We will gather goals and objectives early in the systems engineering process and document them in the user needs assessment and systems requirement documents and maintain and update them accordingly based on the priorities and changes.

Core to Edge Considerations

AMG will evaluate, plan and design all the components of the TMS from core to edge including central management software and hardware, video monitoring, automated traffic volume counts, video detection, information dissemination and ethernet and serial communication on Fiber Optic Network to ensure a smooth transition to the new TMC location.

Effective Project Management and Quality Control

AMG will provide project management services for each task for the duration of the project. Management activities will consist of administration, coordination, attending meetings, scheduling, and quality control. AMG staff has been trained in an established Project Management (PM) Framework, which identifies the critical tasks that will help the Project Team to manage risks and quality on a typical project.
Cost Control: AMG will prepare and submit monthly progress reports, updated Critical Path Method (CPM) schedules, and invoices in accordance with City requirements. Timely and proper invoicing enhances that ability of the AMG team and City of Stockton to ensure cost control. AMG will implement Earned Value Tracking (EVT) for purposes of closely tracking our costs versus budget on the project. Control of project costs will be accomplished by monitoring on a task level basis. Monthly invoices will consist of a cover letter, and a monthly progress report, summarized at the major task level, providing budget, billed amount and balance, and Earned Value. Each invoice will contain a detailed cost report of all labor and expenses, produced by AMG’s accounting system and receipts or other proof of expenditure for any other expenses.

Quality Assurance / Quality Control (QA/QC): Quality control will play a major role in the successful completion of the project, with tasks delivered on time and on budget. AMG will implement and maintain quality control procedures to manage conflicts, ensure product accuracy, and identify critical reviews and milestones. Deliverables will be reviewed through a well-established and formalized process that AMG documents through a quality assurance plan and record keeping. Each deliverable is independently reviewed and documented by appropriate qualified individuals and/or teams. A log of all QA/QC measures taken during the project, including any corrective actions taken, will be maintained by the Project Manager.

Detailed Work Plan

TASK 1: PROJECT MANAGEMENT

Project management and quality assurance are key to the success of any project. AMG staff has been trained in an established Project Management (PM) framework, which identifies the critical tasks that will help the project team to manage risks and quality on a typical project. The project management framework is followed for all projects conducted by AMG. It establishes the organization, management, and control of all aspects of a specific project throughout its duration, from initiation to final handover of deliverables.

We will follow a simple, yet robust Project Management Framework to ensure the project is delivered within the project schedule timeline. We will develop a detailed project schedule that will be updated on a bi-weekly basis for the project’s duration to be used as a tool to measure progress. As indicated in our approach, we will have a continuous dialogue with agency staff through in-person meetings, teleconference, or email exchange to discuss project status, work completed, and share other updates, as required. This effective and timely communication will enable AMG to handle any complaints with the work product or billing issues as soon as they arise.

Monthly progress reports will be submitted along with the billings to provide an overview of:

- Work progress by task, to date
- Work plan for the next month
- Identified key steps and upcoming meetings
AMG will hold a project kick-off meeting with City of Stockton to establish project organization, objectives, and scope in collaboration with City staff and project stakeholders.

**Task 1: Project Management Deliverables:**
- Bi-Weekly Communications
- Final Work Plan and Detailed Project Schedule
- Monthly Progress Reports and Invoices
- Kick-off Meeting Minutes

**TASK 2: TRAFFIC MANAGEMENT SYSTEM CONFIGURATION REPORT**

**TASK 2.1: EXISTING INVENTORY AND BACKGROUND RESEARCH**

A detailed knowledge of existing conditions is important to conduct a system evaluation. Current TMS components, age, condition, compatibility, and operational characteristics will be compiled and researched. AMG will work with project stakeholders, such as Public Works, Police, IT and City’s Contractor for this background research and existing inventory task. AMG will send out an initial inventory request and will follow up with stakeholders’ workshop. AMG has a good understanding of the equipment currently being used by the City, but all TMC equipment would be verified in person. The workshop will enable us with proper information on the devices and help us understand the current issues with the existing system. The workshop will also serve as an opportunity to understand the goals for the TMS upgrades and appetite for futuristic strategies like AV/SAV and Vehicle to Infrastructure strategies.

*Task 2.1 Deliverables: Workshop material, participation, and notes.*

**TASK 2.2: NEEDS ASSESSMENT**

Using the existing inventory of TMS, an evaluation of existing TMS will be conducted to understand the condition and issues with the existing system. AMG will research and identify future improvements and technologies included in the San Joaquin Council of Government’s regional ITS plans. FHWA’s ITS Strategic Plan will be used as a guideline for the purpose of identifying the future strategies. The future strategies will be included in the discussions with the project stakeholders to understand the readiness and plans to implement the future strategies.

Based on the evaluation of existing TMS and future needs, a needs assessment will be performed. This assessment will identify gaps in the system based on the current status and desired goals and objectives of the City for the TMS upgrade. The needs assessment will include various categories to accommodate all the TMS stakeholders including the users.

**TASK 2.3: REQUIREMENTS**

**TASK 2.4: System Evaluation**

AMG will evaluate at the minimum four traffic signal control systems, including the central management software and controllers including at least one existing system. AMG understands that the TACTICS/SEPAC traffic control system works well for the City needs as compare to Transuite/D4. AMG will evaluate TACTICS/SEPAC, Centracs, Trafficware, and Intelight at the minimum. AMG will include any other traffic control systems with the consensus of the project stakeholders. AMG has worked with all the advanced traffic control systems available in the market. Our assigned project
manager teaches courses on signal systems at UC Berkeley, which covers all the major off-the-shelf systems.

The following are some of key elements that will be considered in the evaluations:

a. Ease of use
b. Time based signal coordination
c. Pedestrian and bicycle timing
d. Traffic responsive
e. Report functions
f. Transit priority and preemption
g. Tech support availability
h. Timing data transfer between server, controller, laptop, and other storage devices
i. Local and system mapping
j. Compatibility with third party equipment and software such as, but not limited to, video detection and adaptive traffic control.
k. Reliability of all components

AMG will coordinate with the manufacturers, vendors, and City staff to facilitate field demonstration of the recommended systems and components that are not currently being used by the City. The evaluation will include compliance with the system requirements developed based on the needs of the TMS and the results of the evaluation will be presented in the systems engineering documents format. A draft and final version of the documents will be provided for City’s review and files.

**Task 2.4: System Evaluation Deliverables:**

- System Validation (Draft and Final)
- System Verification/Acceptance (Draft and Final)
- Subsystem Verification/Acceptance (Draft and Final)
- Unit/Device Test (Draft and Final)

**TASK 2.5: DETAILED DESIGN PLAN**

AMG will prepare a detailed design plan that includes all the TMS components. The design will include standards for the following but not limited to:

1. Traffic signal control system (including the central management software and controllers
2. Standards for existing TMS sub-systems (CCTV cameras, EVP/TSP, Weigh-in-motions) and any near-term future sub-systems
3. Traffic signal controller and network switches
4. Components needed for the system communication network
5. Components for new TMC and satellite stations at the City’s Operation and Maintenance Division, San Joaquin County Public Works, and Caltrans District 10.

The detailed system communication network architecture will be developed to show the TMS systems and sub-systems including traffic signal and video networks at City’s TMC and its satellite stations.
**TASK 2.6: IMPLEMENTATION/TRANSITION PLAN**

AMG will prepare a detailed transition for a near-term (5 years) implementation plan. A list of priority recommendation with an opinion of probable costs for the improvements will be included. A list of potential funding sources for the recommendations will also be provided, which could supplement the CMAQ grants already secured by the City. The implementation plan will include the plan and steps in transitioning for the current TMC location to the new TMC location. The purpose of this implementation plan is to provide tools for the City to continue to proactively plan, fund, operate and maintain the growing traffic management system for the current and future transportation needs.

**Task 2 Deliverables:** Draft TMS Configuration Report-65%; Draft TMS Configuration Report-95%; and Final TMS Configuration Report – 100%.

The Draft TMS Configuration Report at 65% will be submitted with the Detailed Design Plan completed. 95% draft report will be submitted with all the components of the TMS configuration report completed.

**TASK 3: TRAFFIC SIGNAL DESIGN AND OPERATIONS GUIDE**

Based on the upgrades to TMS recommended in the TMS Configuration Report, AMG will prepare the Traffic Signal Design and Operations Guide. Existing TMS, California MUTCD 2014 Revision 5, Caltrans Standard Specifications and Plans, City's Standard Specifications and Plans will be used as relevant in the preparation of this guide.

The contents of this guide will be organized in the following topics:

1. Design Standards
2. Equipment Standards
3. Signal Timing Parameters
4. Detection Configuration
5. Performance Monitoring
6. Data Management: Guidelines to collect and manage the traffic signal timing database, change management, traffic volume data, and
7. Based on the stakeholders’ meeting and appetite for futuristic ideas, AMG’s signal design guide would include V2X and Smart City capable devices and standards.

Example of Experiences with Similar Type Work

AMG staff has successfully completed numerous traffic management systems, traffic operations, ITS strategic plans, traffic signal timing and systems integration projects. In addition to the references listed in the References section, the following are highlights of similar projects AMG has completed.

**Pershing Avenue Adaptive Traffic Control System | Stockton, CA:** AMG staff have worked on the design on an adaptive traffic control system at 16 intersections along Pershing Avenue between Hammer Lane and Fremont Street. System hardware and software were evaluated to recommend adaptive traffic control system components required for the project intersections. Insync, SCATS, ACS-Lite, SCOOT and SynchroGreen were evaluated as part of the project.

**Various Design Projects Control System | Stockton, CA:** AMG staff have worked on various signal design and fiber design projects in the City of Stockton. Some of the projects are: Arch Road Fiber Design Project, Traffic Signal modifications at Harding Way at El Dorado Street and Center Street, California Street and Lafayette Street, Arch and B Signal, Pacific Avenue/Castle Street, Hammer Lane/Kelley Drive to name a few.

**Caldecott Tunnel Fourth Bore Tunnel Operations System | CCTA:** AMG staff performed all the electrical, communications, and ITS devices procurement, installation, and testing. AMG staff prepared the Detailed Design of the communication network and Tunnel Operating System, refined functional requirements, and developed software architecture and integration solutions. System components included: Tunnel Operation System (TOS), Tunnel Management System (TMS), Lighting Control System (LCS), water management system, emergency response system, automated alert and response system, tunnel Supervisory Control and Data Acquisition (SCADA), Vehicle Detection System (VDS), and Video Image Processing (VIP). As System Manager, Kasra Behbahani prepared the Detailed Design, Detailed Systems Architecture, Software Development Document, and IP Schema. Kasra performed Systems Integration oversight including verification and validation of the entire systems performance functionalities.

**Caltrain Communications Systems | San Jose, CA:** AMG Communications services include plans, specification and estimates for communications system upgrade; development of technical specifications and pre/post award support for new system procurements; and as-built system documentation. AMG provides design services during construction and consultant support for radio communications, LAN/WAN networks, SW/HW services and infrastructure for rail operations. Caltrain is a commuter rail service operating on a 77-mile corridor between the cities of San Francisco and Gilroy. Caltrain is owned and governed by the Peninsula Corridor Joint Powers Board (PCJPB or JPB). Caltrain shares the corridor with Union Pacific Freight operations and other passenger rail service providers.

**North and South LRT Communications Systems Design |** AMG managed the design teams for the South Light Rail Transit Sections 1B, 2, and 3, and North Light Rail Transit Northern Alberta Institute of Technology (NAIT) Extension’s Communications and Central Train Control System and providing PS&E deliverables for final design. Communications and Central Train Control System element design included Synchronous Optical Network (OC-3) fiber optic outside plant cable system, CWDM/Gigabit Ethernet System Network, telephone system, Public Address and Visual Messaging Sign system (PA/VMS), Supervisory Control and Data Acquisition (SCADA) for wayside facilities and stations, CCTV System, Central Train Control System control consoles and field side signal system interface, station Local Area Network (LAN) Fare Collection system, wayside facility access control
system, grade separation intrusion detection system, wayside Communications and Signal duct bank, and LRT Control Center terminations and control consoles.

**ITS, Traffic Incident Management Program, Traffic Management Center Operations & System Engineering Services | Baton Rouge, Louisiana:** AMG staff are currently providing oversight and management of the TMC Operations Staff for the Statewide, Baton Rouge, Shreveport, and Houma TMCs. AMG also assisted in the development of Standard Operation Procedure manuals and other TMC operations documents, facilitates TIM stakeholder meetings, and provides guidance on proposed changes to legislation. We have also developed and executed two pilot programs: The Instant Tow Dispatch Pilot Program and the Heavy-Duty Tow Incentive Pilot Program. Both aim to improve vehicle towing efficiency in incident management situations.

**GoMentum Program |** AMG staff helped to co-found GoMentum Station, one of the nation’s largest secure testing facility for connected and autonomous vehicles (CAVs). GoMentum Station provides a unique and varied terrain and infrastructure for testing the latest developments in transportation technology. So far, more than 25 private and public-sector entities – from automakers to technology and communications firms – are invested in testing these technologies at the 5,000-acre former naval weapons facility.

This collaborative partnership includes multiple automobile manufacturers; Original Equipment Manufacturers and Tier 1 suppliers; communications suppliers; technology companies; researchers and academia; public agencies and other partners. These entities are converging in research development, testing validation and commercialization of CAV technologies to define the next generation of transportation network infrastructure.

**Shared Autonomous Vehicle Pilot Program |** AMG is the program manager for CCTA's Shared Autonomous Vehicle Pilot Program. The pilot program will deploy electric, low-speed, driverless, multi-passenger shared autonomous vehicles (SAVs) throughout Contra Costa County to solve first- and last-mile commuting challenges by connecting residents to transit at low cost with zero emissions. Authorized by California Assembly Bill 1592, the program is poised to become the first of this kind in the United States where autonomous shuttles will be sharing the road with drivers, pedestrians, and cyclists.

AMG staff are providing professional engineering and program management services required to plan, test and implementation the SAV Pilot Program in Contra Costa County. The program requires extensive collaboration among multidisciplinary visionaries in both the public and private sectors. Project activities include planning, procurement, testing, operations, legislative and regulatory approvals, innovative financing, development of the sustainable business model and consensus building with stakeholders.
AMG References

I-80 ICM Systems Integration Project | Alameda & Contra Costa Counties, CA:

**Detailed Description:** The I-80 Integrated Corridor Mobility (ICM) project will enable operational improvements and implement intelligent transportation System (ITS) strategies, such as adaptive ramp metering and incident management, along a 19.5-mile portion of I-80 from the San Francisco-Oakland Bay Bridge Toll Plaza to the Carquinez Bridge in Alameda and Contra Costa Counties. The AMG Systems Integration team was responsible for the preparation of detailed design for Center to Field and Center to Center communications, and upgrading Transportation Management Centers, Transit and Traffic Signals systems integration, and sub-systems and systems verification. Coordination with 13 local cities and agencies was necessary to establish a communication network between transportation centers and field devices.

**Client Reference:** Randy Iwasaki, Executive Director, CCTA, riwasaki@ccta.net, 925.256.4724

**Staff Involved:** Habib Shamskhou, Joy Bhattacharya, Kasra Behbahani, Vasavi Pannala, Shahin Sotoudeh

IDEA Grant System Management | MTC, Various Cities

**Detailed Description:** AMG staff assisted in the preparation of Innovative Deployment for Enhanced Arterials (IDEA) grant applications for multiple cities in the Bay Area. AMG is serving as the Systems Manager for the cities of Dublin, Concord, Walnut Creek, Hayward, San Rafael, and CCTA providing technical assistance and systems oversight for the deployment of the innovative projects. The projects include the implementation of Automated Traffic Signal Performance Monitoring (ATSPM) System for the cities of Hayward and San Rafael as part of the Category 1 funding. AMG is also assisting the deployment of Transit Signal Priority based on MMITSS protocol, including DSRC communication and multiple levels of priority based on bus ridership information.

**Client Reference:** Rafat Raie, Deputy Director of Public Works, City of San Rafael, rafat.raie@cityofsanrafael.org, 415-485-3473

**Staff Involved:** Joy Bhattacharya, Vasavi Pannala, Chris Higbee, Shruti Shrivastava, Kasra Behbahani

SR 238 Improvement Project | Hayward, CA

**Detailed Description:** This award-winning project was designed to reduce congestion in downtown Hayward to accommodate current and projected future traffic demand in the corridor and improve accessibility. AMG staff has evaluated various adaptive control traffic signal systems and implemented SCATS adaptive signal control system at 32 intersections in Phase I and 18 intersections in Phase II projects. As part of the project, AMG evaluated signal systems, video camera systems, switches, and other ITS components. Once all items were evaluated and recommended, AMG staff designed the signal upgrades and setup the TMC in public works division. The signal designs and signing and striping details conform to the City standards, California MUTCD guidelines, and Caltrans standard plans, specifications, and design requirements. The project was completed on time and within budget.

**Client Reference:** Abhishek Parikh, Transportation Manager, City of Concord, Abhishek.Parikh@cityofconcord.org, 925.671-3129 (Former City of Hayward Project Manager)

**Staff Involved:** Joy Bhattacharya, Vasavi Pannala, Kasra Behbahani, Chris Higbee, Stephen Au
Level of Effort
A matrix identifying number of hours per task and percentage of work by task is provided in Appendix A. Cost proposal is provided separately.

Schedule
A detailed schedule with time required to complete each task is provided in Appendix B. The schedule will be updated monthly throughout the duration of the project.

Local Preference
All the work on the project will be done from the AMG Walnut Creek office.

Cost Proposal
The cost proposal is included in a separate email.

Conflict of Interest
AMG does not have any conflict of interest with the City and AMG will exercise reasonable care and diligence to prevent any actions or conditions that could result in a conflict with the best interest of the City.
APPENDIX A | Level of Effort
## Level of Effort for TMS Configuration Report and Traffic Signal Design and Operations Guide

**Stockton PW 1522**

<table>
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<th>Task</th>
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<th>Support Staff</th>
<th>Total Hours</th>
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<td></td>
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<tr>
<td>Task 2: TMS Configuration Report</td>
<td></td>
<td></td>
<td>4 40</td>
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<tr>
<td>Task 2.1: Existing Inventory and Background Research</td>
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<td></td>
<td>1 39</td>
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<tr>
<td>Task 2.2: Needs Assessment</td>
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<tr>
<td>Task 2.3: Requirements</td>
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<td></td>
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<td>Task 2.4: System Evaluation</td>
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<tr>
<td>Task 2.5: Detailed Design Plan</td>
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<tr>
<td>Task 2.6: Implementation Plan</td>
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<tr>
<td>Task 3: Traffic Signal and Operations Guide</td>
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| Total Hours by Team Member | 16 | 62 | 142 | 120 | 24 | 30 | 70 | 54 | 30 | 6 | 554 |
APPENDIX B | Schedule
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Date: Mon 6/29/20
APPENDIX C | Resumes
Habib Shamskhou
Principal-In-Charge & QA/QC

Habib brings nearly 31 years of experience managing a wide variety of transportation projects. Originally trained as a transportation system engineer, he is now a recognized authority on emerging advanced technologies in transportation. Habib’s specialties include program management, congestion management, active traffic management, strategic planning, and alternative analysis, as well as system architecture, system evaluation, system integration, transportation safety, funding, P3, O&M, and program implementation. Habib is focused on developing and growing the use of Connected Vehicles and Autonomous Vehicles (CAV) technology, Smart Cities, and Intelligent Transportation Systems (ITS) across North America and internationally.

Recent multi-million-dollar projects Habib has been involved in include the GoMentum Station CAV Program in Contra Costa County, I-80 Integrated Corridor Management (ICM)/Active Traffic Management in Northern California, I-5/I-90/SR520 Active Traffic Management System (ATMS) Design-Build project in Seattle, developing Corridor System Management Plans (CSMPs) for Caltrans, and implementing several ITS SMART corridor and system integration projects for Alameda County in California, as well as ITS projects in New York, Kentucky, Massachusetts, Rhode Island, Florida, Arizona, Texas, Nevada, Oregon and Canada.

**Project Experience**

**Various Program Management projects, United States**

Habib is an experienced program manager capable of managing large, complex, and controversial transportation technology projects. He is a consensus builder with expertise in developing conceptual design for multi-disciplinary projects toward operational, functional, and aesthetic excellence within budget. He is an expert in funding and grant application and assisted several agencies to secure funding for their ITS, Smart Cities, and CAV programs.

**GoMentum Station Connected Vehicles and Autonomous Vehicles Program, Concord, California (Program Director)**

GoMentum Station in Concord, California is where the Contra Costa Transportation Authority (CCTA) leads and facilitates a collaborative partnership among multiple AMs; OEMs and Tier 1 suppliers; communications suppliers; technology companies; researchers and academia; public agencies and other partners. These entities converge in research development, testing validation and commercialization of CAV technologies to redefine the next generation of transportation network infrastructure and mobility. (visit: www.gomentumstation.net). Habib is co-founder of the program and is currently the Program Director managing all aspects of this innovative program.
Automated Highway System (AHS) Program (Project Manager)
Automated Highway System (AHS) program, a nine-company consortium led by General Motors. The NAHSC was a $200 million-dollar program in partnership with the US Department of Transportation to specify, develop and demonstrate a prototype AHS by the year 2002. As a program manager, Habib directed the precursor system analysis of automated highway system for FHWA, evaluating issues pertinent to AHS in the areas of applications.

Various ITS Projects, United States (Technical Director and Project Manager)
His project involvement in the ITS arena includes, Active Traffic Management (ATM) including speed harmonization; Advanced Traveler Information System (ATIS); Congestion Management and ICM; system evaluation and analysis; ATMS; Advanced Public Transit Systems (APTS); traffic surveillance and control systems; Transportation Management Center (TMC) design; ITS coalition and consensus building; ITS strategic planning and design; development of System Engineering Management Plan (SEMP); procurement of ITS devices; ITS homeland security; system integration; and operation and maintenance. Projects include:

✓ I-80 ICM Project – Alameda and Contra Costa Counties
✓ Webster Street SMART Corridor Project, Alameda County

Caltrans Corridor System Management Plans (CSMPs), California (Program Manager)
Program manager for development of several CSMPs for Caltrans. The CSMP are requirements of the CA Bond Measure program related to Corridor Mobility Improvement Account. The CMPS’s provide for integrated management of all travel modes to facilitate the efficient and effective mobility of people and goods within California’s most congested corridors utilizing the latest techniques in micro-simulation modeling and advance technologies.

Various Strategic Planning projects, United States
Habib is trained strategic planner with expertise of developing short and long term strategic plans for all kinds of organizations based on key stakeholder input. He conducted workshops and training and worked on several ITS early deployment and strategic plans including the following projects.

✓ ITS Element of Valley Transportation Plan 2020, Strategic Plan, Santa Clara County, California
✓ Automated Vehicle Location System and Transit Priority Control System, Fairfield / Solano County, California - Developed both Countywide Transportation Strategic Plan and Transit ITS Strategic Plan
✓ Intelligent Transportation Management Systems Project (ITMS), San Francisco, California

Various Toll Facility Improvement Projects, United States
Habib has been an active member of IBTTA and has been engaged in Toll and Revenue (T&R) studies, technology evaluation, market studies, design and rehabilitations of several toll plazas across the United States.
Joy Bhattacharya, P.E.-PTOE
Project Manager

Joy is AMG’s Vice President of Innovative Transportation Solutions. He has in-depth experience in the development, design and implementation of various engineering strategies in major metropolitan areas, including Adaptive/Responsive Traffic Signal Systems and Transit Priority Systems; Incident Management Plans; design of automated Electronic Toll Collection systems; preparation of PS&E for field implementation of CCTV, Changeable Message Signs, Highway Advisory Radio, Ramp Metering and ATMS systems; and freeway and arterial operations using micro-simulation. Local projects to his credit include the Mountain House ATMS, City of Hayward Adaptive Signal Systems, Webster Street SMART Corridor System, SR-4 and I-80 Integrated Corridor Management, and the Santa Clara VTA Capitol Corridor Transportation Study.

Project Experience

State Route 4 Integrated Corridor Management (SR 4 ICM) Project, Contra Costa County, CA (Project Manager).
Joy served as the Project Manager for the SR 4 ICM project. The primary goal of the SR-4 ICM project was to build a comprehensive multi-modal system for the SR-4 corridor to create a balanced, responsive, and equitable system that will monitor and control traffic to improve the overall safety and mobility of the corridor. To create a balance, stable, and reliable traffic flow throughout the corridor, agencies along the corridor, under the leadership of CCTA, have joined to address the congestion problem on SR-4 through implementation of ICM strategies along the corridor. The SR-4 ICM project integrates several innovative key operational strategies for the freeway, ramps, local arterials, and transit to mitigate congestion and to better manage the traffic flow throughout the corridor. Joy developed the Systems Engineering documentation for the project, including the Systems Engineering Management Plan (SEMP), Concepts of Operations, Systems Requirements, Analysis Modeling and Simulation Plan, and the Corridor-wide Implementation Plan. The project involved participation of all stakeholders including cities, counties, transit agencies, Caltrans, CHP, and BART.

Joy conducted one-on-one meetings with all stakeholders and 12 joint workshops for the stakeholders of the project. Though the collaborative process, various ICM strategies were selected for implementation along the corridor. The preliminary systems elements, ICM functionalities, and ICM sub-systems were identified based on the selected ICM strategies. The project is ready for the Phase 2 portion of the work, which would involve design and systems integration of the project elements.

I-80 Integrated Corridor Mobility Project, Alameda CTC, Alameda and Contra Costa County, CA (Project Manager).
AMG staff was responsible for evaluating the existing system and providing solution by designing, developing and implementing communication between the field elements and the TMC and between the City TMC and Regional TMC. As Project Manager, Joy worked closely with 11 cities and 2 transit agencies to implement the system. AMG staff is responsible for the successful implementation and operation of all the advanced strategies implemented as part of the project. The project
included the implementation and integration of traffic and transit operations strategies including adaptive ramp metering, ramp metering priority for transit, traffic operations systems, active traffic management, and incident management along a 19.5-mile section of I-80 between the Bay Bridge Toll Plaza and the Carquinez Bridge. In addition to the freeway improvements, the project consists of local arterial and transit improvements along San Pablo Avenue, including signal synchronization, transit signal priority and flush plan for incidents.

**Webster Street SMART Corridor Project, Alameda County, CA (Project Manager).**
Joy was the Project Manager for the Webster Street SMART Corridor Project. The project developed a TSP system to reduce travel time along five AC Transit lines; designed traffic signal coordination systems along Webster Street and Constitution Way/Lincoln Avenue; designed a new traffic signal at Webster/Pacific Avenues and signal modifications at five intersections; designed and implemented an Advance (VDS); designed and implemented a CCTV system; and implemented an ATIS.

**Citywide Advanced Traffic Management System (ATMS) Upgrade Project, Milpitas, CA (Project Manager).**
Joy supervised the upgrade of the City’s signal system to the state-of-the-art ATMS now system provided by Naztec. As a sub-consultant to Naztec, Joy prepared the design plans for the project, which the contractor was responsible to install. The City upgraded controllers citywide. Joy assisted in migrating the signal timing settings including signal priority and light rail preemption settings to the new controllers utilizing the ATMS.now user interface. The project included developing and updating the timing plans including TSP settings for all the signalized intersection within the City of Milpitas.

**I-880 HOV Lane Widening Project, Santa Clara County, CA (Project Manager).**
The project's purpose was to increase highway capacity, reduce congestion, enhance safety, and improve connectivity between I-880 and US-101, two critical elements of Santa Clara County’s transportation network. The project adds over 4 miles of HOV (High Occupancy Vehicle, or carpool) lane in each direction of I-880 in Santa Clara County, between State Route 237 in the City of Milpitas and US 101 in the City of San Jose. The project fills an existing HOV lane gap by extending the HOV system that connects northern Santa Clara County to Alameda County, a distance of about 20 miles. As the Project Manager, Joy supervised preparing PS&E for the I-880 HOV Lane Widening project.
Vasavi Pannala, P.E.
Project Delivery Lead

Vasavi is a Project Manager in AMG’s Innovative Transportation Solutions group. She is a licensed Civil Engineer with more than 18 years of experience in engineering and management, leadership and mentoring, team building and supervision, as well as creative problem solving. As a project manager, she has a proven record of completing projects on time and within budget. Technical experience includes systems engineering, transit operational analysis, traffic signal design, traffic operational analysis, Intelligent Transportation Systems design, traffic control and lighting design. She has extensive training and experience in the use of software tools including HCS, Synchro, Corsim, TRAFFIX, PARAMICS, VISSIM, Integration, Lumen Micro, AGI 32, Microstation and AUTOCAD.

Project Experience

Corridor System Management Plans, Caltrans Dist.4, CA (Deputy Project Manager).
Deputy Program manager and project coordinator for various Dist. 4 Caltrans Corridor System Management Plans (CSMP). A CSMP provides integrated management of all travel modes to facilitate the efficient and effective mobility of people and goods within California’s most congested corridors utilizing the latest techniques in micro-simulation modeling and advance technologies. Project role included client and sub-consultant coordination; supervise project administration, resource allocation, and reviewing the technical reports developed.

I-80 Integrated Corridor Mobility (ICM) Project CSMP, Alameda CTC, CA (Deputy Project Manager).
Served as deputy project manager for this Active Traffic Management (ATM) project. The project implemented and integrated of traffic and transit operations strategies including adaptive ramp metering, ramp metering priority for transit, traffic operations systems, active traffic management, and incident management along a 19.5-mile section of I-80 between the Bay Bridge Toll Plaza and the Carquinez Bridge. Technical work included review of PARAMICS traffic simulation modeling results, preparation of various traffic technical reports including Corridor System Management Plan, System Engineering Management Plan (SEMP) and Concept of Operations, Systems Manager, testing and validation, and project closing.

SR 37 Transportation and Sea Level Rise Corridor Improvement Plan, MTC, CA (Project Engineer).
Served as lead engineer in prioritizing the recommendations and in preparation of the SR 37 Corridor Plan with near-mid-and long-term improvements to help address the existing transportation issues. This corridor plan is a first step of many to proactively identify opportunities and solutions to the transportation, ecosystem and sea level rise for the SR 37 corridor.
Grand MacArthur SMART Corridor Project, Alameda CTC, Oakland, CA (Project Manager).
Vasavi served as the Project Manager for the Grand MacArthur SMART Corridor project. The project included transit and traffic operational analysis, PS&E, Systems Engineering Management Plan and Systems Integration with a primary goal of enhancing transit operations project along West Grand Avenue Corridor in Oakland, CA. Transit analysis also looked at ways to increase ridership to achieve productivity gains. The Transit Operations Analysis report documented existing conditions of AC Transit's Transbay Route NL operations and recommended improvements to enhance transit operations in the corridor. Route structure, service headways, revenue hours and miles, fleet requirements and roadway configuration were studied to determine general characteristics of the transit route. Ridership surveys were conducted, and demographic data was analyzed to understand ridership characteristics. Ridership patterns, route load profile, run time, dwell time, speed, and schedule reliability were analyzed to summarize Route NL operations.

Dynamic Transit Routing, Metropolitan Transportation Commission (MTC), CA (Project Manager).
As a Project Manager on this project, Vasavi worked closely with MTC and AC Transit staff to develop a Dynamic Transit Routing plan to dynamically reroute Transbay buses across San Francisco Bay Bridge based on real-time traffic conditions. This study involved assessment of Transbay bus route operations using Swiftly software, understanding the requirements, architecture, concept of operations of AC Transit's CAD AVL and AC Transit's GTFS data feed. The study also assessed various traffic data sources to determine the reliability of the data to use for this application. With the implementation of this dynamic transit routing plan that AC Transit's CAD AVL can dynamically reroute the Transbay buses based on real-time traffic and incident conditions. Swiftly is an enterprise software to help transit agencies and cities improve urban mobility by providing real-time data platform. This software can be used for analyzing transit operations, planning, scheduling and customer service applications.

AC Transit Line 97 Transit Signal Priority Project, Hayward, CA (Project Manager).
Acting as the City’s Senior Transportation Engineer, Vasavi was the Project Manager who oversaw the implementation and completion of AC Transit Line 97 Transit Signal Priority and Adaptive Traffic Signal System within the jurisdiction of City of Hayward. The project included relocation, extension and widening of bus stops as well. She oversaw the testing and validation of the TSP requirements and TSP reporting in the Adaptive Traffic Signal System software.
Kasra Behbahani
Systems and Network Communications-Lead

Kasra Behbahani is our Communications Systems expert with more than 15 years of experience in development and implementation of transportation management systems and information system solutions. Kasra has a strong background in networking, communications, software development, systems engineering, and implementation. Kasra has in-depth knowledge of communications system needs and architecture for legacy and future systems and well knowledgeable of the standards, protocols, data types, telecom and communication topologies, IP addressing, cloud computing, and internet engineering. Kasra has experience working various projects including but not limited to Traffic Control Systems, ITS, Integrated Corridor Management (ICM), Advanced Transportation Management Systems (ATMS), Tunnel Management Systems, Train Control Systems, Transit CAD/AVL systems, Autonomous and Connected Vehicles, Smart Cities, and Fare Collection Systems. Kasra has hands-on experience programming and configuring devices and designing regional level communication networks and their standards, IP schemas, and security requirements based on the needs and requirements of various projects.

Kasra has experience working on MTC’s Regional Fiber Ring, Caltrain Positive Train Control (PTC), BART Train Control System network upgrade project, D4ATMS upgrade as part of I-80 Integrated Corridor Mobility Project for Alameda County Transportation Commission, Real-time Transit Information Signs for Santa Clara Valley Transportation Authority, Caldecott 4th bore tunnel, Tunnel Operating System for Caltrans, Train Dispatch Communications System for Caltrain. These projects used various communications technologies such as GPRS, 3G, 4G LTE, 5G, DSRC, 1Gbe Fiber, SONET, DWDM, Ethernet, IPSec, MPLS, APN, ATM, 2FF, DTS, etc.

Project Experience

Shared Autonomous Vehicle (SAV) Pilot Program and GoMentum Station Connected Vehicle/Autonomous Vehicle (CV/AV) program, Concord, CA. (Systems Engineer).

As Systems Engineer, Kasra is the systems engineer for the CCTA’s GoMentum Station CV/AV comprehensive program, testing, and verifying systems in one of largest test-bed facilities in the world with more than 20 miles of paved roadway, railroads, bridges, tunnels, buildings, and intersections. Projects consists of various USDOT CV apps, cutting edge technologies, Systems Engineering, Software Engineering, and ITS technologies such as 4G/5G, DSRC, 900Mhz wireless communications, Decision Support Systems, Traffic Management Center (TMC) Expert Systems, Integrated Corridor Management (ICM), interoperable managed lane systems, Bike and Pedestrians Safety, Advanced Traffic Signal System, Self-Parking and Next Gen Parking Management Systems, Next Gen Traveler Information systems, Commercial Vehicles Operations, Connected Transit, and Emergency Response systems. As part of this project, Kasra is working closely with AV manufacturers such as EasyMile to verify their autonomous capabilities and safety features including security of data exchange between their vehicles and infrastructure, roadside communications.

Kasra@amobility.com | P: 925.451.1043
equipment, other nearby autonomous vehicles, and central. Kasra also works with BestMile to develop a Fleet Management System for AVs.

**I-80 Integrated Corridor Management Project (ICM) – Systems Engineering, System Integration, and Software Development, San Francisco, CA. (IT Specialist and IT Project Manager).**

Kasra managed IT tasks of the project, conducted a feasibility study of a proposed system, and evaluated proposed functional requirements and improvements to District 4 ATMS. He also developed technical reports such as systems high-level design, systems specification, system validation plan, and system and sub-systems verification plan. Kasra actively participated in the development of Concept of Operations (ConOps) and Functional Requirements. Kasra prepared detailed systems design, systems integration plan, Center to Field (C2F) and Center to Center (C2C) communications verification, and performed actual testing, configuration, systems integration, and systems verification. The project components include: Freeway Management Systems; Adaptive Ramp Metering; Active Traffic Management; Speed Harmonization; Incident Management; Arterial Management Systems; Transit Management Systems; Advanced Traveler Information Systems; Traffic Surveillance; Monitoring Systems. Kasra is currently performing routing maintenance of the C2C and C2F networks and traffic control systems for I-80 ICM that consists of devices in multiple cities such as Berkeley and Oakland, Contra Costa County, and Caltrans.

**SR-4 Integrated Corridor Management Project (ICM) Systems Engineering, Concord, CA. IT Project Manager.**

Kasra constantly met with project stakeholders and led the project meetings to collect needs and requirements of proposed system and inform project stakeholders of the project process on monthly basis. Kasra developed project’s Systems Engineering Management Plan (SEMP), ConOps, and High-Level System Requirements (SysReq). As part of the process Kasra identified risks, necessary disaster recovery plan, necessary procedures during failure or incidents and identified appropriate solutions for daily operation of City Traffic Engineers, first responders such as California Highway Patrol, local Police Departments, and Fire Departments. SysReq also documented necessary routine procedures for operation, support, and maintenance of the system, its sub-systems, and components.

**Train Control Communications Network Upgrade Project for Bay Area Rapid Transit (BART), Oakland, CA.**

As IT Project Manager and Systems Engineer, Kasra was in charge of upgrading BART’s existing Train Control Communications Network which had reached end of support by the manufacturer. Kasra met constantly with BART engineers and management in Train Control and Communications departments to perform needs assessment and prepare detailed technical requirements for proposed replacement system. Kasra perform industry survey and verify feasibility of customizing and development of the devices to meet BART expectations and requirements related to security, performance, and reliability.
Sheldon Leader
Communications Expert - Systems Support

Shel is a technology and communications systems professional, active in the development and design of Telecommunication, SCADA, Security, and Networking systems since 1975 working with State and Local and Federal Government, Transportation, Transit, Hospital, University, and Financial customers throughout the United States and Canada. Shel has spent his career working with clients to understand problems, concerns and requirements in order to develop practical technology deployments. Types of systems experience include: Automated Toll Collection communication networks; Fiber Cable Deployment; Traffic Management Centers; E 9-1-1 Operation Centers; Transit Computer-Aided-Dispatch/Automatic-Vehicle-Location systems; Computer aided dispatch and wireless systems for public safety; fiber optic communication networks; wireless communication systems; 10 GigE fiber backbone and Core system network; University & Hospital systems to provide secure access to sensitive laboratory facilities; Wireless systems to provide patient data to hospital emergency room staff; Significant work experience merging legacy and new technologies – especially for networks. Experience includes working with clients to develop complete systems starting with the Concept of Operations, development of a requirements document, preliminary and final systems design, publication of RFP, evaluation of submitted proposals, and management of the system deployment, testing and final optimization.

Project Experience

**Caltrans District 3** – Sub to Kimley-Horn as Communication SME for “Adaptive Ramp Metering.”

**MTC** – Sub to Kimley-Horn I-880 Communications Infrastructure Alternatives Assessment.

**BART** – Develop network system to support SCADA at Bay Point High Voltage Transformer site.

**City of Walnut Creek** – Technology Subject Matter Expert supporting deployment of systems for traffic control and traveler information services.

**Valley Transportation Authority (VTA)** – Contract Resident Engineer providing technical design and project management for Security Systems on various VTA projects. Security systems include deployment of card access readers at VTA facilities with CCTV perimeter cameras. Also managing the installation of CCTV cameras and networks at VTA Light Rail stations.
SFMTA Two-Way Radio Replacement and CAD/AVL – Contractor managing the process of deployment of the fixed and vehicle systems. Developed materials management plan and a systems installation plan.

Golden Gate Transit for INIT – Project Manager responsible for the deployment of the CAD/AVL system. Also provided support for INIT on the Community Transit CAD/AVL system in Everett Washington.

SANDAG 511 Traveler Information System – Project Manager responsible for working with client to develop legacy upgrade path to provide Smartphone applications and update Core Server and Network systems.

MTC Bay Area Center-to-Center (C2C) system – Project Manager responsible for developing application to visualize traffic data on an internal mapping system.

Maryland Transportation Authority – Principal Engineer responsible for the development of a new Two-Way Radio System for the Maryland Transportation Authority. The MdTA wanted to deploy a new P25 standards based statewide radio system to support expanding operations of its Police Department. The system required integration of a fiber optic communication backbone to support dispatch centers and the radio tower sites.

Network Consultant for Bell Atlantic – Project Manager and principal engineer responsible for the I-95 Early Action TIMS Program, Pennsylvania department of Transportation. The I-95 TIMS project involved the development and implementation of a T-1/T-3 network, and a Traffic Control Center in Philadelphia.
Shahin Sotoudeh
AV/CAV Lead

Shahin Sotoudeh has more than 18 years of experience in systems engineering, project management, development, implementation, networking, and systems integration with hardware/software. Shahin is focused on developing low-speed Shared Autonomous Vehicle (SAV) projects and he is an expert in SAV system design, planning, verification and testing, and operation. His consulting experience includes system analysis, system and sub-system test plans, and providing feasibility studies with technical specifications in hardware and software. He is experienced in field element design including Variable Message Signs (VMS) and Closed-Circuits Television (CCTV). Shahin has proven his ability to assess client needs, build trust, and define project requirements, successfully completing several ITS projects and security systems; managing responsibilities related to budget, scheduling, performance, and workforce.

Project Experience

GoMentum Station Connected and Autonomous Vehicle (CAV) program, Concord, California (Senior Systems Engineer)
Shahin is the senior systems engineer of Contra Costa Transportation Authority (CCTA) GoMentum Station Connected Autonomous Vehicles (CAV) comprehensive program, testing and verifying systems. GoMentum Station in Concord, California is where CCTA leads and facilitates a collaborative partnership with multiple automobile manufacturers; OEMs and Tier-1 suppliers; communications companies; technology companies; researchers and academia; public agencies and other partners that converge in research, development, testing, validation and commercialization of CAV applications and technologies to define the next generation of transportation network infrastructure. EasyMile has been testing their EZ10 vehicles at this testbed and GoMentum will soon facilitate the testing of local motors Olli and Ohmio LIFT vehicles.

Shared Autonomous Vehicles (SAV) First Mile/Last Mile pilot program in Contra Costa, California (Senior Systems Engineer and Project Operations)
Shahin is responsible for testing and verifying systems related to the SAV first mile/last mile pilot program. The project activities include planning, funding, testing, design, regulations, certification, development of business model and consensus building with stakeholders. Initial project testing has been conducted at the GoMentum Station site and continued in the parking lot and the public roads within the Bishop Ranch business park in Contra Costa County. Testing is currently planned to be expanded to the the City of Dublin near the Dublin/Pleasanton BART Station. The phase II of the project includes deployment of more than 160 units throughout Contra Costa County. Shahin is the task leader for the test plan, operations, coordination, and testing results. The use of advanced software, sensors, GPS, Lidar, intelligent software and
robotics technologies in the SAV environment offer a multitude of benefits to travelers and transit operators.

**Autonomous Vehicle Pilot Project in Downtown Las Vegas, NV (Senior Systems Engineer)**
Shahin provided system verification services and conducted testing as part of the program management oversight services for AAA to implement a one-year SAV shuttle demonstration in downtown Las Vegas. AAA has partnered with the city of Las Vegas, the Regional Transportation Commission of Southern Nevada (RTC) and Keolis North America (Keolis) on this project. Keolis is operating the NAVYA autonomous shuttle in live traffic and the route is close to a half-mile containing different layouts including a straight driving path, pick-up/drop-off stations, midblock and intersection pedestrian crossings, T-Junction, 4-way stopped control intersections, and signalized intersections. The AV shuttle travels in a lane with open traffic and navigates four stop lights, communicating via DSRC road-side and on-board units.

**I-80 Integrated Corridor Management Project – Systems Engineering, System Integration, and Software Development, San Francisco, California (Senior Systems Engineer)**
Shahin was working with the system integration team to design and implement center-to-center communication network and development of video integration for the SMART corridors. The project implemented a fully integrated corridor mobility solution with active traffic management, adaptive ramp metering, and incident management along I-80. Shahin's tasks included preparation of the risk management plan, concept of operations, detailed system requirements, and field element specifications. Project elements included active traffic management on the freeway, including variable speed limits and lane control signs; incident detection; adaptive ramp metering; diversion management including trailblazer signs; local traffic signal system coordination and extensive freeway and arterial surveillance systems.

**I-5/SR520/I-90 Active Traffic Management System (ATMS) Design-Build project Seattle, Washington (Senior ITS Engineer)**
Engineering team member for ITS testing and documentation aiming to deliver fault-free system and consistent with the specifications. As well as verifying proper installation and calibration of the ITS devices in the field. Development of ITS test plans, sub-system test procedures along with the required test forms and identification of potential system failures and recovery steps. Shahin was a team member for the development and NTCIP compliance verification and validation of Dynamic/Variable Message Signs.

**I-580 SMART Corridor System Integration Tri-valley, California  (Senior ITS Engineer)**
Shahin was responsible for the systems integration, video streaming, software integration, and performance testing of the I-580 SMART corridor in Tri-Valley. The project involved designing a comprehensive ITS system including communications, integration of traffic signal systems, ramp metering, traveler information, HAR, CCTV; followed by system integration services to install, test and implement the project elements.
Radin Rahimzadeh
CAV & Smart Cities Specialist – AV/CAV Support

Radin Rahimzadeh specializes in connected and autonomous vehicles (CAV) and encompassing smart city design for the advancement of innovative transportation solutions. Radin has experience in regulatory and policy analysis, data management, and P3 stakeholder coordination to produce recommendations that are inclusive, adaptable for specific localizations, and future-forward.

Project Experience

GoMentum Station Connected and Autonomous Vehicle Program, Concord, California (Smart City and CAV Specialist)
Radin was one of two full-time employees at the GoMentum Station, a partnership between Contra Costa Transportation Authority (CCTA) and the City of Concord. The GoMentum Station is one of the largest test-bed facilities in the world and recently designated as one of 10 USDOT Automated Proving Grounds for the exploration of CAV Technology. Radin’s responsibilities have been to research and recommend vehicle and regulatory pathways to local, state, and federal agencies (including research on FMVSS requirements) goal mapping, strategic planning for the test-site, and managing ecosystem partners.

Shared Autonomous Vehicles (SAV) First Mile/Last Mile pilot program in Contra Costa, California (Research and Policy Analyst)
The SAV project will initiate the planning and testing required for the implementation of the SAV Program. Project activities include planning, funding, testing, design, regulations, certification, development of business model and consensus building with stakeholders. Initial project testing will be conducted at the GoMentum Station site as well as on non-public roads within the Bishop Ranch business park in San Ramon, CA. Radin supported the team responsible for the testing and verifying systems in SAV first mile/last mile pilot program for test plan (including development of testing scenarios), operation, coordination, and test results. The phase II of the project includes deployment of more than 162 units throughout Contra Costa County.

511 Contra Costa Transportation-as-a-Service – Systems Engineering, System Integration, and Software Development, San Francisco, California (Systems Engineer)
Radin was working on the research and development of an application that is inclusive of all modes of transportation used by stakeholders in Contra Costa County. The research and recommendations produced optimized the integration of multiple modes of transportation as applicable to transportation demand management to maximize traveler choice and enhance transit data sharing amongst agencies in the region.

Electrifying All Fleets, Mobility-as-a-Service Mayor’s Office of Sustainability, Los Angeles, California (Project Lead and Research Analyst)
A year-long research endeavor as administered by the Los Angeles Mayor’s Office of Suitability to explore solutions for electrifying all fleets transportation in the city with the goals to reduce: traffic congestion, vehicle emissions) and reliance on single-occupant vehicles. Radin and her team developed feasible solutions for the city’s current state as well as for a five-year time horizon through the steady adoption of electric ride-share models as coordinated in a mobility-as-a-service framework.

**CAV Invest Strategies, Mubadala Company, Abu Dhabi, United Arab Emirates (Research Analyst)**

Radin furthered the study administered by Mubadala Sovereign Firm of Abu Dhabi by developing an in-depth analysis of existing and emerging global level 4 and level 5 autonomous vehicles and provided recommendations for an invest strategy that is aligned with the firm’s five-year vision and investment budget.
Chris Higbee, PE
Signal Design Lead

Chris Higbee has 5 years of experience in Complete Streets design and implementation, traffic calming, parking, traffic impact and congestion management. Additionally, he has prepared many transportation policy and planning documents, including Pedestrian & Bicycle Master Plans and General Plan Circulation Elements. He has knowledge of several computer programs: AutoCAD, AutoCAD Civil 3D, Synchro, Highway Capacity Software, Google Earth/Maps and Microsoft Office Suite.

Project Experience

Magee Ranch Traffic Impact Study, Danville, CA (Lead Project Engineer). The Magee Ranch residential development required an extensive traffic impact analysis to evaluate the proposed Project’s impacts to the surrounding roadway network. To assess these impacts, Chris performed traffic operations analysis, and evaluated transit, bicycle and pedestrian access and safety. The project required an in-depth bicycle level of service (BLOS) analysis that would bring perspective to the existing state of bicycle operations in the study area and highlight how Project-traffic would affect them. The Study included data collection for vehicle, bicycle and pedestrian volumes as well as field verification of existing conditions.

Comprehensive Pedestrian & Bicycle Master Plan, Belmont, CA (Lead Project Engineer). The Comprehensive Pedestrian and Bicycle Plan (CPBP) was developed for adoption as part of Belmont’s General Plan Circulation Element through MTC Grant funding. The policy document includes purpose, goals and objectives, summary of existing (2015) conditions, community input and needs, a proposed citywide network and priority improvements list, and a recommended implementation and phasing program. Chris was responsible for assessing the City’s existing condition, including traffic volumes, bicycle and pedestrian network deficiencies, past collision history, and developing much of the document adopted by the City Council in November 2016.

Downtown Traffic Corridor Study and Design, Hollister, CA (Lead Project Engineer). In 2014, the City of Hollister performed a corridor study for San Benito Street, which was observed to have high speeds and cut-through traffic volumes through the downtown area. As lead project engineer, Chris and the team developed two alternative Complete Street designs to implement a road diet. Each was analyzed for operational effectiveness and scored against various selection criteria. Following
extensive outreach, the recommended alternative was accepted and approved for phased implementation in February 2015. Chris then developed signing and striping plans for the downtown portion of the corridor, which included reducing the number of travel lanes from four to two with a center median, minimizing lane widths, and implementing Class III bicycle facilities to promote accessibility and comfort.

**Transportation System Monitoring and CMP Update, Transportation Authority of Marin (TAM), Marin County, CA (Lead Project Engineer).**
TAM is the designated Congestion Management Agency (CMA) for the County of Marin, required to maintain a Congestion Management Plan (CMP) per California Government Code 65089. TAM is also required to monitor the implementation of all elements of the CMP and prepare a monitoring report every other year, which facilitates the CMP update allowing TAM and its member agencies to continue accessing federal and state funds. Chris lead the effort in developing the Monitoring Report providing perspective on various arterial and freeway segment performance throughout the County and assisting with key decisions on future transportation investments.

TAM elects to include extensive bicycle and pedestrian monitoring data during its biennial CMP update process to understand how past alternative transportation initiatives are performing as well as general biking and walking activity throughout the County. As lead project engineer, Chris was responsible for interpreting all collected data, including vehicle volumes, occupancy and travel times on the CMP roadway network, bicycle and pedestrian volumes at select County locations, and transit availability and ridership. In addition to traditional data collection methods, the 2014 Monitoring Report referenced commercially available data for the first time to validate its use for future efforts with reduced cost implications.

The data was analyzed to provide a state of operations on the designated CMP roadway network, comparing them to past monitoring efforts and identifying deficient locations. The Final Report document provided a comprehensive summary of the results using visual graphics to illustrate operating trends on Marin County's designated roadways and provided basis for development of the 2015 CMP Update for the County.

The biennial CMP Update is a State-required document identifying the CMP-designated roadway system in Marin County, system performance (including levels of service, transit ridership and bicycle and pedestrian activities), travel demand management strategies, land use analysis program, countywide travel demand model, capital improvements program, and conformance to existing State requirements. Chris was responsible for directing the Project team to achieve a complete CMP Update document that identified all aspects of the designated transportation system in Marin County.
Steven Au, PE
Signal Design - Support

Steven has in-depth experience in the preparation of Plans, Specifications, and Estimates (PS&E) for new/modified traffic signals systems, signing and striping, street lighting, traffic calming, construction zone traffic control, Intelligent Transportation Systems (ITS), park-and-ride design, transit center design, ADA requirements, and pedestrian safety and bicycle facilities projects. Steven is knowledgeable in the software applications related to design and traffic operations. He is experienced with AutoCAD, Synchro, and Traffix. His controller experience includes Econolite, BiTran, and NAZTEC.

Project Experience

Traffic Signal, Signing & Striping Design
✓ Prepare PS&E for traffic signal interconnect projects in Traffic Signal Design including San Tomas Expressway and Central Expressway, project engineer in Bridge Design for the Seismic Retrofit Program, Resident Engineer for traffic signal construction projects. Project engineer for LRT Feasibility Studies in Project Development which included JPB meetings and TAC meetings.
✓ Pacific Ave. at Robinhood Dr. Signal Modification, Stockton
✓ East Leland Road & Loveridge Road Signal Modifications, Pittsburg
✓ Corral Hollow Road Widening Improvements, Traffic Signals, and LED Lighting Project, Tracy

Traffic Studies, On-Call Engineering
✓ Lakeview Light Industrial Development Traffic Study, Fremont
✓ Union City Blvd. & Bettencourt Way Residential Development Traffic Study, City of Union City
✓ Capitol Grand Tower Development Traffic Study/EIR, Sacramento
✓ Ukiah Medical Office Building Traffic Study, Ukiah
✓ Vasco Crossing Traffic Study, Livermore
✓ Brookview Residential Development Traffic Study, Tracy

Safety Improvements
✓ HSIP grant projects for shoulder improvements for four rural roads, Uvas Road HSIPL-5937(190), Stevens Canyon Road HSIPL-5937 (188), Watsonville Road HSIPL-5937(199), and Clayton Road HSIPL-5937(189). Project engineer for sidewalk improvements near schools, East San Jose Pedestrian Improvements CML-5937(191). Other experience includes traffic investigation from County
Traffic Signals & LED Lighting

Resident, traffic signing requests, and traffic striping on County roads and expressways. Coordination with city staffs.

Other Projects

- Review of developer plans, resident engineer for roadway construction and roadway overlay, design engineer for County bridge design projects.
- Rural Road Audit, City of San Jose
Shruti Shrivastava
Traffic Control System and Signal Timing Lead

Shruti Shrivastava has 7 years of experience as a top-performing, quality-focused, & analytically driven engineering professional. Subject Matter Expert in signal coordination, traffic control systems, traffic operational analysis, transportation planning, parking studies, and simulation and modeling. She has extensive experience in macro and microscopic traffic simulation software's and model development and application. She has experience with a variety of software packages including Synchro, SimTraffic, SIDRA, VISSIM and HCS. Shruti is a strong cross-functional team leader that mentor’s junior engineers and inspires a culture of excellence. She has a track record of leading project teams to meet project scope, budget, and deadline. She is a detail oriented multi-tasker that quickly learns new systems, operations, and performance measures and thrives in both independent and team-centered environments.

Project Experience

19th Avenue and Fashion Island Boulevard Corridor Improvements Study, City of San Mateo, CA, 2019-2020, Task Lead & Engineer
The objectives of this project were to determine the feasibility of: improve vehicle progression and throughput, bridge widening, and conversion of 19th Avenue between South Delaware Street and South Grant Street-Ginnever Street from one-way street to two-way roadway. As a part of this project Shruti developed short-term (1-2 years), mid-term (3-5 years) and long-term (6-10 years) alternatives along with an implementation plan documenting level of impact, cost effectiveness and ease of implementation. Conducted data collection, origin-destination (OD) study, and evaluated existing and cumulative conditions level of service and delay analysis under no-build conditions and with proposed alternatives. Alternatives such as Reversible Lanes over the bridge, Synergistic Traffic Intersection (STI), intersection spot improvements and signal coordination were proposed.

Local Traffic Flow/Long Range Planning Solutions Study, Town of Atherton, CA, 2018-19, Task Lead & Project Engineer
This study evaluates existing traffic operations and origin-destination (OD) patterns within the Town of Atherton, recommends short- and long-term measures for efficient circulation, smooth progression, improved operations, and safety for all modes of transportation including auto, pedestrian, and bicycles; and provides recommendations concerning changes to the town’s transportation impact criteria and functional street classifications that guide street design priorities and standards.

Traffic Analysis for Realignment of Talmage Road, City of Ukiah, 2018, Project Manager
Evaluated alternatives for realignment of Talmage Road and prepared feasible conceptual design plans to improve existing traffic operations. Alternatives included evaluation of signal and roundabout options, realigning existing streetscape for improved circulation, traffic flow and bicycle/pedestrian safety.

Shruti@amobility.com | P: 925-393-4727
I-80/Gilman Street Interchange Improvement Project, Alameda County Transportation Commission, 2015-2017, Project Engineer: The objectives of this project were to simplify and improve navigation, mobility and traffic operations, reduce congestion, vehicle queues and conflicts, improve local and regional bicycle connections and pedestrian facilities, and improve safety at the I-80/Gilman Street interchange. The project evaluated study intersections under existing, opening year (2020) and design year (2040) scenarios. Additionally, the project evaluated potential lane geometry and traffic control modifications including designing roundabouts to improve operations at the ramp intersections and adjacent intersections along Gilman Street.

Transportation System Monitoring Report & CMP Update, Transportation Authority of Marin, 2016-17, Project Engineer
The County of Marin maintains a Congestion Management Plan (CMP) through the Transportation Authority of Marin (TAM), the designated Congestion Management Agency (CMA), as required by the California Government Code 65089. The project fulfills the biennial monitoring task as required by the State. Transportation System Monitoring Report provides an insight into the performance of various arterial and freeway segments, throughout the County, and assists with key decisions on future investment of transportation dollars.

Analysis of Electronic Tolling Implementation on 7 state-owned Bridges in San Francisco Bay Area (2016), Project Engineer
Evaluated feasibility of all electronic tolling and multi-payment toll lane systems. Created scoring system designed to integrate into existing toll structure across the state.

Sperry Road at Interstate 5 Improvements Project for Stanislaus County, Caltrans, and City of Patterson (2015), Project Engineer
Managed data collection, field review, development, and validation of traffic models according to Caltrans requirements. Recommended optimal lane configurations and traffic signal phasing’s and timings, conducted ramp metering, freeway mainline segment and ramp analyses. Prepared Traffic Operational Analysis Report (TOAR) and Intersection Control Evaluation (ICE) Reports for the project.

Additional Engineering Project Highlights
- Developed/evaluated alternatives for intersections, roadways, and freeway interchanges to improve traffic operations: Oyster Point Boulevard & E. Grand Avenue Improvements Project (City of South San Francisco), Golden State Boulevard Intersection Improvements (Stanislaus County)
- Performed multiple Origin-Destination Analyses: Pleasant Hill Road/Reliez Valley Road OD Study (Contra Costa County), Town of Atherton OD Study, Hayward Mission Boulevard Phase 3 (City of Hayward),
- Developed conceptual plans for multimodal improvements, short/long term mitigation measures for traffic operations, safety, and circulation; Alameda De Las Pulgas Corridor Study (Town of Atherton), Loyola Corners Feasibility Studies (City of Los Altos), SR 238 Corridor Improvements Project (City of Hayward)
Vishnu Gandluru
Transportation Engineer

Mr. Gandluru is a Transportation Engineer with a background in Transportation and Civil Engineering. His 16 years of experience includes signal timing and coordination, traffic impact studies, parking studies, engineering studies for residential neighborhoods, downtown areas and freeway ramps, freeway operations, traffic management plans, accident analysis, GPS-based travel time studies, traffic analysis for intelligent transportation systems (ITS) projects, Origin Destination studies, and travel demand modeling.

Project Experience

**Traffic signal timing and coordination**

**MTC PASS 2011-2012 Signal Timing Projects (9 signals), Various Jurisdictions, CA, MTC, 2011-12.** Performed travel time runs, developed existing and proposed Synchro traffic models, implemented signal timing (in-field and via TMC) and fine-tuned signals.

**MTC PASS 2010-2011 Signal Timing Projects (32 signals), Various Jurisdictions, CA, MTC, 2010-11.** Performed travel time runs, developed existing and proposed Synchro traffic models, implemented signal timing (in-field and via TMC) and fine-tuned signals.

**MTC 2008 Regional Signal Timing Program (RSTP), Foster City, CA, MTC, 2008-09.** Performed travel time runs, developed existing and proposed Synchro traffic models, implemented signal timing (in-field and via TMC) and fine-tuned signals.

**Citywide Signal Timing Project, Milpitas, CA, Western Pacific Signal, LLC, 2010-2011.** (40 signals) Project lead for performing travel time runs, developed existing and proposed Synchro traffic models, implemented signal timing through Naztec Streetwise® software and fine-tuned signals.

**Main Street and Boronda Road Traffic Adaptive Signal Coordination Project, Salinas, CA, City of Salinas, 2012-2013.** (7 signals) Project lead for conducting before and after travel time runs and prepared an evaluation report documenting benefit-cost ratio of adaptive signal coordination system provided by Insync®.

**Cypress Corridor Signal Coordination, Redding, CA, City of Redding, 2008.** (11 signals) Project lead for performing travel time runs, developed existing and proposed Synchro traffic models and implemented signal timing on-field followed by fine-tuning of timings.

**Charleston & Arastradero Adaptive Signal Coordination, Palo Alto, CA, City of Palo Alto, 2006-2007.** (11 signals) Project lead for conducting before and after travel time runs and prepared an evaluation report documenting benefit-cost ratio of adaptive signal coordination system provided by McCain software.

**Herndon Avenue & Willow Avenue, Clovis, CA, City of Clovis, 2004-2005.** (5 signals) Project lead for performed travel time runs, developed existing and proposed Synchro traffic models and implemented signal timing on-field.