



University Transportation Research Center
RFP Cover Sheet

Title: Intelligent Transportation Systems Resource Center (ITSRC)
Proposal Number: 2016-17
Sponsor: NJDOT
Date Issued: July 21, 2016
Pre-Proposal Meeting: None
RFP Due at NJDOT: August 26, 2016
RFP Closing Date: August 26, 2016

If you plan to apply:

Please contact Camille Crichton-Summers, (research.bureau@dot.nj.gov, 609-530-5637) with any questions. This is in lieu of a pre-submission meeting. Questions must only go to Camille Crichton-Summers and must be received by August 1, 2016.

If you plan to submit a proposal through UTRC, please notify us by email at peickemeyer@utrc2.org. Also please indicate whether you are open to teaming up with faculty at other universities on this project.

Proposal submission guidelines:

When you apply, please use the UTRC cover sheet for technical proposals and budget for NJDOT proposals, which are available at: <http://www.utrc2.org/resources>. Proposals must be submitted directly to NJDOT by the closing date.

Proposals must be prepared in accordance with NJDOT's Information and Instructions for Preparing Proposals. Please visit: <http://www.state.nj.us/transportation/refdata/research/pdf/techpropresproj.pdf>

For questions about budget preparation, contact: Penny Eickemeyer, peickemeyer@utrc2.org. Please note that matching funds will not be made available from UTRC for this project.

Please visit the NJDOT Research Website for important information about this RFP

http://www.state.nj.us/transportation/refdata/research/research_procurement.shtm

New Jersey Department of Transportation
Bureau of Research
RESEARCH PROJECT
Request for Proposal
2017-20 Program

Date of RFP
7/21/2016

Closing Date
8/26/2016

Intelligent Transportation Systems Resource Center (ITSRC)
Project No. 2016-17

(Proposals must be prepared in accordance with NJDOT's *Information and Instructions for Preparing Proposals*. Please visit: <http://www.state.nj.us/transportation/refdata/research/pdf/techpropresproj.pdf>
Revised Proposal Evaluation Forms are available for your information on the website.)

Proposals will be based on the merit of the information contained in the proposal. Budgets will be evaluated separately. Please place three (3) copies of the budget for this project in a separate sealed envelope.

1 - RESEARCH PROBLEM STATEMENT, BACKGROUND, AND OBJECTIVES

1-1. Purpose. This Request for Proposal (RFP) provides to those interested ("Universities") in submitting proposals for the subject procurement sufficient information to enable them to prepare and submit proposals for the New Jersey Department of Transportation's (NJDOT's) consideration on behalf of the State of New Jersey to satisfy a need for the Project.

1-2. Issuing Office. The Bureau of Research ("Issuing Office") has issued this RFP on behalf of the NJDOT. The sole point of contact in the NJDOT for this RFP shall be the Research Bureau Manager ("Issuing Officer"), Camille Crichton-Sumners, Bureau of Research, NJDOT 1035 Parkway Avenue Trenton NJ 08625, Research.Bureau@dot.nj.gov. Please refer all inquiries to the Issuing Officer.

1-3. Scope. This RFP contains instructions governing the requested proposals, including the requirements for the information and material to be included; a description of the service to be provided; requirements which Universities must meet to be eligible for consideration; general evaluation criteria; and other requirements specific to this RFP.

1-4. Problem Statement.

The New Jersey Department of Transportation (NJDOT) is seeking a qualified University to run the Intelligent Transportation Systems Resource Center (ITSRC) Program, and assist with its continuation and support in improving, applying and implementing a comprehensive ITS and Transportation Systems Management and Operations (TSM&O) strategy that maximizes technology advancement, deployment and research performance effectiveness, human and capital resource utilization to improve safety, mobility, and traveler information for the motoring public.

ITSRC will address core elements and undertake new research, planning, outreach, training, technology transfer and other activities.

1-5. Type of Contract. It is proposed that if the Issuing Office enters into a contract because of this RFP, it will be a **Cost Reimbursement, Deliverable based** contract containing the Standard Contract Terms and Conditions. The Issuing Office, in its sole discretion, may undertake negotiations with one or more Universities whose

proposals, in the judgment of the Issuing Office, show them to be qualified, responsible, and capable of performing the Project.

1-6. Disadvantaged Business Information. The New Jersey Department of Transportation is committed to providing opportunities for Disadvantaged Business Enterprises to compete for work. To support this commitment, there is a goal of twelve point four nine percent (12.49%) of the total contract dollar amount set for this RFP.

It is suggested that you utilize organizations certified by NJDOT's DBE Unified Certification Program (NJ UCP) as listed on the NJDOT webpage.

1-7. Best and Final Offers.

- A. While not required, the Issuing Office reserves the right to conduct discussions with Universities for obtaining "best and final offers." To obtain best and final offers from Universities, the Issuing Office may do one (1) or more of the following, in any combination and order:
 - 1. Schedule oral presentations;
 - 2. Request revised proposals;
 - 3. Enter into pre-selection negotiations.

- B. The Evaluation Criteria found in Part 2, Section 2-4, shall also be used to evaluate the Best and Final offers.

1-8. News Releases. Universities shall not issue news releases, Internet postings, advertisements, or any other public communications pertaining to this Project without prior written approval of the Issuing Office and then only in coordination with the Issuing Office.

1-9. University Representations and Authorizations. By submitting its proposal, each University understands, represents, and acknowledges that:

- A. All of the University's information and representations in the proposal are material and important, and the Issuing Office may rely upon the contents of the proposal in awarding the contract(s). The Department shall treat any misstatement, omission, or misrepresentation as fraudulent concealment of the facts relating to the Proposal submission.

- B. The University has arrived at the price(s) and amounts in its proposal independently and without consultation, communication, or agreement with any other University or potential University unless it's a joint proposal.

- C. The University has not disclosed the price(s), the amount of the proposal, nor the approximate price(s) or amount(s) of its proposal to any other firm or person who is a University or potential University for this RFP. The University shall not disclose any of these items on or before the proposal submission deadline specified in the Calendar of Events of this RFP.

- D. The University has not attempted, nor will it attempt, to induce any firm or person to refrain from submitting a proposal on this contract, or to submit a proposal higher than this proposal, or to submit any intentionally high or noncompetitive proposal or other form of complementary proposal.

- E. The University makes its proposal in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive proposal.

- F. To the best knowledge of the person signing the proposal for the University, the University, its affiliates, subsidiaries, officers, directors, and employees are not currently under investigation by any governmental agency. The aforementioned representative(s) have not in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding or proposing on any public contract, except as the University has disclosed in its proposal.
- G. To the best of the knowledge of the person signing the proposal for the University and except as the University has otherwise disclosed in its proposal, the University has no outstanding, delinquent obligations to the NJDOT including, but not limited to, any state tax liability not being contested on appeal or other obligation of the University that is owed to the Department.
- H. The University is not currently under suspension or debarment by the NJDOT, any other state or the federal government, and if the University cannot so certify, then it shall submit along with its proposal a written explanation of why it cannot make such certification.
- I. The University has not made, under separate contract with the Issuing Office, any recommendations to the Issuing Office concerning the need for the services described in its proposal or the specifications for the services described in the proposal.

2 - PROPOSAL REQUIREMENTS

2.1. Please visit: <http://www.state.nj.us/transportation/refdata/research/pdf/techpropresproj.pdf> for the proposal submission requirements. Proposals **shall not** be accepted without fulfilling the requirements in the document.

2-2. Objections and Additions to Contract Terms and Conditions. The University will identify which, if any, of the terms and conditions it would like to negotiate and what additional terms and conditions the University would like to add to the standard contract terms and conditions. The University's failure to make a submission under this paragraph will result in waiving its right to do so later, but the Issuing Office may consider late objections and requests for additions if to do so, in the Issuing Office's sole discretion, would be in the best interest of the Department. The Issuing Office may, in its sole discretion, accept or reject any requested changes to the standard contract terms and conditions.

The University shall not request to completely substitute its own terms and conditions nor request changes to the other provisions of the RFP. All terms and conditions must appear in one (1) integrated contract. The Department reserves the right to select more than one Institution of Higher Education. The Issuing Office will not accept references to the University, or any other, online guides or online terms and conditions contained in any proposal.

Regardless of any objections set out in its proposal, the University must submit its proposal, including the separate sealed cost proposal, based on the terms and conditions of the contract. The Issuing Office will reject any proposal that is conditioned on the negotiation of the terms and conditions set out in the contract or to other provisions of the RFP as specifically identified above.

2-3. Disadvantaged Business Enterprise (DBE) Involvement. Provide detailed information describing the NJDOT DBE Unified Certification Program (NJDOT UCP) certified DBE. Include the business name of the DBE with the address, contact person, phone number, the NJDOT DBE Unified Certification Program (NJDOT UCP) certification number, a detailed narrative of the services to be provided, and the percent of the proposal's total cost to be contractually allocated to the DBE. No cost information can be displayed in the technical proposal.

Physical certification letters and/or expiration dates should not be requested from DBE certified firms. DBE certification does not expire. If no DBE is qualified, available, or willing to participate, the contractor must provide detailed, verifiable information describing the good faith effort made to locate a DBE. If the good faith effort is determined to be unacceptable, the proposal may be disqualified or other action taken.

2-4. Criteria for Selection. Please see the NJDOT Research Process for Review and Evaluation of Proposals at <http://www.state.nj.us/transportation/refdata/research/pdf/researchprocess.pdf>.

3 - WORK STATEMENT

The ITS Resource Center was established by the New Jersey Department of Transportation in 2008 to utilize extensive technological resources and expertise of academia and their research partners in assisting NJDOT towards developing and implementing a comprehensive Intelligent Transportation Systems (ITS) management strategy. New Jersey recognizes it cannot solve most congestion issues by expanding roadways. ITS is a means of optimizing utilization of existing capacity for harmonized throughput and overall efficiency of the transportation network without the challenges of extensive right of way (ROW) needs for roadway widening; most improvements are made within the existing ROW. With limited resources and a challenging atmosphere for road widening, the focus has shifted to getting more utilization of existing capacity through deployment of 'smart technology,' better known as ITS, accompanied by enhanced incident management operations and intensive special event operations. Moreover, these new transportation technologies and tools create additional opportunities for emission and crash reductions, if they are researched, planned and implemented strategically.

The Resource Center consists of a collaborative and comprehensive program (Program) that has developed into a premier statewide resource for NJDOT's planners and engineers regarding the improvement of ITS and Transportation Systems Management and Operations (TSM&O). The program includes researching state-of-the-art ITS practices and provide expertise in developing, implementing, and evaluating innovative ITS applications, Incident Management response, coordination and training, innovative business processes, planning and management strategies, agency collaboration and information exchange. It also is a comprehensive resource for data and models necessary for generating reliable measures of system performance to be used in developing and supporting decision making processes, providing technical research, cutting-edge education and knowledge transfer necessary to support the Department in improving safety, mobility, and efficiency of New Jersey's surface transportation systems. The Program also provides ITS technology, research, planning and pilot deployment support as appropriate in the Department where it may assist in advancing the Department's overall mission of improving lives by improving transportation.

The overall goal is to enhance NJDOT's Transportation Systems Management & Operations goals through the research of available cutting-edge ITS resources through technology assessment, evaluation of ITS implementation strategies and scenarios, applications of advanced modeling and simulation tools for corridor planning and management, evaluation of emerging concepts, applications and technologies, and technology transfer. Moreover, this Program is a resource available through the NJDOT to facilitate partnerships between federal and state transportation agencies, metropolitan planning organizations, transit operations, academia, private industry, and other entities that promote and advance implementation of ITS technologies for New Jersey's transportation system. This partnership is reflected in the involvement of these entities on a regular basis.

3-1. Research Objectives

The objective of the ITS Resource Center Program is to identify, enhance, guide and strengthen the State's direction and decision making in the activities of NJDOT Transportation Systems Management. Since its inception, the Program has conducted these types of core activities:

1. Applied studies and program evaluation/analyses;
2. Concept of Operations documentation
3. Training and education;
4. Operations Center evaluations and improvements
5. Incident management Safety Service Patrol and Incident Management Response Team assessments, improvements, research and deployments
6. Technical and Executive Management assistance; and
7. Outreach and information dissemination

The activities above were achieved by maximizing the use of resources, identifying often-changing needs and technologies, managing performance, and supporting integration of activities with other Departmental programming and decision-making efforts. These activities specifically focused on technology assessments, operational tests, planning and research studies, development of new technology applications, testing deployments of new technologies, scenario development, pilot studies, evaluation of ITS implementation strategies, application of advanced transportation and traffic modeling tools, maintaining and upgrading the ITS information database, outreach, education, and technology transfer. These efforts ensured that the Department made and continues to make appropriate decisions in investing in the most effective ITS applications and deployments, which maximizes benefits to the traveling public.

This robust program has begun to move the Department forward in a strategic, well-documented and effective manner in technology advancements to improve surface transportation and benefit all road users. However these technologies are rapidly developing and new processes, management tools, and applications continue to emerge. Many TSM&O technologies and processes recently identified require additional refinement, design and systems engineering, performance assessment and/or evaluation to assist the Department in developing appropriate strategies. It is envisioned that some of the tasks listed below will aid in the implementation of others in a carefully executed program.

The ITSRC proposed work program will address the core items above and undertake additional items, for an overall combined TSM&O program which will:

1. Conduct Annual Best Practices Reviews
2. Support implementation of the NJDOT ITS Strategic Deployment Plan and Emerging Technology Policies
3. Provide ITS and TSM&O Training and Technology Transfer and Outreach for NJDOT and Other Agencies
4. Provide support to NJDOT for data analysis, tools, research and solutions for TSM&O and transportation planning and operations application
5. Support Planning and Capacity Building For Effective Traffic Operations and Integration of Arterial and Freeway Management
6. Conduct and Implement Work Zone and Related Mobility Monitoring Research and Evaluation
7. Provide Technical and on-call support for Technology Evaluation and Deployment
8. Conduct ITS Feasibility, ConOps and Concept Development and System Requirement Studies for ITS And TSM&O Pilot Applications
9. Provide Program Management/Communication Protocol and Methodology for Technical Leads

3-2. Tasks

[Provide a listing of appropriate general tasks divided into phases based on types of work (e.g., laboratory, field) or by year (e.g., year 1, year 2) or other appropriate milestones]

The NJDOT is seeking the insight of proposal responders on how best to achieve the research objectives. Proposers are expected to describe a research effort that can realistically be accomplished as expeditiously as possible. Proposals must present the proposers' current thinking in sufficient detail to demonstrate their understanding of the problem and the soundness of their approach for conducting the required research.

PHASE I – Literature Search

Conduct a literature search of the current state of the practice.

After the award of the project, a more comprehensive literature search should be conducted. At the completion of this literature search, the PI may be asked to make a presentation to the Research Project Selection and Implementation Panel to discuss their findings and to discuss the appropriate research approach.

PHASE II – Research Approach and Anticipated Results

Clear description of how you will solve the problem and implement anticipated findings. Work may be divided into phases (e.g., Laboratory, Field or Year 1, Year 2) as necessary to clarify tasks. *Exit Criteria* must be developed during this phase.

Task 1: Best Practices Research and Strategic Planning/Policy Development

TSM and ITS techniques, technologies, policies, regulatory environments and practices continue to rapidly change. To assist NJDOT in adopting practices and technologies to respond to these changing landscapes and to address relevant emphasis areas identified in federal transportation legislation, conduct high level Best Practice national/international scans annually for:

- A. All Departmental-related traffic operational and deployment aspects including Traffic Incident Management, Safety Service Patrol, Central Dispatch, Incident Management Response Team and Traffic Operations Centers, and related software and technologies; Comprehensive TSM&O Management Systems incorporating elements of Mobility Systems Engineering, management systems, freight management, smart cities technologies, financial and capital management and mobility systems engineering and related deployment aspects including arterial management, traffic management plans (TMP), other work zone (WZ) practices and technologies in a national/international scan. Review and recommend improvements, focusing on the use of ITS and TSM&O technologies and strategies; best practices relating to a traffic operations center (TOC) evaluation and improvement program that reviews and incorporates best practices from around the country.
- B. Develop a recommendation for a comprehensive and formal *TSM&O Management System* that incorporates appropriate measures and elements of TSM, MSE, and Traffic Operations to provide input to other Departmental functions. Utilize lessons learned in Best Practices scan. Propose an implementation methodology to include a feedback-loop with a given time frame, and updates. Propose means to connect this new Management Strategy with the NJDOT ITS Strategic Deployment Plan (SDP) as well as Departmental capital programming.
- C. Support Implementation of NJDOT ITS Strategic Deployment Plan (SDP), and related policy research to ensure updates and communication with multiple Department units occur and the SDP moves forward towards identified goals. Propose process for improving integration with Capital Investment, Statewide

Planning, Traffic, and Capital Program units, and incorporate freight-planning ITS components into the SDP for traditional and emerging applications such as Weight-in-Motion Systems (WIMS) and other ITS-related freight technologies. Research, quantify and support the tools, techniques and outreach as appropriate for ITS and Transportation Systems Management and Operations (TSM&O) strategies and technologies as identified in the current SDP for consideration in the transportation planning, capital programming and project delivery processes to improve integration of planning and operations and document recommendations.

- D. In concert with TSM&O statewide partners, as well as within the Department, contribute to the development, planning, evaluation, adoption, training and implementation of the Connected Corridor and the Capability Maturity Model (CMM) frameworks and plans for New Jersey.
- E. Promote TSM&O successes within and external to the Department by creation of website concept and execution, to be eventually incorporated and regularly updated as part of the Department's Internet site, Identify methodology for making a business case for the benefits of TSM&O in NJ.
- F. Assist in integration of performance-based planning and programming concepts in deployment plans for ITS and TSM&O strategies, and as part of the Smart Growth Investigative Team and related statewide planning efforts such as the Long-Range Plan update, congestion management support, and tool selection. Create draft 'report card' type approach of TSM benchmarks of potential interest to NJ roadway users and set up transferable database to automatically extract information into said Report Card utilizing already-identified performance measures and ones anticipated to be incorporated in the *TSM&O Management System*. Include available and emerging technologies users are interacting with on roads as well as behind the scene or less noticeable improvements TSM&O utilizes to improve transportation, special event related traffic, and minimize impacts of major roadway construction projects. Support, document and participate in TSM&O programs and outreach initiatives such as the ITS SDP update process, Complete Team, Connected Corridor, and Statewide ITS Architecture in collaboration with NJDOT, FHWA, MPO, and other stakeholders.

Task 2. Develop and Conduct TSM&O and ITS Training, Technology Transfer and Outreach

Develop and execute an overall ITS/TSM&O annual plan for training in specific areas of traffic management and operations that builds upon training to date to enhance the effectiveness of NJDOT and local agency incident management-related personnel. Provide ITS and TSM&O training and technology transfer and outreach for NJDOT and other agencies, a critical measure in the rapidly changing and emerging technology of traffic operations and management. Provide these opportunities to all areas of the Department performing activities related to ITS. Ensure adequate training so all existing and new personnel have appropriate levels of utilization of technologies, software and other tools they utilize. A full range of Peer-to-Peer, in-person instruction, workshops, webinars etc. and technology transfer training opportunities should be included. Arrange for invitations, attendance tracking and certificate distributions. As appropriate arrange for in-field workshops to apply classroom learning on-site. Provide all attendees with detailed training documentation.

Task 3. Data Analysis Tools, Solutions and Research to Support TSM&O and Transportation Planning for Operations

- A. Conduct research, and develop a framework for collecting and assessing best methodologies for extraction, analysis and utilization of data for performance measure criteria. Provide assistance, research and technical support for data acquisition, integration, analysis, innovative solutions, performance measure evaluation, reporting, and visualization for transportation planning and operations, including smart city data needs, for data synthesis/engines for real-time optimization,

situational awareness and predictive analytics as needed. Support collaboration internal and external through various committees.

- B. Conduct research and develop a framework for utilization of mobile data collection from Departmental, partner agency and external sources. Consider use of DOT fleet for pilot application: traffic, weather, infrastructure condition data, etc.

Task 4. Traffic Operations Capacity Building and Integration of Arterial and Freeway Management

- A. Collect information and practices from other existing TOCs and Central Dispatch Centers (CDU) and conduct traffic operations and CDU research studies to evaluate technical, logistical and human capital requirements and scheduling for optimal 24-hour functionality, taking into account NJ's unique traffic operation parameters. Develop Concept of Operations design and propose process for testing and implementation. Develop a methodology for deployment of improvements.
- B. Research and develop a formal Safety Service Patrol (SSP) Program that considers national best practices and encompasses multiple parameters and culminates in an easily updatable Operational Manual, utilizing accepted national guidelines. Provide manual and training. Conduct and create concept of operations for utilization of permanently installed cameras on SSP trucks and Incident Management Response Team (IMRT) vehicles.
- C. Develop a program that conveys the Safe Passage regulations in a pictorial or multi-lingual sign format for placement along roadsides; evaluate placement locations and design options that maintain any regulatory compliance requirements.
- D. Evaluate the feasibility of combining arterial management center operations with freeway operations at the TOCs, and recommend best practices for integration/communication protocols. Develop pilot to test and evaluate impacts to overall operations. Include technology, human capital, communications, technology transfer and locational components. Develop protocols for signal timing, ramp metering (if in effect), hard shoulder running, ATM, and other tools for modification during emergencies, weather and special events, and major incidents.
- E. Evaluate the performance of NJDOT Traffic Incident Management (TIM) programs and provide recommendations for program improvements. Building on the existing adopted statewide TIM plan and related working group input, recommend and update the existing adopted plan through plan updates, Statewide Committee review and comment, and adoption. Expand and foster interagency coordination and enhance collaboration and communication among the agencies participating in traffic incident management.
- F. Assess capabilities of current practices of traffic operations (weekly calls, TMP reviews, etc.) with other Departmental functions (construction for ex.); test and recommend optimized practices.

Task 5. Work Zone and Related Mobility Monitoring and Improvement Research

- A. Conduct interactive review of best practices with iterative feedback loop to test and improve work zone monitoring utilizing National Operations Center of Excellence (NOCoe) and other nationally accepted measures.

- B. Develop work zone monitoring programs for utilization in evaluating WZ ITS strategies. Test usefulness in pilot applications as an online application with a backend database. Program to include instrumentation of select work zones in order to collect background data in support of development, testing and evaluation of mid- and long-term work zone management plans. Reference FHWA WZ ITS Implementation Guide for defining project needs assessment, deployment of appropriate WZ ITS data collection, performance measures and effective WZ management.

Task 6. Technical Support for Technology Evaluation and Deployment

- A. Provide Technical Support for Technology Evaluation and Deployment: Conduct innovative ITS technologies and TSM&O strategies pilot research and deployment studies and assess feasibility of implementing, costs and effectiveness for traffic operations, incident management, traffic and related surveillance, data collection, and related areas. Propose researched and structured guidelines and specify methodologies to be utilized for technology evaluations in a systematic manner, – including costs and life-cycle maintenance, implementation considerations and recommendations (as appropriate). Such research will include but not be limited to available and emerging technologies as follows:
1. Connected vehicle (CV) technologies and vehicle/highway automation pilot studies; incorporate CV/AV evaluations for freight/trucks, paratransit as applicable, in addition to passenger vehicles. Utilize FHWA Vehicle to Infrastructure (V2I) guidance and products to ensure interoperability, efficient and effective planning, procurement and operations. Also utilize/reference FHWA CV Reference Implementation Architecture to ensure appropriate use of CV Standards regarding software programming (codes, definitions, formats) to create interoperable, consistent and seamless communication data exchange;
 2. Connected and automated vehicle policy research and deployment/utilization of for NJ, relating to requirements for in-state test bed locations, on-road testing, and develop recommendations for regulations/legislation necessary to safely implement operating same for pilot tests within the state of NJ;
 3. Unmanned aerial vehicles (UAV) (drones) for remote traffic video surveillance, incident management surveillance, bridge inspection and evaluation, Light Detection and Ranging (LiDAR)-Assisted accident site reconstruction, WZ and special event reconnaissance, and UAV to Vehicle or other communication center, and incorporating appropriate federal regulatory compliance;
 4. On-call support to NJDOT related to ITS technology research, evaluation and potential deployment of pilot applications including pilots for arterial and corridor management.
- B. Traffic simulation and analysis models as needed to evaluate and test modifications to existing traffic engineering practices/solutions utilizing existing and emerging technologies.
- C. Video analytics pilot studies and test proposed technologies, applying earlier lessons learned

Task 7: Conduct ITS Feasibility Studies, Concepts of Operations, and System Requirement Studies for ITS and TSM&O Pilot Applications

Follow the Federal and Regional systems engineering process ('V diagram') and the ITS Architecture for all of the following tasks, and provide recommendations and lessons learned based upon outcomes for:

- A. Conduct high-level concept of operations (ConOps) studies, including for the following potential applications utilizing the FHWA Regional ITS Architecture by following the systems engineering process ('V diagram') and the ITS Architecture:

- a. Conduct Active Traffic Demand Management (ATDM) studies
 - i. Following up on earlier ATDM research as well as applicability for utilizing additional ATDM strategies and concepts or in additional locations.
 - ii. Additional ATDM research in truck parking, parking demand management and other potential pilot deployments
 - b. Conduct advanced signal control and advanced traffic management systems (ATMS) ConOps and research. Propose and test algorithms and strategies to improve operations on priority signalized (arterial) corridors.
 - c. Conduct advanced Integrated Corridor Management (ICM) development and design studies to enhance the current systems. Build on ongoing studies to maintain communication and mutually-agreed system protocols. Propose and test pilot applications and measure mobility, reliability, efficiency and safety across multiple travel modes to assess traveler benefits and options in real-time.
- B. In this task, for each activity where a high-level ConOps effort was completed, develop more detailed and refined System Requirements Specification studies for completed ConOps studies, including the high-level ConOps for the ICM effort along the I-495 corridor begun in the 2015-2016 Program. Ensure the needs identified in the ConOps are satisfied and that all applicable ITS Regional Architecture standards are met. These pilot efforts are intended to test and improve on results utilizing the systems engineering V-diagram process as well as integrate multi-agency communication/outreach to support successful long term utilization. Develop high-level system design documentation to define the overall system framework, detailed design specifications for system components and integration, verification and validation plans. Use the FHWA recommended Regional ITS Architecture and Systems Engineering processes for ITS project development and planning to ensure project/user needs, institutional agreement, technical integration and requirements are met.
- C. As part of the V-diagram systems engineering process, develop and test traffic demand and other traffic models, and conduct simulations for testing select ITS and TSM&O applications. This step involves data collection, simulation development, research and selection of appropriate modeling options, model evaluation of impacts, and analysis of operational strategies, identifying those strategies best suited to meeting stated goals established earlier in the V-diagram process. Ensure all recommended Regional Architecture and Systems Engineering processes are utilized and requirements met.

Task 8. Program Management

- A. To ensure satisfactory progress this task is integral to overall program success and covers all contract/technical management responsibilities to ensure all activities are undertaken as well as possible and within the parameters of the Basic Agreement and awarded Task Order. Select and identify a single individual to be sole source of contact with technical Department management and contract management. Describe communication protocol that will ensure all communication is conducted with the involvement of this individual and their technical TSM&O counterpart. Also provide management/communication protocol and methodology for technical leads in completing activities. Provide copies of any/all subcontracts/scopes and describe quality assurance measures that will be utilized to ensure timely deliverables receipt.
- B. Meet with TSM&O technical staff management as appropriate, at a minimum once a month for management meetings. Attend conference call and technical activity meetings to review current progress, discuss and resolve obstacles as needed. This monthly progress meeting is separate from technical activity meetings. Propose options for resolving management, contractual or deliverable obstacles to ensure agreed upon deadlines can be maintained. Take and prepare brief meeting summaries to identify action items, outcomes, next steps and deliverables for all meetings and provide same to

TSM&O with maximum a one-week turnaround after the meeting. Oversee preparation of technical reports and provide quality control. Schedule and plan deliverable schedules with ample time for Departmental review, revision and approval. Ensure that the Department staff are aware of all communications at appropriate decision points, including communications with sub-consultants. Explain methodology to ensure schedules provided are adhered to and detail staff support needed to ensure timely completion of all work program tasks. Assist in preparations for meetings with Department/FHWA staff in reporting progress.

3-3. Implementation and Training Plan

The PI must meet with the Research Project Selection and Implementation Panel (RPSIP) and other NJDOT units to present the findings and as appropriate train these personnel in the use the project results.

The PI will develop an implementation plan as per the guidelines provided by NJDOT Research Bureau. All training shall be provided by licensed personnel on the subject matter. The training hours should count toward PDHs where feasible.

3-4. Emergency Preparedness: To support continuity of operations during an emergency, including a pandemic, the Department needs a strategy for maintaining operations for an extended period. One part of this strategy is to ensure that essential contracts that provide critical business services to the Department have planned for such an emergency and put contingencies in place to provide needed goods and services.

1. Describe how you anticipate such a crisis will affect your operations.
2. Describe your emergency response continuity of operations plan. Please attach a copy of your plan, or at a minimum, summarize how your plan addresses the following aspects of pandemic preparedness:
 - a) Employee training (describe your organization’s training plan, and how frequently your plan will be shared with employees).
 - b) Identify key employees (within your organization) and their essential business functions.
 - c) Identify contingency plans for:
 - i. How your organization will handle staffing issues when a portion of key employees are incapacitated due to illness.
 - ii. How employees in your organization will carry out the essential functions if contagion control measures prevent them from coming to the primary workplace.
 - d) Explain how your organization will communicate with staff and suppliers when primary communications systems are overloaded or otherwise fail, including key contacts, chain of communications (including suppliers), etc.
 - e) Explain how and when your emergency plan will be tested, and if the plan will be tested by a third party.

3-5. Deliverables

- Discussion to Support and Refine the Project Tasks
- Presentation of Summary of Literature Search Results
- Sketch planning and other analytical tools as required by each activity/task; ITS specific architecture per FHWA and region standards.
- Project work plan. A work plan for each task that identifies the work elements of each task, the resources assigned to the task, and the time allotted to each element and the deliverable items to be produced. Where appropriate, a PERT or Gantt chart display should be used to show monthly/ quarterly project,

task, and time relationship. Please follow the Figure 1 at a minimum for each proposed year of the project and total life of the project.

- Include a fee proposal breakdown (Figure 2, below) for each proposed year of the project and total life of the project, in addition to the NJDOT: Bureau of Research budget preparation guidelines.
- Monthly Time Line Chart With Corresponding Activities and Deliverables
- Meeting Minutes of All Meetings Conducted With Customers, Research Project Manager (RPM) and Other Project Stakeholders Submitted Electronically Within 48 Hours of Meeting
- Quarterly Reports in the Latest Format Version Provided to RPM and Customers Via Email Three (3) Weeks Prior to Annually Scheduled Research Bureau Quarterly Meeting Schedule
- Technical memorandum on the measures that are working or not working
- Technical memorandum and presentations on status of activities and modifications of activities if requested
- Interim Status reports suitable for Senior Leadership if required
- Draft Final Report and Draft Tech Brief is Due in Hard Copy and Electronic Format to the Customers and RPM three (3) months before the end date of the Project Contract for Review, Comments and Incorporation of Comments
- **Final Report Package:** Final Report and Tech Brief, with Appropriate Tables, Graphs and Charts in Hard Copy Version, PDF File Format, Word, and on CD ROM in Accordance With the Latest Version of the "Guidelines for Preparing NJDOT Research Final Reports and Tech Briefs", are due prior to final invoice submittal of the project to allow time for review by the Research Project Selection and Implementation Panel. The Final Acceptance will be granted upon receipt of two copies plus one per Research Project Selection and Implementation Panel (RPSIP) member of each presentation, technical memorandum, draft final report, and Final Report (plus 10 copies).

4 - CONTRACT TIME

The PI must provide the anticipated research study duration based on the proposed tasks. Consideration should be given to potential impediments so that adjustments are incorporated into the schedule minimizing the need for time extensions. Please be advised that going forward, new task orders having permissible justification will be allowed no more than one time extension with the advent of 2 CFR 200.

A 48 month time frame would be preferred.

5 - CONTACTS

In lieu of a pre-proposal meeting interested parties shall send all questions related to this RFP to the Research Manager prior to August 1, 2016. Questions on this topic **shall not** be directed to any Research Project Manager, Research Customer, or any other NJDOT person. All questions are to be directed to Camille Crichton-Summers by sending an e-mail to Research.Bureau@dot.nj.gov or by phone (609-530-5966).

6 - DEADLINE

**Proposals (10 single-bound copies) are due at the NJDOT Bureau of Research
no later than 5:00 p.m. on August 26, 2016**

Authorization to Begin Work: January 01, 2017

PROPOSAL DELIVERY INSTRUCTIONS:

For private, paid messenger services such as Federal Express, DHL, UPS, etc., or for hand-carried deliveries:

2016 PROPOSAL-NJDOT
New Jersey Department of Transportation
Bureau of Research
1035 Parkway Avenue
Trenton, New Jersey 08625-0600

For U.S. Postal Service mail:

New Jersey Department of Transportation
ATTN: Camille Crichton-Summers
Manager, Bureau of Research
P.O. Box 600
Trenton, New Jersey 08625-0600

PROJECT SCHEDULE (SAMPLE)

Project Title	Detection of Damage Precursors in Steel Components for Life-Cycle Assessment																							
Project No.	2016-09																							
Principal Investigator																								
	MONTHS																							
RESEARCH TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Task 1																								
	10	25	45	75	100																			
Task 2																								
			25	50	75	100																		
Task 3																								
		10	20	30	50	60	80	90	100															
Task 4																								
										25	50	75	100											
Overall % Complete																								
Projected	7%	18%	26%	45%	58%	70%	75%	83%	88%	94%	97%	100%	This row represents projected overall progress.											

Figure 1: Sample Project Schedule



BUREAU OF RESEARCH

Fee Proposal Breakdown		NJDOT Bureau of Research University Task Order for:																
		Name of Research Study																
		Name of Institution																
		Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		Task 7				
Name	Title	Hrly Rate	Hours	\$	Hours	\$	Hours	\$	Hours	\$	Hours	\$	Hours	\$	Hours	\$	Total Hrs	Total \$
Faculty 1	Professor			\$0.00		\$0.00		\$0.00		\$0.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$ -
Faculty 2	Associate Professor			\$0.00		\$0.00		\$0.00		\$0.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$ -
Graduate Assistant	Supporting Role			\$0.00		\$0.00		\$0.00		\$0.00	0	\$0.00	0	\$0.00	0	\$0.00	0	\$ -
Total Hours and Direct Labor Cost			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fringe Benefits:																		\$0
B: Fringe Benefit rates 1	0.00%																	\$ -
B: Fringe Benefit rates 2	0.00%																	\$ -
B: Fringe Benefit rates 3	0.00%																	\$ -
Direct Expenses (Itemize and explain in detail)																		
Supplies	Name all the supplies Used in the Quarter with unit cost and Quantity																	
Travel	Breakdown the travel according to mileage																	
Tuition	Breakdown needed for tuition																	
Subcontract Expenses																\$0		
Subcontract 1																		
Subcontract 2																		
Total Direct Expenses																\$0		
Indirect Costs/Overhead																\$0.00		
Grand Total																\$0		

Figure 2: Sample Fee Proposal Breakdown