



**COMMONWEALTH OF VIRGINIA
VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT)
ADMINISTRATIVE SERVICES DIVISION
1201 E BROAD STREET
RICHMOND, VIRGINIA 23219**

Note: To the extent allowed by law, this public body does not discriminate against faith-based organizations in accordance with the Code of Virginia, § 2.2-4343.1 or against a bidder or offeror because of race, religion, color, sex, national origin, age, disability, sexual orientation, gender identity, political affiliation, or status as a service disabled veteran or any other basis prohibited by state law relating to discrimination in employment. VDOT is committed to increasing procurement opportunities for small and micro businesses, including small or micro businesses that are owned by minorities, women, or disabled veterans, and strengthening the Commonwealth's overall economic growth through the development of its IT Offerors.

REQUEST FOR PROPOSAL 156859-RFP

Project Name: ***Artificial Intelligence-Based Decision Support System (AI-DSS) for Enhancing Transportation Incident Management***

Issue Date:	February 2, 2022
Due Date/Time:	March 30, 2022, 2:00 PM Eastern
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1. INTRODUCTION

A. Request for Proposal Objective

The purpose of this Request for Proposal (“RFP”), issued by the Virginia Department of Transportation (“VDOT”), is to select a qualified Offeror to implement, deploy, and operate an **Artificial Intelligence-Based Decision Support System (“AI-DSS”) for Enhancing Transportation Incident Management in Northern Virginia (“NoVA”) and Metropolitan Fredericksburg**. Release of this RFP is the second step in a two-tiered competitive procurement process. In the first step, Offerors were invited to respond to a **Request for Qualification (“RFQ”)** by submitting an **Expression of Interest (“EOI”)**. A subset of Offerors, drawn from those submitting EOIs, were then pre-qualified/short-listed to compete to deploy this AI-DSS initiative. Now those Offerors who have been pre-qualified/short-listed will have the opportunity to respond to this RFP with full technical and pricing proposals.

Only those Offerors that received a signed letter from the VDOT Contracting Officer stating the Offeror has been pre-qualified/short-listed to respond to RFP No. 156859 and capable of meeting the “**Must-Have**” factors of this solicitation (see Section 3 Subsection B) may respond to this request-for-proposal. The VDOT Evaluation Team will review and score proposals in accordance with the evaluation criteria established for this RFP. Scores from the EOI assessment will not factor into the evaluation of the responses to this AI-DSS RFP. VDOT will award a contract to the Pre-Qualified Offeror who has made the best proposal and provides the best value to the Department and the Commonwealth.

In this document, “Pre-Qualified Offeror” refers to an entity pre-qualified/short-listed in the EOI phase (RFQ#156859, AI-Based Decision Support System, eVA IFQC 52-2) of the procurement process to respond to this RFP. “Pre-Qualified Offeror” also means “Supplier” (or “Bidder” or “Offeror” or “Contractor” or “Vendor”) that submits a proposal in response to this RFP.

Note that the pre-qualification letter pertains only to the composition of the Pre-Qualified Offeror team described in the EOI submission. “Pre-Qualified Offeror team composition” refers to the proposed organizational structure of the Offeror team that will perform the work (prime/subcontractor, joint venture, other alliances, etc.) and identification of the partner members (firms, universities, and other organizations) who will participate on the Offeror team. Changes in team composition between the EOI submission and subsequent RFP response that alter the qualifications and experience of the team may impact evaluation (see Section 3.C).

PROPOSALS SUBMITTED BY FIRMS NOT PRE-QUALIFIED TO RESPOND TO THIS RFP WILL NOT BE CONSIDERED.

B. Project Term and Options

The *initial term* of the contract is estimated at *36 months*, as follows:

- 24 months for development and deployment of the AI-DSS, and
- 12 months for operational support of the AI-DSS initiative.

This initial term will be followed by *five (5) one-year (1) optional renewal periods* for extending AI-DSS operational support. VDOT will provide the Offeror with a minimum of 90 days’ advanced notice on whether it intends to exercise the next sequential optional renewal.

C. Project Overview

The purpose of this procurement is to solicit sealed proposals from Pre-Qualified Offerors and make award to one Offeror to provide a Software-as-a-Service (“SaaS”) system solution to review and evaluate current transportation conditions, predict future conditions, and help agency operators make informed decisions when cooperatively managing recurring and non-recurring circumstances that impact their transportation networks (transit, arterial, freeway, parking) in NoVA and Metropolitan Fredericksburg (i.e., Stafford County, Spotsylvania County, and the City of Fredericksburg). AI-DSS is a multi-agency collaborative tool using real-time and historical data to improve safety, reliability, and mobility for travelers. Under the AI-DSS initiative, public and private-

sector transportation safety and service providers across NoVA and Metropolitan Fredericksburg will adopt technologies to improve multi-modal travel conditions and make available to operating agencies the tools to collaborate and coordinate in responding to transportation events. It is anticipated that stakeholders engaged in transportation-related activities across the RM3P region will participate in the AI-DSS.

A companion project to the AI-DSS is called the *Commuter Parking Information System* (CPIS). CPIS is planned as a real-time, app-based parking availability system that will provide reliable information on parking space availability at lots serving bus, vanpool, and carpool commuters. The system will monitor parking conditions at the individual commuter lots, reporting out static and real-time occupancy information. Another component of the parking initiative will be to *predict parking space availability* – i.e., to advise commuters on the prognosis for finding available parking at specified lots 15, 30, and 60 minutes into the future. Predicting parking availability will be a function of the AI-DSS.

Under this AI-DSS procurement, VDOT is seeking an innovative system of solutions that (1) predict incidents, congestion, and parking availability; (2) select appropriate pre-agreed response plans to respond to actual and predicted events; and (3) furnish associated services to support these systems, including response plan development, response plan evaluation, alerts for agency actions, and an interface for agencies to integrate the system with their management systems.

D. Innovation to Government

The Commonwealth encourages all Pre-Qualified Offerors to bring innovative ideas and/or solutions to government—ideas that result in cost and operational efficiencies or improvements, while simultaneously enhancing the services that governments provide to citizens.

E. SWaM Participation in Project

It is the policy of the Commonwealth to contribute to the establishment, preservation, and strengthening of small businesses and micro businesses, including those small or micro businesses owned by women, minorities, or service-disabled veterans; and to encourage their participation in Commonwealth procurement activities. The Commonwealth encourages all Suppliers to provide for the participation of these small businesses through partnerships, joint ventures, subcontracts, and other contractual opportunities.

Offerors qualified to respond to this RFP must submit a Small Business Subcontracting Plan (see Appendix H). It is the goal of the Commonwealth that over 42% of its purchases be made from small businesses. The Subcontracting Plan must be included in the proposal submission.

A Supplier which is a small business, a small woman-owned business, a small minority-owned business, or a small service-disabled veteran-owned business, as defined in § 2.2-4310 or § 2.2-1604 of the Code of Virginia, or a certified micro business as defined in Executive Order Number 20 (2014), is a SWaM business. If Supplier is a SWaM business, the Supplier should include a copy of all Virginia SWaM certifications with its proposal. No Supplier shall be considered a small business, a woman-owned business, a minority-owned business, a service-disabled veteran business or a micro business unless certified by the Department of Small Business and Supplier Diversity (DSBSD). For information, go to <http://www.sbsd.virginia.gov/>.

Please provide a *Small Business (SWaM) Subcontracting Plan* as set forth in Appendix H. In the submitted Small Business (SWaM) Subcontracting Plan, please state the percentage of the contract, during the Initial Contract Period and any Subsequent Renewal Periods, that will be spent with SWaM subcontractors. Please also include a list of all subcontractors you plan to utilize who are not Virginia-certified SWaM businesses in Appendix F, *Supplier Experience and Reference Spreadsheet*. If the Supplier does not plan to use small business subcontractors in executing a contract resulting from this RFP, so state on the Small Business (SWaM) Subcontracting Plan – Appendix H.

Offerors shall specify in the *Small Business Subcontracting Plan* the percentage of work to be performed by SWaM team members. For the SWaM goal, Offerors will be evaluated on the proportion of work, up to 42%, that will be performed by Virginia-certified SWaM businesses.

F. Disadvantaged Business Enterprise Policy

It is the policy of the Virginia Department of Transportation that Disadvantaged Business Enterprises (DBE) as defined in 49 CFR Part 26 shall have every opportunity to participate in the performance of federally funded contracts. A list of certified DBE firms is maintained on the **Department of Small Business and Supplier Diversity's (DSBSD)** web site (www.sbsd.virginia.gov) under the Small Business and Supplier SWaM and DBE Directory. Contractors are encouraged to take all necessary and reasonable steps to ensure that DBE firms have opportunities to compete for and perform services on this contract, including participation in any subsequent supplemental contracts. If the contractor intends to subcontract a portion of the services on the project, the contractor is encouraged to seek out and consider DBE firms as potential subcontractors. The contractor is encouraged to contact DBE firms to solicit their interest, capability and qualifications. Any agreement between a contractor and a DBE firm whereby the DBE firm promises not to provide services to other contractors is prohibited.

The DBE goal for this procurement is 12%. The DBE goal shall be met.

G. DBE and SWaM Compliance

VDOT is required to capture DBE and SWaM payment information on all contracts. The successful prime contractor will be required to complete Form C-63 ASD for federally funded projects on a quarterly basis.

Any DBE or Small, Women-owned, and Minority-owned (SWaM) firm must become certified with DSBSD prior to submitting a response to this solicitation. If a DBE or SWaM firm is the prime contractor, the firm will receive full credit for planned involvement of their own forces, as well as the work that they commit to be performed by DBE or SWaM subcontractors. DBE or SWaM prime contractors are encouraged to make the same outreach efforts as other contractors. DBE or SWaM credit will be awarded only for work actually being performed by them. When a DBE or SWaM prime contractor subcontracts work to another firm, the work counts toward the DBE or SWaM goals only if the other firm is itself a DBE or SWaM. A DBE or SWaM prime contractor must perform or exercise responsibility for at least 30% of the total cost of its contract with its own workforce.

DBE or SWaM certification entitles contractors to participate in VDOT's DBE and SWaM programs. However, this certification does not guarantee that the firm will obtain VDOT work, nor does it attest to the firm's abilities to perform any particular work.

H. VDOT Overview

VDOT serves the citizens of the Commonwealth and traveling public daily through its mission to plan, deliver, operate and maintain a transportation system that is safe, moves people and goods, enhances the economy, and improves quality of life. The Commonwealth Transportation Board guides the Department's work much like a board of directors and provides funding for roadways, airports, seaports, and rail and public transportation. The Virginia Secretary of Transportation functions as the Chair.

Virginia has the third largest state-maintained highway system in the country. VDOT maintains over 58,000 miles of roads, bridges, and tunnels, and employs over 7,700 people through a diverse workforce. VDOT has nine highway districts, divided into thirty-one residencies; the residencies are responsible for one to four counties each. VDOT also has five Transportation Operations Centers (TOCs) across the Commonwealth. These centers monitor traffic and travel conditions, dispatch personnel to respond to incidents and events, coordinate traffic signals, manage the collection and usage of traffic data, and provide information to travelers to make informed choices about when and how they travel. VDOT also has assigned staff at its District Offices and Residencies, including Northern Virginia and Fredericksburg, to assist with traffic signal and incident management.

I. Overview of RM3P

The *Regional Multi-Modal Mobility Program (RM3P)* – a partnership between the Office of the Secretary of Transportation, the Virginia Department of Transportation (VDOT), the Northern Virginia Transportation Authority (NVTA), and the Virginia Department of Rail and Public Transportation (DRPT) – is an innovative technology initiative funded under the Commonwealth of

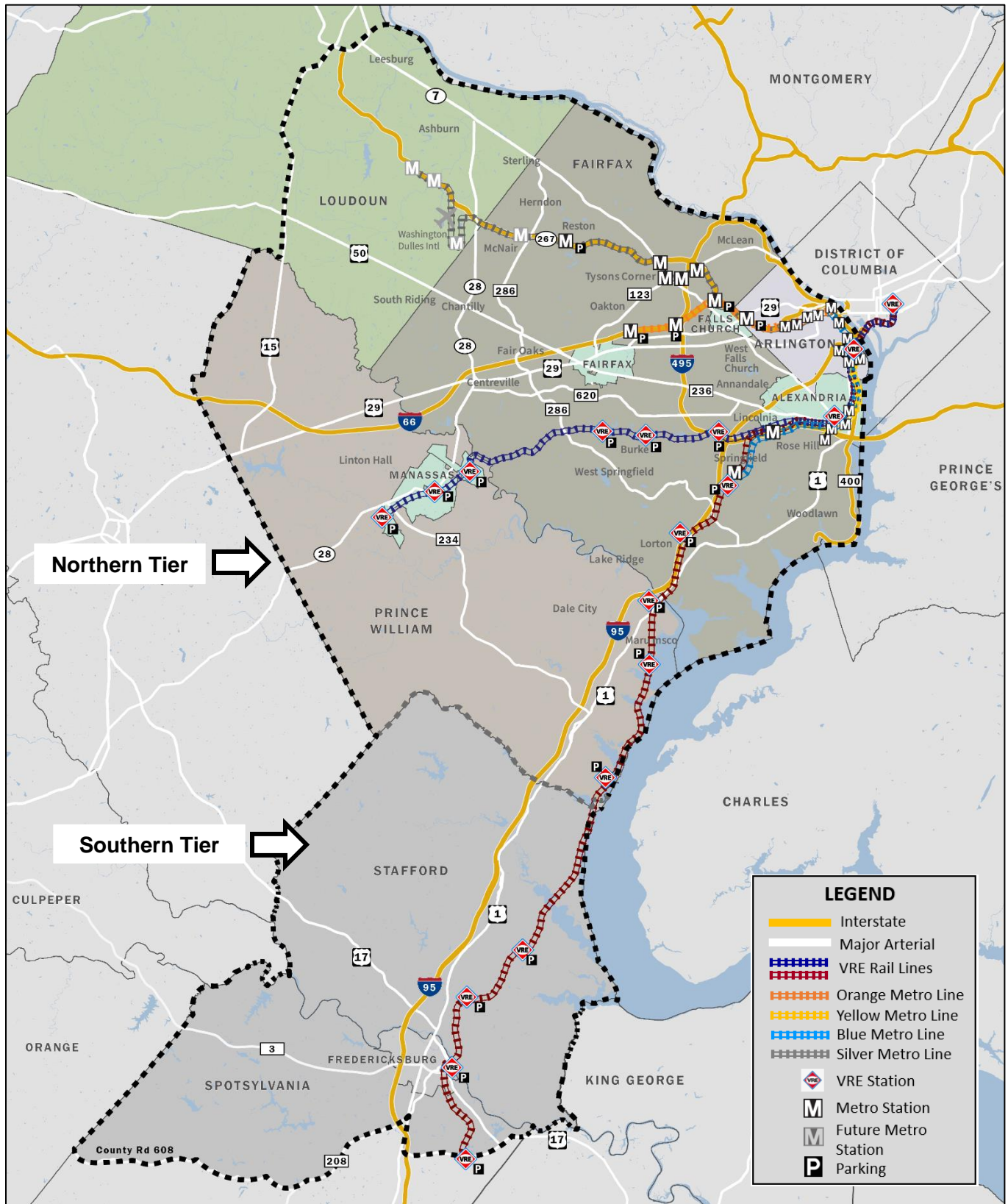


Figure 1: Boundaries of RM3P Region

Virginia's Innovation and Technology Transportation Fund (ITTF). This initiative aims to improve safety, reliability, and mobility for travelers in the Northern Virginia and Metropolitan Fredericksburg. The intent of this technology initiative is to leverage the collaborative use of real-time data by Virginia's public and private sectors to optimize the functioning of the transportation network, as well as to provide to customers the tools to make more informed travel choices. Stakeholders across the region are expected to participate in this important advancement, known to many as the *RM3P Initiative*.

To achieve the goals of improving travel safety, reliability, and mobility, five sets of technological projects – referred to as program elements – will be implemented under other regional initiatives. These include the:

- Data-Exchange Platform (DEP),
- Artificial Intelligence-Based Decision Support System for Enhancing Transportation Incident Management (AI-DSS),
- Commuter Parking Information System (CPIS),
- Multi-Modal Analytical Planner (MMAP), and
- Regional Multi-Modal Mobility Enhancement via Dynamic Incentivization (DI).

As shown in Figure 1, the RM3P Region is comprised of two tiers: a *Northern Tier*, that encompasses Northern Virginia, and a *Southern Tier*, that includes Metropolitan Fredericksburg (i.e., Stafford County, Spotsylvania County, and the City of Fredericksburg). The Northern Tier is the “core area” of RM3P, where all five RM3P program elements will be implemented. Expansion to the Southern Tier was made possible by award of a federal Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) grant to VDOT. Specifically, the ATCMTD grant will enable the AI-DSS and CPIS components to be deployed in the Southern Tier of the region. Additionally, limited DEP capabilities necessary to support the AI-DSS and CPIS extensions will apply to the Southern Tier.

This RFP pertains to deployment of the AI-DSS. The AI-DSS will facilitate multi-agency and multi-modal strategies to mitigate the adverse impact of various events in the region, such as roadway crashes, transit delays, bad weather, congestion, transit crowding, and other occurrences that negatively impact the regional transportation network.

J. Responding to this RFP

Interested Pre-Qualified Offerors shall demonstrate they have the necessary technical prowess, products, and approach to meet VDOT's requirements to implement and deploy the AI-DSS, as specified in Section 4, Statement of Work.

Pre-Qualified Offerors responding to this RFP must certify they meet all of the *Must-Have* factors of the AI-DSS initiative (see Section 3, Subsection B). Only those submissions that meet 100-percent of the Must-Have factors will be further evaluated.

VDOT expects to make a single contract award as the result of this solicitation. VDOT may, at its sole discretion, make one award, multiple awards, or none at all.

Alliances among Offerors are acceptable to meet the requirements of this procurement. However, VDOT requires a single point-of-contact for interfacing with the Offeror team for purposes of contract discussions and negotiations.

VDOT reserves the right to adjust the requirements or scope of this solicitation. In the event that any modifications become necessary, amendments to this solicitation will be posted on the Commonwealth's procurement portal, eVA, at: <http://www.eva.virginia.gov>.

K. Non-Discrimination of Contractors

A bidder, offeror, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, sexual orientation, gender identity, national origin, age, disability, faith-based organizational status, any other basis prohibited by state law relating to discrimination in employment or because the bidder or offeror employs ex-offenders unless the

state agency, department or institution has made a written determination that employing offenders on the specific contract is not in its best interest. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, services, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, the public body shall offer the individual, within a reasonable period of time after the date of his objection, access to equivalent goods, services, or disbursements from an alternative provider.

- a) Title VI Non-Discrimination General Assurance: The Virginia Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders/offerors that it will affirmatively insure that for any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids/proposals in response to this solicitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

L. Additional Non-Discrimination Assurances: USDOT 1050.2A/Appendix A

During the performance of this contract, the consultant, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") shall comply with **USDOT Order No. 1050.2A/Appendix A** as follows:

(1) **Compliance with Regulations:** The contractor shall comply with the Regulation relative to nondiscrimination in federally-assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

(2) **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

(3) **Solicitations for Subcontractors, Including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

(4) **Information and Reports:** The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Virginia Department of Transportation to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Virginia Department of Transportation as appropriate, and shall set forth what efforts it has made to obtain the information.

(5) **Sanctions for Noncompliance:** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Virginia Department of Transportation shall impose such contract sanctions as it may determine to be appropriate, including, but not limited to: (a.) withholding of payments to the contractor under the contract until the contractor complies, and/or (b.) cancellation, termination or suspension of the contract, in whole or in part.

(6) **Incorporation of Provisions:** The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

The contractor shall take such action with respect to any subcontract or procurement as the Virginia Department of Transportation may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Virginia Department of Transportation to enter into such litigation to protect the interests of the Virginia Department of Transportation, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

M. Additional Non-Discrimination Assurances: USDOT 1050.2A/Appendix E

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the nondiscrimination statutes and authorities specified in USDOT Order No. 1050.2A/Appendix E, including but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English Proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

2. PROPOSAL ADMINISTRATION

A. Overview

This RFP was developed to provide Pre-Qualified Offerors with the information required to prepare and submit full technical and cost proposals. This section, together with the information in Section 3, "RFP Response Instructions," outlines the administrative procedures and guidelines you must use and comply with when preparing a submission.

This RFP consists of the following documents and attachments:

- The current document entitled, *Artificial Intelligence-Based Decision Support System (AI-DSS) for Enhancing Transportation Incident Management*. This includes:
 - Section 1, Introduction
 - Section 2, Proposal Administration
 - Section 3, RFP Response Instructions
 - Section 4, Statement of Work
- Appendix A – *Service Level Agreements* (Complete and submit with proposal)
- Appendix B – *AI-DSS System Needs* (For informational purposes only)
- Appendix B.1 – *AI-DSS System Requirements Spreadsheet* (Complete and submit with proposal)
- Appendix C – *RM3P/ATCMTD Concept of Operations – Draft* (For informational purposes only)
- Appendix D – *RM3P/ATCMTD Program Evaluation Plan* (For informational purposes only)
- Appendix E – *Candidate Lots for Parking Prediction* (For informational purposes only)
- Appendix F – *Supplier Experience and References* (Complete and submit with proposal)
- Appendix G – *State Corporation Commission (SCC) Form* (Complete and submit with proposal)
- Appendix H – *Small Business Subcontracting Plan* (Complete and submit with proposal)
- Appendix I – *Enterprise Cloud Oversight Service (ECOS) Overview* (For informational purposes only)
- Appendix I.1 – *ECOS Assessment Questionnaire* (Complete and submit when requested by VDOT)
- Appendix J – *Pricing* (Complete and submit with proposal)
- Appendix K – *VDOT Agreement: Standard Solutions Contract* (Exceptions taken, if any, to the terms and conditions in Appendix K should be detailed in Appendix O. A redlined version of Appendix K, if applicable, will be required upon request from VDOT from those Suppliers who move into negotiations.)
- Appendix L – *Cloud Services Terms and Conditions* (Exceptions taken, if any, to the terms and conditions in Appendix L should be detailed in Appendix O. A redlined version of Appendix L, if applicable, will be required upon request from VDOT from those Suppliers who move into negotiations.)
- Appendix M – *Agreement for Use of Data* (For informational purposes only)
- Appendix N – *Must-Have Factors, Product Specifications, and VDOT Standard Agreement Questionnaire* (Complete and submit with proposal)
- Appendix O – *Offeror Exceptions to VDOT Standard Agreement and Cloud Terms and Conditions* (Complete and submit with proposal)
- Appendix P – *Proprietary/Confidential Information Summary Form* (Complete and submit with proposal, if applicable)
- Appendix Q – *FHWA 1273, Required Contract Provisions* (For informational purposes only)
- Appendix R – *107.15, Special Provision for Use of Disadvantaged Business Enterprises* (For informational purposes only)
- Appendix S – *Form C-111, Minimum DBE Requirements* (Complete and submit with proposal)
- Appendix T – *Form C-112, Certification of Binding Agreements with DBEs* (Complete and submit with proposal)

- Appendix U – *Form C-49, DBE Good Faith Efforts Documentation* (Complete and submit with proposal)
- Appendix V – *Form C-63, Vendor Payment Compliance Report* (For informational purposes only; successful Offeror shall prepare and submit form quarterly)
- Appendix W – *Firm Data Sheet* (Complete and submit with proposal)
- Appendix X – *Title VI Evaluation Form* (Complete and submit with proposal)

The annotations alongside each Appendix item, above, indicate whether the Appendix content (1) is provided for informational purposes only, or (2) needs to be completed and submitted with the Offeror's proposal. See Section 3 and the individual Appendices for additional details.

B. Virginia Public Procurement Act (VPPA)

This RFP is governed by the Virginia Public Procurement Act ("**VPPA**"), Code § 2.2-4300 *et seq.*, and other applicable laws.

C. Anti-Discrimination- § 2.2-4310 and § 2.2-4311, and § 2.2-4343.1(E)

By submitting its proposal, an Offeror certifies to the Commonwealth that it will conform to the provisions of the Federal Civil Rights Act of 1964, as amended as well as the Virginia Fair Employment Contracting Act of 1975, as amended; and, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and § 2.2-4311 of the VPPA.

D. Ethics in Public Contracting - § 2.2-4367 *et seq.*

By submitting its proposal, an Offeror certifies that its proposal is made without collusion or fraud; that the Offeror has not offered or received any kickbacks or inducements from any other bidder, Offeror, manufacturer, or subcontractor in connection with its proposal; and that the Offeror has not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services, or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged. In addition, an Offeror will disclose any actual or perceived conflicts of interest in its proposal and will notify VDOT if it becomes aware of a potential conflict of interest in the future.

E. Announcement of Award - § 2.2-4300 *et seq.*

If a contract is awarded or announced as a result of this solicitation, the purchasing agency will post notice of the award decision on the DGS/DPS eVA web site (<http://www.eva.virginia.gov>) for a minimum of 10 days. No award decision will be provided verbally. Any final contract, including pricing, awarded as a result of this solicitation will be made available for public inspection.

F. Authorized to Transact Business in the Commonwealth - § 2.2-4311.2

All Offerors organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership, or registered as a limited liability partnership must be authorized to transact business as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code, or as otherwise required by law. In its proposal, Offeror must include either (i) Offeror's identification number issued to it by the State Corporation Commission; or (ii) a statement explaining why Offeror is not required to be registered. No award can be made to any Offeror without this information unless this requirement is waived. Appendix G of this solicitation includes a space for Offeror to provide the information required in (i) or (ii) of this subsection. If an Offeror anticipates the use of additional resources through a partnership or subcontracting relationship with other entities, the requirements of this Section 2.F will also apply to any entities that are engaged as partners or subcontractors of Offeror providing services directly to the Commonwealth upon award of a contract.

G. Prohibited Products and Services - § 2.2-5514

No Offeror may include as part of its proposal, whether directly or indirectly through subcontractors, any hardware, software, or services that have been prohibited for use on federal systems by the U.S. Department of Homeland Security.

H. Prohibited Contributions and Gifts - § 2.2-4376.1

No Offeror that submits a proposal in response to this solicitation, and no individual who is an officer or director of the Offeror shall knowingly provide a contribution, gift, or other item with a value greater than \$50 or make an express or implied promise to make such a contribution or gift to the Governor, his political action committee, or the Secretary of Administration during the period between the submission of the proposal and the award of any resulting contract award with an expected value of \$5 million or more dollars.

I. Liability

The issuance of this RFP and the receipt of information in response to this RFP will not cause VDOT to incur any liability or obligation, financial or otherwise, to any Offeror. VDOT assumes no obligation to reimburse or in any way compensate an Offeror for expenses incurred in connection with its submission.

J. Nondisclosure

All proposal information submitted by an Offeror will be treated as confidential prior to contract award and will not be disclosed except as required by law or by court order.

K. Proprietary Information

VDOT reserves the right to use information submitted in response to this document in any manner it may deem appropriate in evaluating the fitness of the solution(s) proposed. Ownership of all data, materials, and documentation originated and prepared for VDOT pursuant to the RFP shall rest exclusively with VDOT and shall be subject to public inspection in accordance with the § 2.2-4342 of the VPPA and the Virginia Freedom of Information Act.

Trade secrets or proprietary information submitted by an Offeror in connection with a procurement transaction or prequalification application submitted pursuant to subsection B of § 2.2-4317 of the Code shall not be subject to the Virginia Freedom of Information Act (Code § 2.2- 3700 *et seq.*) if an Offeror:

- i). invokes the protections of this section in writing prior to or upon submission of the data or other materials,
- ii). identifies specifically the data or other materials to be protected, and
- iii). states the reasons why protection is necessary.

Please note that you may not designate as trade secrets or proprietary information (a) an entire bid, proposal, or prequalification application; (b) any portion of a bid, proposal, or prequalification application that does not contain trade secrets or proprietary information; or (c) line item prices or total bid, proposal, or prequalification application prices.

FAILURE TO COMPLY WILL RESULT IN THE DATA OR OTHER MATERIALS BEING RELEASED TO OFFERORS OR THE PUBLIC AS PROVIDED FOR IN THE VIRGINIA FREEDOM OF INFORMATION ACT.

When submitting a redacted proposal, the redacted version must have all proprietary information deleted that has been marked as "Proprietary." Section numbers which are redacted should be identified as follows: Example: Section 3, Paragraph B: "Redacted". The redacted version of the proposal must be carefully edited, altered, and refined by the Offeror in order to protect and maintain complete confidentiality of protected information. VDOT will not accept responsibility for any public disclosure of proprietary information that is a result of improper redaction by the Offeror. If a redacted version of the proposal is prepared, the Offeror must also submit the *Proprietary/Confidential Information Summary Form* (Appendix P). On the form, identify all items and pages in the proposal that contain proprietary information and the reason you deem the information proprietary. The classification of an entire proposal as proprietary or trade secret is not acceptable and will not be honored by VDOT or the Commonwealth. (See Section 3, Subsection E for additional instructions.)

L. Proposal Protocol

In order to be considered for selection, Offerors must submit complete responses to this RFP as described herein. Offerors must submit their proposals on The Commonwealth's electronic procurement site eVA at www.eva.virginia.gov. In order to submit electronic proposals, Offerors must be registered in eVA.

The proposal must be signed by an authorized representative of the Offeror. Electronic signatures are acceptable.

Proposals should be prepared and organized as indicated in Section 3, *RFP Response Instructions*, providing a concise description of capabilities to satisfy the requirements of the RFP. Emphasis should be placed on completeness and clarity of content.

The following are instructions for submitting an electronic proposal:

- a. Go to <http://www.eva.virginia.gov>
- b. Click on "I Sell to Virginia"
- c. Click on "eVA Vendor Training"
- d. Click on "Respond to IFBs-RFPs and more"

The entire proposal response including any/all attachment and any/all addenda must be submitted electronically in eVA no later than the closing date and time stated in this RFP.

It is the responsibility of the Offeror to ensure its proposal and all required attachments are properly completed, readable and uploaded to eVA by the date and time deadline stated on the electronic solicitation posting. Offerors should allow sufficient time to account for any technical difficulties they may encounter during online submission or uploading of documents. In the event of technical difficulties, Offerors should contact:

eVA Customer Care at (866) 289-7367 or email <mailto:eVACustomerCare@dgs.virginia.gov>.

Late proposals will not be accepted and will be automatically rejected from further consideration.

Note to Offerors: This solicitation includes the requirement for the Offeror to submit a Small Business Subcontracting Plan (SBSP) **with** the electronic proposal response in eVA. Offerors selecting "Vendor Will Complete All Work" box must be certified as a small/micro business by the Commonwealth of Virginia, Department of Small Business and Supplier Diversity (DSBSD) by the due date of this solicitation to participate in the SWaM Program.

If the Offeror is not a DSBSD-certified small business, the "Vendor Plans To Use Subcontractors" box must be selected and the Offeror shall identify the portions of the contract that will be subcontracted to DSBSD-certified small business for the initial contract period and any subsequent renewal periods.

M. Pre-Proposal Teleconference

An optional pre-proposal teleconference will be hosted by the Contract Officer on the date and time specified in Table 1. The pre-proposal conference is open to all Suppliers who register in advance. The virtual conference will begin promptly at the time indicated.

To participate in the pre-proposal conference, register with tiffany.winfrey@vdot.virginia.gov by sending an email stating your firm's name and your participating representative(s), including title, company affiliation, and email address. (The registration deadline is three business days prior to the pre-proposal conference.) Registered Offerors will receive a teleconference access link and number for the call – this information shall not be forwarded to others. All questions generated prior to and during the meeting will be responded to in the form of a written addendum to the solicitation posted to eVA.

The purpose of this teleconference will be to allow participants the opportunity to ask questions and obtain clarification relative to this solicitation. While attendance at this teleconference is not a

prerequisite to submitting a proposal, Offerors intending to submit proposals are encouraged to attend.

Please have a copy of the solicitation with you. Any changes resulting from this teleconference will be issued in a written addendum to the solicitation.

N. Single Point-of-Contact

It is the responsibility of the Offeror to inquire about and request clarification of any requirement in this RFP that is not understood. No verbal inquiries will be accepted outside of the pre-proposal teleconference. VDOT will not be bound by verbal responses to questions. Submit all inquiries concerning this RFP in writing by email, subject: “Questions on Solicitation 156859-RFP” to:

SPOC: Tiffany Winfrey
 Email: tiffany.winfrey@vdot.virginia.gov

The deadline for submission of questions is specified in Table 1. No questions will be answered after that date. Questions submitted by three business days prior to the teleconference may be answered verbally during the pre-proposal teleconference in addition to the written response.

Offerors are to limit all contact, whether verbal or written, pertaining to this RFP to the designated SPOC for the duration of this proposal process. It is not permissible for any Offeror, or any entity working on behalf of an Offeror, to solicit information from any individual or government source other than from the official SPOC listed above. Any unauthorized solicitations for information from anyone other than the SPOC may be grounds for disqualification of Offeror’s proposal.

O. Procurement Website

The Commonwealth’s procurement portal, <http://www.eva.virginia.gov>, provides information about Commonwealth solicitations and awards. Offerors are encouraged to check this site on a regular basis and, in particular, prior to submission of responses to identify any amendments to the RFP that may have been issued.

P. Timetables

Table 1 summarizes key milestone dates associated with responding to this RFP.

Table 1: Milestone Dates for 156859-RFP

Milestone	Target Date
RFP posted to eVA	February 2, 2022
Pre-proposal conference	February 15, 2022, 1:00PM ET
Deadline for submitting written questions	February 24, 2022, 4:00 PM ET
Proposals due	March 30, 2022, 2:00 PM ET

Q. eVA Registration Required

By the date of proposal submission, the selected Offeror(s) must be registered and able to accept orders through eVA. To register with eVA, select the “Sell to Virginia” button on the eVA website, <http://www.eva.virginia.gov>, for registration instructions and assistance.

R. Excluded Parties List

An Offeror will not be awarded a contract if it, or any of its affiliates or subcontractors, is an excluded entity on the federal government’s System for Award Management (“SAM”) at <https://www.vita.virginia.gov/supply-chain/scm-policies-forms/#sam>, or the Commonwealth’s Debarment List as provided by Code § 2.2-4321 at the time of award.

3. RFP EVALUATION FACTORS AND RESPONSE INSTRUCTIONS

Interested Pre-Qualified Offerors shall demonstrate that they have the necessary qualifications, prior relevant experience, and capabilities to meet VDOT’s requirements to implement and deploy the AI-Based Decision Support System (AI-DSS), as specified in Section 4, Statement of Work, and Appendix B.1, AI-DSS System Requirements.

Offerors responding to this RFP are to adhere to the specific format set forth in Table 3, below. VDOT will reject any proposal not in the specified format, or that does not address all the requirements of this RFP. Proposals should be thorough and concise. Avoid broad, unenforceable, or unmeasurable responses. Include all requested information in each section as indicated below.

A. Evaluation Factors

The evaluation factors applicable to this RFP are as follows:

- i. Must Have Factors: Offerors responding to this RFP must certify they meet all of the Must-Have factors shown in Table 2:

Table 2: Must-Have Factors

No.	<i>Must-Have (M) Factors</i>
1.	(M) Proposal must be received by the due date and time. Incomplete or late submissions will not be reviewed.
2.	(M) The Offeror must include in its response the pre-qualification letter issued by VDOT.

Offerors must confirm that they meet the Must-Have factors by completing and submitting the spreadsheet in Appendix N. VDOT will review each proposal to confirm that these Must-Have factors are met. All Must-Have factors will be evaluated on a met-or-not-met basis. Any proposal that does not meet all of the Must-Have factors will be set aside and receive no further consideration.

Only those submissions that meet 100 percent of the Must-Have factors will be further evaluated.

- ii. The extent to which the Supplier’s proposal satisfies the requirements identified in Section 4 of this RFP, the Appendix B.1 Requirements Spreadsheet, and Appendix K VDOT Agreement: Standard Solutions Contract
- iii. Supplier’s viability and past performance (see Appendix F), including Supplier’s diligence and thoroughness in following and completing the requirements of this solicitation.
- iv. Supplier’s status as a DSBSD-certified small business or micro business, including small businesses or micro businesses that are owned by minorities or women, and Supplier’s proposed Supplier Procurement and Subcontracting Plan (Appendix H).
- v. Supplier’s employment of persons with disabilities to perform the specifications of the contract (See Section 1.F of this RFP).
- vi. Pricing (Appendix J), which may include submitted price, negotiated price, discounted price, total cost of ownership, etc.

B. Proposal Evaluation Process

VDOT will review each proposal received by the due date and time to determine whether it meets the “Must-Have factors” of this RFP. All Must-Have factors (Appendix N) will be evaluated on a met-or-not-met basis. Any proposal that does not meet all of the “Must-Have” factors will be set aside and will receive no further consideration.

The proposals that meet all the Must-Have criteria will be distributed to the evaluation team who will assess and score each Offeror's response to this RFP based on a review of the submitted materials.

This is a "best-value" procurement and proposals will be evaluated for their qualitative, technical, and sustainable features in addition to price. Proposals will be reviewed in terms of their ability to meet or exceed the agency's requirements as stated in this RFP.

VDOT may elect to continue the evaluation of the most qualified proposal(s) and may request that an Offeror clarify or explain certain aspects of their proposals.

A numerical scoring system will be used to evaluate proposals. The point values assigned to each of the evaluation criteria are included in the file posted on eVA entitled "DSS RFP 156859 Evaluation Category Weighting."

At any time in the evaluation process, VDOT may conduct any or all of the following assessments:

- Review industry research
- Request Offeror to elaborate on or clarify specific portions of its proposal
- Invite Offeror to make a presentation
- Invite Offeror to demonstrate its products and/or participate in a pilot test
- Conduct discussions with key personnel
- Contact Offeror's references
- Assess Offeror's capability to comply with the Commonwealth's security and data privacy policies, standards, guidelines, and related contract terms as specified in the RFP
- Review pricing
- Contacting an Offeror's customers
- Requesting an Offeror elaborate on or clarify specific portions of their proposal, including, as applicable, any responses to the RFP's security requirements

VDOT may limit all of the above to the most qualified proposals. No Offeror is guaranteed an opportunity to explain, supplement, or amend its initial proposal. Each Offeror is encouraged to ensure that its initial proposal contains and represents its best offering. **You should submit your best proposal and not assume there will be an opportunity to negotiate, amend, or clarify any aspect of your initial submitted proposal.**

Each Offeror should be prepared to conduct product demonstrations, pilot tests, presentations, or site visits at the time, date and location of VDOT's choice, should VDOT so request.

VDOT will select for negotiation those proposals deemed to be fully qualified and best suited based on the factors stated in the RFP. Negotiations will then be conducted with those Offerors. After negotiations, VDOT may select the proposal(s) that, in its opinion, is the best proposal(s) representing best value and may award a contract to those Offeror(s). For purposes of this RFP, VDOT will determine best value based on the value relative to the cost of the Service/Solution, giving consideration to the project's budget objectives. As this is a cloud-based procurement (i.e., off-premise hosting), following VDOT's selection of the best proposal(s) representing best value to the Commonwealth, Offeror's failure to successfully answer, negotiate, and/or comply with security requirements necessary in order to approve Offeror's cloud application, may result in removal from further consideration. Refer to Appendix I of the RFP.

If any Offeror fails to provide the necessary information for negotiations in a timely manner, or fails to negotiate in good faith, VDOT may terminate negotiations with that Offeror at any time.

VDOT reserves the right, at its sole discretion, to reject any proposal or cancel and re-issue the RFP. In addition, VDOT reserves the right to accept or reject in whole or in part any proposal submitted, and to waive minor technicalities when in the best interest of the Commonwealth.

VDOT SHALL NOT BE CONTRACTUALLY BOUND TO ANY OFFEROR PRIOR TO THE EXECUTION OF A DEFINITIVE WRITTEN CONTRACT.

C. Changes in Team Composition

The Offeror shall disclose all changes in composition of the Offeror team for the AI-DSS project that have occurred between submission of the EOI response and submission of this RFP proposal response. This includes (1) the deletion from the Offeror team of any firms or other entities identified as members of the Offeror’s team in the EOI response, (2) the addition to the Offeror team of any firms or other entities not identified as members of the Offeror team in the EOI response, (3) the unavailability of any key staff identified in the EOI response, and (4) any other changes (including role changes) or clarifications that impact, or could potentially impact, the composition of the Offeror team. If no changes in team composition have or will occur, the proposal shall affirmatively so state in the Team Composition Statement.

Changes to team composition that substantively alter the qualifications of the Offeror team will impact evaluation of the Offeror’s proposal.

D. RFP Response Page Limits

Responses to this RFP are **limited to ninety (90) pages** in length for all content in Tabs 1-7 per Table 3, below. This limit is exclusive of the content in Tabs 8-12, including requirements, pricing, resumes, and forms. Resumes should be presented in Tab 10—resumes for all Key Personnel should be included, with individual resumes each limited to two (2) pages or less.

E. File Naming and Document Limits

In order to facilitate VDOT’s review of the submitted proposals, you should label the files using the following naming convention: [RFP #].[Submission Date in format YYYYMMDD].[Name of Lead Offeror].Tab[#].[Section Title]. Example: RFP#156859.20220131.OfferorName.Tab3.docx.

Each tab should be saved as a separate electronic file and contain the information specified for that tab in Table 3. If you are not redacting any parts of your submission, you do not need to submit Tab12.

In the event that the size of any single file exceeds 60MB, an additional file should be created so that all files are within the size limits. If, for example, the “Response Content” (Tab X) of your submission is greater than 60MB, break the content into two files, labeling them TabXA and TabXB, respectively.

Submit your technical proposal response as an MS Word document. Font size should be 11-pt. or larger; top, bottom, and side margins should be one-inch or larger. Line spacing should be single or larger. Page size shall be limited to 8½ x 11-inches (page size exceptions are permitted for tables and figures). The page number limits, noted in Subsection E, are to be strictly adhered to. The requirements compliance matrix, price proposal, etc. should be submitted as MS Excel documents, using the furnished templates. Most of the required forms may be completed and submitted in portable document format (PDF). The optional Proposal Redaction File (identifying proprietary information), if submitted, should be in PDF.

The proposal shall be submitted electronically through the procurement portal. Go to www.eva.virginia.gov. Navigate to this RFP opportunity using the Virginia Business Opportunity search function. Then select “Respond Online.”

F. Offeror's Submission Format

Responses shall be organized as specified in Table 3, below. The proposals are to include all of the information identified under “Content Summary” in the table. Also, the proposal submission should be organized by “Tab” number, as shown, with each tab constituting a separate electronic file.

Table 3: AI-DSS Proposal File Organization and Content

Tab No.	Section Title	Content Summary
Tab 1	Transmittal (Max. 1 page)	<ul style="list-style-type: none"> A signed letter, including identification of the name, title, affiliation, phone, and email of the Offeror’s point-of-contact for this effort.

Tab No.	Section Title	Content Summary
		<ul style="list-style-type: none"> • Acknowledge and attach any Addendums to the RFP (will not count against page limit). • Include a copy of the completed eVA registration confirmation (will not count against page limit).
Tab 2	Executive Summary (Max. 2 pages)	<ul style="list-style-type: none"> • Top-level summary of the most important aspects of the proposal. Should include a concise description of the proposed solution.
Tab 3	Solution and Methodology (Max. 45 pages)	<ul style="list-style-type: none"> • Summarize your understanding of the AI-DSS program effort. • Detail your team’s overarching solution to supporting the AI-DSS program element. • Describe your approach to Software-as-a-Service in this particular project. Specify which products and tools will be used off-the-shelf, which will be customized, and which will have to be developed. Summarize your plans for new development. • Identify key components of the AI-DSS, how you propose to employ them, and your approach to each. These components may include response plans, rules engine, modeling engines, and prediction engines. (Note: Be sure the approach to response plans includes actions for reducing traveler demand that can potentially be addressed under the RM3P “Dynamic Incentivization” program element.) • Detail out your proposed approach to prediction of incidents, roadway congestion, transit crowding, and parking availability. Include in your response how you will predict each variable, the data and sources for making predictions, how far into the future the prediction will cover (in minutes or hours), and how frequently the predictions will be updated? Explain how these prediction elements will be factored into response prediction. For what days of the week and hours during the day do you propose to generate predictions? • Identify and discuss the categories of data that you propose to use as inputs to the AI-DSS. What data sources and types do you have access to, beyond those planned for the Data-Exchange Platform, that could potentially enhance the performance of the DSS? Identify and explain any deficiencies in data that you perceive; prioritize the significance of missing data and strategies for working with the data gaps. • Identify those data elements that will be required to predict parking availability. Specify sources for those elements. • Describe your plan for rolling out the AI-DSS, geographically and functionally. For example, do you propose to initially deploy the technology across the entire region, or begin with rollout to one or more sub-regions? Do you propose to rollout all capabilities and functions at once, or do so incrementally? How will you rollout prediction? During rollout, how do you propose

Tab No.	Section Title	Content Summary
		<p>to assess AI-DSS performance, and assure consistent quality in outcomes?</p> <ul style="list-style-type: none"> • As indicated in Section 4, VDOT is interested in utilizing a Agile/Waterfall Hybrid methodology where system development is necessary. Given your proposed approach to this project, explain how you will incorporate the Agile/Waterfall Hybrid methodology into your plans? For which activities will the methodology be applied? • Propose a preliminary set of measures to assess AI-DSS performance. • Summarize specialized innovations your team will bring to the AI-DSS initiative? Explain how these innovations will contribute to the success and sustainability of the project. • If applicable, summarize any deviations from the AI-DSS statement-of-work proposed. Provide a rationale for the proposed deviations.
Tab 4	Work Plan (Max. 28 pages)	<ul style="list-style-type: none"> • Walk through the seven tasks delineated in the Section 4 Scope of Work: <ul style="list-style-type: none"> ○ Task 1. Project Management ○ Task 2. Solution Elaboration ○ Task 3. System Build and Integration ○ Task 4. Service Enablement ○ Task 5. System Training ○ Task 6. Warranty Support and Operations ○ Task 7. ATCMTD Documentation and Administrative Support • For each task, identify the following: <ul style="list-style-type: none"> ○ Approach/methodology ○ Schedule ○ Task outcomes and deliverables ○ Identification of staff who will be involved in the task ○ Key risks and challenges, and proposed mitigation strategies ○ Innovations the team will bring to this task ○ Proposed deviations, if any, from the statement-of-work or requirements (with explanations) • Identify and detail out any proposed additions of tasks. Specify where the new tasks/subtasks would fit in the sequence of activities.
Tab 5	Schedule and Deliverables (Max. 4 pages)	<ul style="list-style-type: none"> • Include a detailed baseline project schedule, consistent with the scheduling framework specified in Section 4, Statement of Work, showing milestone timetables in calendar months following NTP (notice-to-proceed). • Specify deliverables per the Work Plan and show them in the baseline schedule.
Tab 6	Team Composition (Max. 5 pages)	<ul style="list-style-type: none"> • Team Composition Summary Statement: Disclose all changes to Team Composition pursuant to Section 3, Subsection C. If no changes have occurred or will occur, affirmatively so state. (If changes in Team Composition have occurred, you need to update the

Tab No.	Section Title	Content Summary
		<p>“pertinent experience” information that was included in your Expression of Interest (EOI) response to the RFQ.</p> <ul style="list-style-type: none"> • Identify all of the organizations comprising your team. • Specify those firms on the team that are SWaMs and DBEs. The appropriate SWaM and DBE forms shall be completed and included under Tab 11. • Delineate the roles and responsibilities of each team member. • Respond to the questions on experience and prior performance in Appendix F, Supplier Experiences and References (see Tab 11).
Tab 7	Staffing (Max. 5 pages, exclusive of resumes)	<ul style="list-style-type: none"> • Identify staff to be assigned to the project. • Specify those staff proposed as “Key Personnel.” • Identify staff roles and responsibilities, and past experiences qualifying staff for the assigned roles. • Include a table or matrix showing staff leads and assignments by task and staff availability. • Include an Organization Chart. • Post resumes under Tab 9 for all Key Personnel.
Tab 8	System Requirements (No page limit)	<ul style="list-style-type: none"> • Go to Appendix B.1, <i>AI-DSS System Needs and Requirements Spreadsheet</i>. Fill in the requested information.
Tab 9	Resumes	<ul style="list-style-type: none"> • Include resumes for Key Personnel. • Limit length of individual resumes to 2 pages each.
Tab 10	Pricing (No page limit)	<ul style="list-style-type: none"> • Provide detailed pricing information pursuant to the instructions in Appendix J. • Do not include pricing data under any other tabs of the proposal.
Tab 11	Forms (No page limit)	<ul style="list-style-type: none"> • Furnish the following documents and forms in the sequence indicated: <ul style="list-style-type: none"> ○ <i>Qualifications Letter</i> from the VDOT Contract Officer indicating your firm was down-selected to compete for the RM3P AI-DSS project. ○ <i>Must Haves, Product Specs, VDOT Standard Agreement</i> (Appendix N) – Furnish the required information under all three tabs on the spreadsheet, incl. the Must-Have factors. For each Must-Have Factor, certify whether the Offeror Team satisfies that factor. ○ <i>Supplier Experience and References</i> (Appendix F) – Fill in the required information in the workbook (all tabs) for the Prime Offeror. Provide detailed information on the “Experience Supplement” tab about projects comparable in scope to the AI-DSS. Include pertinent experience for all proposed members of the project team. Furnish the requested references, including at least three (3) points-of-contact who can attest to prior DSS-related performance. ○ <i>Service Level Agreements (SLAs)</i> (Appendix A) – Respond to the SLAs and remedies listed; identify and explain any exceptions taken on the “Vendor Response” tab.

Tab No.	Section Title	Content Summary
		<ul style="list-style-type: none"> ○ <i>Firm Data Sheet</i> (Appendix W) – Complete and submit this form. ○ <i>SCC Form</i> (Appendix G) – Complete this form for Prime and all Sub-Contractors. ○ <i>Small Business Subcontracting Plan</i> (Appendix H). ○ <i>Form C-111, Minimum DBE Requirements</i> (Appendix S) and <i>Form C-112, Certification of Binding Agreements with DBEs</i> (Appendix T) – Both forms need to be completed and submitted with the proposal. ○ <i>ECOS and Assessment Questionnaire</i> (Appendix I and I.1) –The questionnaire does not need to be submitted with the proposal (see “ECOS Compliance,” below). ○ <i>Title VI Evaluation Form</i> (Appendix X) – Fill in and submit the requested information. ○ <i>Offeror Exceptions to VDOT Standard Agreement</i> (Appendix O) – Identify and explain any exceptions taken to the VDOT Standard Agreement (Appendix K).
Tab 12	Proposal Redaction File (Optional)	<ul style="list-style-type: none"> ● Include this file only if there is proprietary information you propose to delete from public disclosures of your proposal. The file should be in PDF format. ● Create a new file, duplicating the entire content of the proposal (Tabs 1-11). Mark those sections deemed “proprietary.” ● Complete and include the Appendix P form.

By responding to this RFP, the Offeror certifies that all information provided in the submission is true and accurate.

G. ECOS Compliance

Suppliers who will furnish software-as-a-service (SaaS) applications to VDOT need to be authorized to do so by the Virginia Information Technology Agency (VITA). To gain VITA approval, Offerors shall follow the VITA Enterprise Cloud Oversight Service (ECOS) process; ECOS approvals will need to be in place prior to contract award. For additional information, refer to the VITA website: <https://www.vita.virginia.gov/technology-services/catalog-services/cloud-services/cloud-third-party-use-policy/>.

Offerors should not submit the ECOS Questionnaire (Appendix I.1) with their proposals. However, they should be prepared to promptly submit the completed Questionnaire upon VDOT request. Offerors actively under VITA Oversight may not need to resubmit the Questionnaire.

4. STATEMENT OF WORK

The content contained within this Section 4, will become part of the VDOT Agreement: Standard Solutions Contract (Appendix K in this solicitation) as the Exhibit C Statement of Work.

A. Background

This statement of work is a general guide and is not intended to be a complete list of all the work necessary to complete the project. One of the early deliverables by the Offeror will be a detailed work plan that meets the requirements for managing the project defined in this section.

The selected Offeror shall implement a comprehensive, fully integrated suite of software systems covering the general functional areas and specific requirements detailed in the Requirements Specification (Appendix B).

The AI-DSS is to be furnished as Software-as-a-Service (SaaS), providing the functionality to review and evaluate the current conditions, as well as to predict conditions of the Northern and Southern Tier transportation network; to help agency operators make informed decisions in managing both recurring and non-recurring congestion conditions that affect their transportation networks (transit, arterial, and freeway conditions, and parking availability); and to make recommendations on the actions to be taken to optimally respond to transportation events in the region. It is assumed that the AI-DSS will be a multi-phased functional deployment with additional functionality deployed during each phase until the full SaaS technologies proposed by the Offeror are completed.

VDOT is requesting that the Offeror propose an innovative SaaS solution that meets the following high-level needs and functions for the AI-DSS:

- Predict/project transportation events (location, expected duration, severity) that will occur in a customer-configurable future period, such as between 15 minutes and an hour into the future.
- Predict/project traffic congestion (location, expected duration, intensity) that will occur between 15 minutes and an hour in the future.
- Predict/project transit crowding that will occur between 15 minutes and an hour in the future.
- Predict/project the availability of parking spaces at selected individual regional parking facilities between 15 minutes and an hour in the future during AM Peak.
- Process data from the DEP and Offeror's supplemental data sources to identify non-predicted events that occurred on the transportation system.
- Develop multi-modal, multi-agency response plan elements through coordination and agreement with regional operating agencies.
- Develop business rules and operating procedures for responding to incidents and congestion through coordination and agreement with regional operating agencies.
- Recommend response plan elements for actual and predicted transportation incidents and the expected impact of the response plan.;
- Recommend response plan elements for actual and predicted traffic congestion.;
- Recommend response plan elements for actual and predicted transit crowding conditions.
- Recommended response plan elements emphasizing not only efficient and effective issue removal (restore transportation service supply) but also attempt to reduce demand on the individual transportation networks (i.e., freeway, arterial, transit) and the overall system (e.g., through incentivization, traveler information, ramp metering, etc.).
- Provide a data interface for parking availability predictions to send data and prediction information to the RM3P Data-Exchange Platform (DEP).
- Provide a web-based graphical user interface that authorized transportation operators can view, modify, and coordinate recommended response plans.
- Provide response plan recommendations to regional stakeholders in various formats including but not limited to an API for agency operating systems to integrate the DSS data, a web-based GUI, and alerts in text and email format.
- The Vendor for the Dynamic Incentivization (DI) project may need to receive triggers from the DSS to implement various DI strategies to manage demand. The AI-DSS vendor may be asked to develop an interface for the DI vendor to receive and implement incentive strategies as implementing demand-

managed related response plan elements. DI interface documentation will be expected for the DI triggers in the response plans. This work is an optional task, and will require separate pricing included in Appendix J.

- Provide a data interface to the RM3P Data-Exchange Platform (DEP) to send prediction information, response plan recommendations, and the executed response plan elements. An ICD document is required.
- Develop a data interface to the DEP to obtain current traffic, transit, and parking information.

The Offeror will propose its SaaS approach based on its expertise and proposed technologies. VDOT is open to innovative solutions and the Offeror shall detail how its solution meets the needs and functions listed above.

Below is a list of probable elements in an AI-DSS solution. VDOT anticipates that these components or capabilities are likely to be reflected in Offerors' responses. Where specific elements are not needed, Offerors should explain the work-around to accomplish the intended purposes:

a) Rules Engine

The Rules Engine contains the logic to make determinations based on pre-defined rules. This includes monitoring current conditions to determine when a response plan needs to be created, updated, or deactivated; and developing response plans from a set of rules applied to current conditions.

In order to assist regional operators, a Rules Engine may be needed and shall be developed by the selected DSS Offeror. For transit, freeway, or arterial related events, the Rules Engine should evaluate the location, time-of-day, severity of an event, and other variables. It should use rules to determine the need for a response plan and, if needed, select the most appropriate or applicable response plan elements. The Rules Engine should re-evaluate the event throughout the life of the event and potentially recommend different response plans and actions. This process should be performed until the event has cleared. The Rules Engine may use logic and business processes that can be expanded to any mode and event type that might occur in the region (e.g., Mobility Service Providers, Parking, Transit). The Rules Engine should include post-event improvement features for continuous improvements that can be applied for future events.

b) Modeling Engine

An AI-DSS Modeling Engine may be used for evaluation and development of various response plans and events within the corridors and hot spots listed in the Predictive Engines section. Using the existing regional planning models as a baseline, it would be expected that a macroscopic/mesoscopic model may be developed to include the additional modal alternatives, including the expansion, calibration, and use of the model for the multi-modal analysis. The results of the analysis, modeling, and simulation (AMS) task may be used along with other relevant field, and stakeholder input to develop a set of pre-defined response plans or elements for use by the Rules Engine. All proposed modeling software needs to be approved by VDOT prior to use.

The Model may be used by the selected Offeror to assist in the training of its predictive service.

c) Response Plans

Several agencies within the region have existing response plans and standard operating procedures (SOP) for events within their areas of responsibility. The selected Offeror/Vendor may use the existing response plans and SOPs. It shall develop a new set of coordinated response plan elements for general and/or specific events identified by VDOT and its partners. The new set of coordinated response plans shall emphasize across-jurisdiction and across-mode responses and demand management. These response plan elements can be specific actions for types of events, or full pre-agreed response plans for specific locations of events. The Vendor may use various technologies to develop a recommended response plan for agencies to implement. The Vendor shall coordinate the development of response plans through a series of workshops and table top exercises with regional operating agencies. Response plan elements shall be recommended based on actual events and predictive events that meet a minimum confidence value. The Vendor should clearly inform agencies if their existing response plans and SOPs are in need of modification. Response plans may have various associated needs such as reducing demand, providing incentives to drivers, increasing transit capacity, providing triggers to

external systems, recommending traveler information, modifying existing traffic control devices, and detouring traffic to approved detour routes.

d) Predictive Engines

The selected DSS Vendor will provide incident prediction; roadway congestion and transit crowding prediction; and parking availability prediction using their proposed technology. The Vendor shall develop and present methods for ensuring practical, time-efficient, and ethical decision-making when training the Predictive Engine and the resulting predictions.

1. During the RFP stage, Offerors will be provided access to current historical data via the DEP to evaluate and recommend sub-regions within NoVA and Metropolitan Fredericksburg. Other publicly available data, such as origin-destination data, regional planning model networks, transit GTFS data, and historical crash data, can be used for this evaluation. Offerors may make recommendations to VDOT on the schedule needed for planned data sources being integrated into the DEP.
2. Offeror shall identify any additional 3rd-party data services or publicly available data that it needs to calibrate its service offering, and additional data collection it will perform.
3. The Offeror shall develop a base service for a minimum of a single sub-area of the NoVA region to pilot their service from the list below and shall expand the base service over time to include the other listed sub-regions for their full-service offering where data is sufficient based on the Vendor's review. Additionally, the final service offering shall be expandable to include the Southern Tier. As an example, sub-regions could be developed for this program which include corridors and hot spots in both NoVA and Metropolitan Fredericksburg, such as the following high priority corridors:
 - I-95 corridor
 - I-66 corridor
 - I-495 corridor
 - SR-267 corridor (Dulles Toll Road)
 - Route 28
 - Fairfax County Parkway
 - Tyson's Corner
 - Route 7
 - Routes 29 and 50 in NoVA
 - Route 1 in NoVA and Fredericksburg
 - Routes 3 and 17 in Fredericksburg

However, **Offeror shall provide its recommended sub-regions and phasing as part of its technical proposal.** Offeror shall present its recommendations and sequential rationale to VDOT for review and approval.

i) Incident Prediction

A predictive service will be provided to calculate the risk of an incident occurring in the next 15 to 60 minutes (location, expected duration, severity) with a confidence interval per prediction (i.e., crash at location X in 30 minutes, 60% confidence). This will include an indication if the predicted incident is a result of an existing incident (i.e., secondary incident). A minimum confidence interval will be configurable, and initially will be agreed to by the selected Offeror and VDOT for notification. Response plan rules may take the confidence interval into consideration when recommending whether a response plan is needed.

ii) Congestion Prediction

A predictive service will be provided to calculate the risk of non-recurring roadway congestion and transit crowding occurring in the next 15 to 60 minutes (location and length of queue, expected duration) with a confidence interval per prediction. A minimum confidence interval will be configurable, and initially will be agreed to by the selected Offeror and VDOT for notification. Response plan rules may take the confidence interval into consideration when recommending whether a response plan is needed.

iii) Parking Prediction

A predictive service will be provided to calculate the expected availability at individual commuter parking facilities within the region over the next 15 to 60 minutes. Predictions are to be generated **during the weekday AM rush hour and during special events identified by VDOT**; prediction is not required for other time periods. A minimum confidence interval will be agreed to by the Vendor and VDOT for notification.

Appendix E shows the list of candidate lots for which prediction of parking availability should be provided. The planned *RM3P Smart Parking Insight* project will collect real-time parking information at multiple parking lots. A subset of the lots where real-time parking information will be collected and lots that have existing real-time parking occupancy counting technology are included in Appendix E.

Appendix E also identifies existing and planned parking data that VDOT expects to be able to share with the successful Offeror. The data will be made available through the DEP Parking API. Offerors are encouraged to propose additional data elements and sources to be used in the prediction of parking availability. Offers should include in the pricing proposal (Appendix J) the base cost and expanded cost for predicting lots listed on Appendix E and additional cost for adding additional lots as options during or after the initial contract term.

iv) Transit Crowding Prediction

A predictive service will be provided to calculate the available capacity within transit routes over the next 15 to 60 minutes. The exact routes, a minimum confidence interval will be agreed to by the Vendor and VDOT for notification.

v) Response Prediction

A predictive service will be provided to calculate the response plan elements and their expected impact/benefit for various events.

AI-DSS Interfaces

The AI-DSS software will use several types of data, both static and dynamic, provided by the DEP. The static data includes data which will not change very often, if at all, during the development and deployment of this project and its on-going operation. While a data set could be limited from the Data-Exchange Platform (DEP), the Offeror is encouraged to identify supplemental necessary data (e.g., telematics, transit real-time crowding or ridership) as part of this proposal or recommend new data sources and priority of planned data sources into the DEP. **Proprietary data used by the selected Offeror for training and operation of its service will not be required to be shared with VDOT. However, it is requested that the metadata of the proprietary data be shared. Additional data sources from local agency systems will be added in the future.** VDOT will provide historical data for AI-DSS calibration and training from the DEP to include data from the following sources:

Table 4: Data-Exchange Platform - Data Feeds Existing and Planned (As of Dec. 31, 2021)

DEP Data Feeds	Notes	Historical Data	Availability Schedule	Known Data Info
Alexandria DASH Static GTFS	Bus	N/A	Dec. 2021	
Alexandria DASH GTFS-RT	Bus	N/A	Dec. 2021	
Arlington ART Static GTFS	Bus	N/A	Dec. 2021	
Arlington ART GTFS-RT	Bus	N/A	Dec. 2021	
Arlington Co. - Traffic Signal System Active Timing	Signal	TBD	No earlier than Mar. 2022	Based on source availability
Arlington Co. - Traffic Signal System Detector Data (ped)	Signal	TBD	No earlier than Mar. 2022	Based on source availability
Arlington Co. - Traffic Signal System Detector Data (volume)	Signal	TBD	No earlier than Mar. 2022	Based on source availability
Arlington Co. - Traffic Signal Location and Status Data	Signal	TBD	No earlier than Mar. 2022	Based on source availability
Arlington Co. - Traffic Signal System Timing Plan Config	Signal	TBD	No earlier than Mar. 2022	Based on source availability
Capital Bikeshare	Bike	TBD	No earlier than Mar. 2022	
Fairfax Connector Static GTFS	Bus	N/A	Dec. 2021	
Fairfax Connector GTFS-RT	Bus	N/A	Dec. 2021	

DEP Data Feeds	Notes	Historical Data	Availability Schedule	Known Data Info
Fredericksburg Regional Transit Static GTFS	Bus	N/A	Dec. 2021	
INRIX Historical Traffic Data (speed and travel time)	Roadways	November 2008 – Present (XD data from July 2018 – Present)	Existing	Pending Data Use Agreement (DUA) approval
INRIX Real-time Traffic Data (speed and travel time)	Roadways	See above	Dec. 2021	Pending DUA approval
Loudoun County Transit Static GTFS	Bus	N/A	Dec. 2021	
Parking Lot Inventory	Parking	N/A	Sep. 2021	Lot name, location, and capacity
Parking Lot Occupancy Data	Parking	2016, 2018, and limited 2019 & 2020	Sep. 2021	Represent a typical usage
RM3P Parking Lot Availability Status Data	Parking	N/A	Pending on parking data procurement schedule	Lot Availability Status Code (1=available, 2=limited, 3=full)
PRTC Static GTFS	Bus	N/A	Dec. 2021	
PRTC GTFS-RT	Bus	N/A	Dec. 2021	
Transurban Device Status	Express Lanes	TBD	No earlier than Mar. 2022	
Transurban Incident, Work Zone, and Congestion Data	Express Lanes	TBD	No earlier than Mar. 2022	
Transurban Planned Event	Express Lanes	TBD	No earlier than Mar. 2022	
VDOT Signals - KITS	Signal	TBD	No earlier than Mar. 2022	
VDOT ATMS Device Status Data (e.g. DMS)	Interstate	2015 – Present	Existing	
VDOT ATMS Incident Data	Interstate	Mar. 2013 – Present	Existing	
VDOT ATMS Weather Events Data	Interstate	Mar. 2013 – Present	Existing	
VDOT ATMS Work Zone and Planned Events Data	Interstate	Mar. 2013 – Present	Existing	
VDOT Parking (Haymarket)	Parking	TBD	No earlier than Sep. 2022	
VDOT RWIS	Weather	5+ years data available outside DEP	Sep. 2021	
VDOT Volume	Interstate	AADT – timeframe TBD	No earlier than Mar. 2022	Data sources could include other agencies.
VRE Static GTFS	Train	N/A	Sep. 2021	
VRE GTFS-RT	Train	N/A	Sep. 2021	
VRE Parking Data (real-time occupancy and capacity)	Parking	N/A	Sep. 2021	Lot Availability Status Code (1=available,

DEP Data Feeds	Notes	Historical Data	Availability Schedule	Known Data Info
				2=limited, 3=full) and availability count
Waze Incidents and Work Zones	Roadways	Dec. 2016 – Present	Sep. 2021	Work zone data included in the incident data feed as a work zone type.
WMATA Bus non-GTFS Incident	Bus	N/A	Dec. 2021	Free text incident information (e.g. delays, outages, station closures, escalator and elevator outages, etc.)
WMATA Bus Static GTFS	Bus	N/A	Dec. 2021	
WMATA Bus GTFS-RT	Bus	N/A	Dec. 2021	
WMATA Parking Lot Capacity	Parking	N/A	Dec. 2021	
WMATA Parking Occupancy	Parking	N/A	No earlier than Jun. 2022	Parking inventory information. Occupancy information may not be available, but if it is it will be in the form of Lot Availability Status Code (1=available, 2=limited, 3=full)
WMATA Rail Non-GTFS Incident	Metro Rail	N/A	Dec. 2021	Free text incident information (e.g. delays, outages, station closures, escalator and elevator outages, etc.)
WMATA Rail Static GTFS	Metro Rail	N/A	Dec. 2021	
WMATA Rail GTFS-RT	Metro Rail	N/A	Dec. 2021	
WMATA Rail Station Incidents	Metro Rail	N/A	Dec. 2021	

For the most recent update, visit the DEP technical website: <https://rm3p.ritis.org>.

Awarded vendor will be approved for establishing a RITIS/DEP account to access DEP API endpoints, selected agency RITIS-filtered APIs (e.g., incidents and detector data in Maryland and DC) with VDOT's approval, and Inrix probe data API, pending DUA approval.

The Offeror shall identify any gaps in data types needed for its service offerings, as part of its proposal; it should also identify data sources the Offeror can provide to fill some of those gaps. Data currently available from the DEP for evaluation during the proposal phase is shown in Table 4. Offeror may recommend and use other data sources that it has access to for evaluation and service offering calibration.

Dynamic data includes data that has an impact on current operations, such as real-time traffic conditions, current location of bus and train vehicles, and items which change rapidly and will assist the operators of the network in making decisions.

Both static and dynamic data types will be important to operational activities in the region and will drive the response selection of the AI-DSS.

As discussed previously, the AI-DSS will utilize the existing static data, events, and performance data in determining response plan recommendations for the operational agencies. Once a response plan is recommended, the AI-DSS will provide a feedback loop to the affected stakeholders through the Agency Interface (see below). The impacted stakeholders, including the DI vendor, will provide a response (agree, modify, or disagree) for the request and provide this response back to the AI-DSS.

Agency Interface

The purpose of the Agency Interface is to provide the Application Programming Interface (API) for integrating with the Agency's transportation operational systems and the RM3P Data-Exchange Platform (DEP), and the Graphical User Interfaces (GUI) needed for the coordination of responses to incidents, construction, and special events. The Agency Interface is the presentation layer for the AI-DSS in simplest terms, along with the interfaces and APIs for stakeholder agency systems. Stakeholder agencies will have the option to interface the AI-DSS with their operational systems outside the scope of this project. However, the Offeror shall provide ICD document and provide technical input to agencies' system administrators to facilitate agencies' use of AI-DSS API. However, the Offeror shall provide ICD document and provide technical input to agencies' system administrators to facilitate agencies' use of AI-DSS API. Additionally, a notification system to include e-mails and text messages shall be provided to allow notifications to stakeholders for various alarms, actions, and requests from the AI-DSS.

B. Technical Requirements

The technical requirements for the potential AI-Based DSS components are identified in *Appendix B.1*. The requirements are a composite of requirements based on the needs identified by stakeholders, identified in Appendix B, and potential technologies that could be used by the selected Offeror.

C. VDOT Responsibilities

VDOT will be responsible to:

- Designate a project manager.
- Form a project oversight committee to guide and advise the project.
- Facilitate partnering with operation and incident responders and other relevant agencies.
- Provide existing documentation in VDOT's possession on the equipment and systems required to interface with the AI-DSS.
- Approve Offeror's access to the DEP. Coordinate the documentation for an interface with other projects. Acquire an Interface Control Document from other projects such as the DEP, DI, and CPIS project, if required.
- Facilitate and support Offeror's data use agreement approval process for using the probe data.
- Provide priority input and participate in solution elaboration, Agile sprint planning, sprint demonstrations, integration, acceptance testing and implementation, training, and technical standups.
- Review, comment, and approve the documentation and other deliverables.

- Monitor the project's implementation progress and schedule.
- Partner with the Offer team for identifying and mitigating risks.
- Establish performance metrics to be monitored by the AI-DSS system.
- Provide facility access and staff support.
- Participate in requirements reviews, integration testing, acceptance testing, implementation, training, and status meetings.
- Coordinate between Vendors of the other RM3P Program Element systems, particularly the DEP, DI, and CPIS systems.
- Fulfill VITA-required activities and submissions.

D. Selected OFFEROR's General Requirements

The selected Offeror and its subcontractors will be responsible for, but not limited to:

- Deliver the AI-DSS products and services on-time and within budget.
- Designate a project manager and key project team members.
- Provide a resource-loaded Microsoft Project Schedule.
- Utilize an Agile System Development Methodology approved by VDOT.
- Provide detailed system design and integration with complete system design documentation.
- Use a cloud-hosting provider approved by VITA or use the VITA ECOS approval process, prior to contract award
- The proposed approach shall comply with the Commonwealth Enterprise Architecture (EA) policies (EA 200) and standards (EA 225) as published by VITA at <https://www.vita.virginia.gov/policy--governance/itrm-policies-standards/>.
- The Offeror shall review and comply with all relevant Commonwealth Adopted Data Standards. A complete list of all adopted data standards is published at: https://www.vita.virginia.gov/media/vitavirginiagov/it-governance/psgs/pdf/COV_Adopted_Standards.xlsx.
- The Offeror shall review and comply with the Commonwealth COV ITRM Security Policies and Standards, as applicable, found at: <https://www.vita.virginia.gov/it-governance/itrm-policies-standards/>.
- The Offeror shall review and comply with the Commonwealth IT Accessibility and Website Standards found at the following URL: <https://www.vita.virginia.gov/it-governance/itrm-policies-standards/>.
- Test all functional capabilities of the service.
- Provide network and workstation security for service.
- Provide all training/maintenance materials, submittals, and documentation to VDOT.
- Implement a rigorous, structured integration methodology.
- Implement a rigorous configuration and change management system.
- Train VDOT-designated personnel.
- Provide project management and control, including leading periodic progress meetings with (and reporting to) VDOT.
- Provide maintenance and support of their DSS service for the duration of the contract.
- Provide warranty services for the duration of the contract.
- Create and maintain a project file-sharing site during the contract period to:
 - Update project progress,
 - Post documentation, and
 - Post meeting agendas, minutes, and action items.
- Provide all necessary data to VDOT's independent evaluator.
- Provide all necessary input to VDOT for fulfilling VITA requirements.

E. Overview of the Project Approach

Methodology

Innovation is one of the primary principles of the AI-DSS solution, and VDOT will provide an environment where vendors have the flexibility to pursue innovative approaches to problems. However, VDOT is committed to deliver certain functionality on a fixed budget within an established timeframe. To meet both of these objectives, VDOT's expected approach is a Waterfall/ Agile Hybrid methodology. The approach is intended to establish fixed boundaries within which the project will operate, but allow maximum flexibility within those boundaries. Figure 2 shows the overall process.

Steps already completed by VDOT and other stakeholders

The concept has already been developed and is described within Appendix B to this document. Similarly, the high-level requirements have been prepared and are attached in Appendix B.1. However, the requirements are not as detailed as those necessary for a Traditional Waterfall approach since there is no expectation for a full Waterfall systems engineering approach.

The goal of these requirements is to give vendors a clear understanding of the minimal functionality for the system so they can consider resources and capabilities necessary to deliver within budget and schedule constraints.

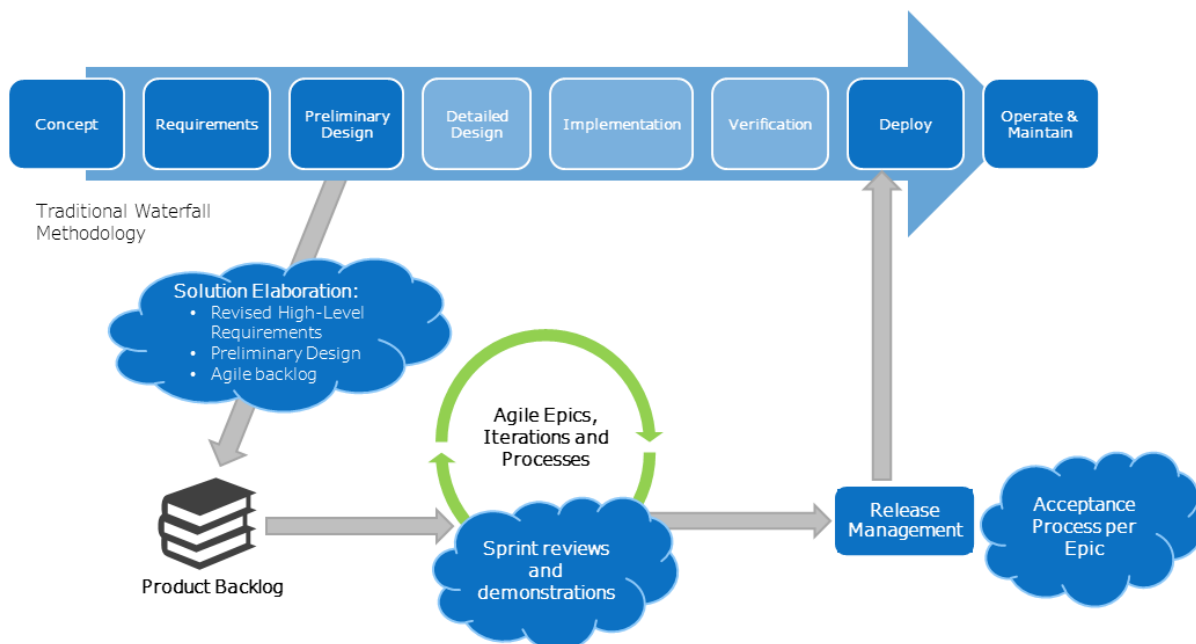


Figure 2: Agile/Waterfall Hybrid Process

Solution Elaboration

One of the first phases of the project under this procurement will be solution elaboration. This phase will be carried out jointly by the vendor and VDOT and will serve as the transition from the Waterfall method to the Agile method. There are key deliverables within this phase:

- Revised high-level requirements: The requirements will be updated to provide additional detail and to take advantage of features available from vendor COTS products or special capabilities. The goal of this document is to provide mutual assurance to both VDOT and the vendor that the solution can be delivered on time and within budget. Detailed requirements will be amended to the requirement document throughout the Sprint development process. It will also serve as the foundation of the Requirements Traceability Matrix which will be used to verify deliverables.
- Conceptual design: This document will describe the following aspects of the system:
 - High-level logical architectures –Identify the major components of the system and how they interact (including components in other RM3P program elements.)

- Data flows for major use cases – Identify what types of data flow to which components through the workings of the system. This will not include detailed data formats, but should identify the nature of all data exchanges.
- Plans or mockups of user experience for major workflows. This will give VDOT a clear picture of the user experience.
- Initial Product Backlog: This document will describe the software that will need to be developed over the duration of the project, including additional functionality, data interfaces, and services being provided. The goal of this document is to mitigate risks which might endanger delivery:
 - The schedule does not have enough time to cope with re-architecting or major re-factoring. Architectural issues must be thoroughly examined and resolved early.
 - Changes to data flows or locations of data residence (particularly regarding personally identifiable data) may force a reevaluation of the project data management processes per VDOT policy.
 - Having a clear picture of the user experience will establish boundaries for all stakeholders and reduce scope creep.

The selected Offeror/Vendor will be responsible for these deliverables, but VDOT will work closely with the Vendor and stakeholders to provide inputs, reviews, and approvals. A critical goal of the solution elaboration phase will be to clearly communicate and document which requirements and features must be delivered within the given schedule and budget.

Development

The Vendor will use the deliverables from the solution elaboration phase to develop the agreed to system. Offeror shall use industry best practices for Agile development; VDOT prefers a Scrum framework. Vendor shall provide the following:

- Visibility into the product backlog and its current state.
- Access to the current sprint schedule, including epics and (if determined) user stories for each sprint.
- Regular VDOT participation in sprint reviews.
- Any modifications to the requirements arising from the agile process must be documented through a process agreed to by VDOT and the Offeror.

Agile Principles

VDOT fully embraces the principles motivating the Agile approach and places particular priority on the following:

- Flexibility to Change: Innovation cannot be perfectly planned in advance. The AI-DSS solution will break new ground, and VDOT and the Offeror need to be prepared to learn and adapt along the way.
- Communication: Candid and effective communication between the Offeror and all stakeholders is a foundational element for a successful project.
- Performing Software: While the AI-DSS solution will be innovative, it is not a research project or a pilot. It is critical that the software is reliable and performant.
- Continuous Improvement: The consumer environment and expectations are constantly evolving. To remain relevant and effective, the solution must also be able to continuously evolve and improve.

Release Management

VDOT expects that, per the Agile methodology, there will be multiple releases of the system as new functionality is added. However, service releases will be tied to payment milestones and will require a formal acceptance and release management process. For those milestones the vendor shall provide the following:

- Acceptance test plan.
- Acceptance test scripts.
- Requirements Traceability Matrix.
- Perform tests under VDOT observation.

For non-milestone releases, VDOT will work with the vendor to determine the best and most efficient process for verification and regression testing.

F. Scope of Work

The expected tasks for the AI-DSS include:

- Task 1: Project Management
- Task 2: Solution Elaboration
- Task 3: System Build and Integration
- Task 4: Service Enablement
- Task 5: System Training
- Task 6: Warranty Support and Operations
- Task 7: ATCMTD Documentation and Administrative Support

Task 1 – Project Management (Offeror)

At a minimum, the selected Offeror's/Vendor's project manager will be responsible for:

- Organizing a project team and managing the team members.
- Providing periodic updates, every 3 months at a minimum, to the work plan and schedules. Changes to the work plan and schedules that exceed 10 percent of the baseline or impact critical path tasks require approval by VDOT through a change management process.
- Submitting monthly project status reports detailing the following:
 - A brief overall project status in 3-5 sentences.
 - Action item updates from the previous meetings.
 - Technical activities and accomplishments during the preceding month.
 - Accomplishment vs. schedule.
 - Technical problems or other issues.
 - Schedule status.
 - Critical path issues.
 - Spending to date, spending vs. percent complete.
 - Plans for the upcoming month.
 - Offeror performance assessment and supporting details.
 - Risk management status.

Management Reports

VDOT requires the deliverables indicated below from the Vendor, in order to monitor progress and ensure compliance:

- Project Management Plan
- Service Development Plan
- Change Management Plan
- Data Management Plan

Project Management Plan

The selected Offeror/Vendor shall develop a Project Management Plan (PMP) which, at a minimum, includes the following sections:

- a) *Scope* – The Vendor will provide an overview of the scope of the service offering, including descriptions of all deliverables.
- b) *Staffing Plan* – The Offeror will identify the key individuals to be involved in the project during negotiations and indicate in the staffing plan the number of personnel assigned to each element of the Tasks. A key individual is defined as a person who is a task leader or individual contributor with specialized knowledge applicable to the project. Any changes to key personnel on the project

will require notification and approval by VDOT. Offeror shall maintain a personnel transition plan for key roles and staff with plans for replacement of personnel over the life of the project. Offeror shall ensure staff availability to meet the scope, schedule, and budget of its proposed solution.

- c) *Detailed Schedule* – The Vendor shall develop a baseline schedule in Microsoft Project based on the WBS and the initial 3-month work plan. This will be described in and referenced by the Detailed Schedule Section. The Project Schedule will be delivered as a separate deliverable.
- d) *Risk Management Plan* – The Vendor shall develop a risk management plan that identifies initial project risks and possible ways to mitigate those risks. The Vendor shall report on the status of each identified risk in the monthly progress report until that risk is fully mitigated. Risks shall be classified as: 1) cost, 2) schedule, and/or 3) scope. Even though the contract is limited to a maximum budget, task budget, scope, and schedule may be adjusted through an amendment process. It is critical that the Vendor keep VDOT informed of any potential impacts to schedule and cost allocations and what steps the Vendor is taking to mitigate adverse cost impacts. It is in VDOT's best interest for the Vendor to meet its cost and schedule commitments, and VDOT will actively support the Vendor in achieving those commitments. When new risks are identified, revision to the pertinent section in the Risk Management Plan shall be issued.
 - The Vendor shall, at a minimum, address the following risk areas which are important to VDOT:
 - Development of new software modules
 - User adoption
 - Platforms for integration and testing
 - Stability of cloud hosting alternatives
 - System security
- e) *Requirements Traceability Verification Matrix* – The Vendor shall develop a Requirements Traceability Verification Matrix to map the functional requirements to their service offering.
- f) *Document Management Plan* – The Vendor shall provide a plan to manage the creation, versioning, and publishing of documents to include the identification of documents that will be iteratively developed during the project's Agile Development process.

Project Risk Register

The Risk Management Plan section in the Project Management Plan shall describe how risks are managed; the Project Risk Register will identify risks and be updated throughout the project. The Project Risk Register will be maintained online with a tool, such as a SharePoint, so the project team and the management team can work with this register collaboratively.

Project Schedule

The Vendor shall develop and maintain a detailed schedule in Microsoft Project based on the WBS and each 3-month work plan that, at a minimum, identifies:

1. Milestones – including those tied to payments
2. Earliest start dates for tasks
3. Latest start dates for tasks
4. Earliest finish dates for task
5. Latest finish dates for tasks
6. Schedule float time in days
7. Duration of tasks in days, where the minimum increment is one day
8. Task names and task numbers
9. Resource loading
10. Critical path information

VDOT anticipates that there will be some changes to the schedule as the project progresses, however, the final completion date shall be firmly adhered to. Any change of the final completion date will require VITA approval in addition to VDOT's approval. The initial schedule should cover the first six months of the project

in detail and the remainder of the project in broader strokes. The Project Schedule shall be updated as needed, at a minimum of every 3 months, by the Offeror and provided to VDOT for review and approval .

Change Management Plan

The Vendor shall prepare and deliver a *Change Management Plan (CMP)* that defines what and how changes will be triggered, requested, reviewed, approved, and scheduled that impact the scope, schedule and budget of their service and may require a contract modification. Any change request proposing a contract modification will require the VDOT Contract Officer's approval. The draft CMP shall be submitted to VDOT within 30 calendar days of NTP. The final CMP will be due within 10 calendar days of receipt of VDOT's comments on the draft document.

Data Management Plan

The Offeror shall prepare and deliver a Data Management Plan (DMP) which describes the solution approach to data storage, governance, and retention outside the DEP. It will describe any security measures and user protections for Personally Identifiable Information (PII) that is part of the system and will adhere to relevant Commonwealth laws and policies. The draft DMP shall be submitted to VDOT within 30 calendar days of NTP. The final DMP will be due within 10 calendar days of receipt of VDOT's comments on the draft document. Format will be compatible with the ATCMTD Data Management Plan requirements.

Project Management Meetings

The Vendor shall organize and host the following administrative meetings. In-person or virtual meetings will be held, as follows:

- Kickoff Meeting
 - The kickoff meeting shall occur within 30 days of Notice-to-Proceed for the project.
- Quarterly Status Meetings
 - The Vendor shall provide monthly status to VDOT via a report, and provide a quarterly status meeting to VDOT and the project Oversight Committee via a virtual or in-person meeting/teleconference.
- Weekly Standup Meetings
 - To address technical matters as input to the Scrum Masters and Product Owners. (During the week that the Monthly Status Meeting is scheduled, the two meetings can be combined.)
- Project Closeout and Post-Mortem Meeting
 - Near the end of the project, the Vendor shall provide a project closeout and post-mortem meeting to provide lessons learned from each phase of the project.
- **Meeting agenda** shall be provided 3 business days prior to all meetings.
- **Meeting supporting materials** (i.e., Presentation slides) shall be provided at least 1 business day prior to all meetings.
- **Meeting minutes** with action items shall be provided within 3 business days after all meetings. Action items progress shall be tracked, monitored, and completed with given deadlines.

Transmittal of Deliverables

Developed Document Deliverables

Document deliverables are an important tool to contain work plans, products, and important decisions made between VDOT and the Vendor and shall conform to the following process for consistent, timely development.

Document Deliverable Process

1. The Vendor and VDOT will agree on deadlines for the document deliverable submittal activities (described below) that fit within and are to be integrated into the project schedule.
2. The Vendor will submit the completed document according to the submittal procedure below.
3. The Vendor shall provide a finalized document after all comments have been completed by the deliverable final due date. A final document shall have the DRAFT watermark removed and the version number of the document incremented to the next whole number.

4. VDOT shall mark the document as final in the document library and email the Vendor that the final document has been accepted.

Document Deliverable Submittal and Review Procedure:

1. The Vendor shall deliver each draft deliverable in an editable format, such as Microsoft Word, to VDOT by the draft deliverable due date.
2. VDOT will review the deliverable and provide comments to the Vendor by the deliverable review due date. Comments will be provided as comment balloons and tracked changes if using Microsoft Word; else, a comments table will be developed by the Vendor which will track each comment's text, reference location within the deliverable, and a place for the Vendor's response, and a status of the comment. VDOT project manager will designate reviewers, if any, in addition to the PM. Other reviewers' comments if conflicts with VDOT PM's, VDOT PM will resolve with reviewers and advise Vendor the final comments.
3. The Vendor will address comments by modifying the submittal and answering questions by the revision due date. Changes to the deliverable shall be tracked using the tracked changes feature of Microsoft Word if the deliverable is in that format; otherwise, a list of changes made to the deliverable shall be provided with the comments' responses.
4. VDOT shall review the Vendor's responses and deliverable changes by the revision review due date. All comments shall be marked as completed using the "Mark as Completed" function of the comment balloon if using Microsoft Word; otherwise, satisfactory completions shall be acknowledged in the comments table.
5. Steps 3 and 4 will repeat until VDOT marks all comments as completed.

Task 2 – System Development Planning

The Offeror shall provide its proposed AI-DSS service using an Agile System Development Process. Project files shall be set up and overall coordination of staff and all agencies involved will be maintained. The goal of this task is to complete everything needed to put system developers in a position to work efficiently to build the system.

The selected Offeror/Vendor will work with VDOT to enhance the system requirements, adding detail and revisions to take advantage of Vendor capabilities. This will be a dialogue between VDOT and the Vendor that will culminate in an updated system requirements document. The Offeror will conduct a requirements walkthrough with VDOT and its representatives to ensure that both have a common understanding of what will be built and what capabilities the system will include. VDOT has sole discretion of the acceptance of any changes to the requirements.

The Vendor will create the initial iteration of the System Design Document (SDD). The goal is that throughout the project the Vendor will add detail to the SDD so that when the project is complete there is a full and coherent description of the system. The intent is NOT to develop a detailed design prior to development; the SDD will ultimately serve as an as-built document. However, VDOT does want the Vendor to write and update the document during the project, rather than after the work is complete. Throughout the life of the project, the SDD will serve as a record of what has been established and achieved to date by VDOT and the Vendor. At this stage, the SDD will describe the:

- Logical architecture of the system as a whole.
- General purpose of each component.
- Implementation technology.
- Deployment environment.
- Connectivity to other components.
- Major data flows and use cases utilizing the component.

The Vendor will use the requirements, solution architecture, and high-level design document to develop the initial product backlog. An additional asset available during this process are the use cases already developed by VDOT (refer to Appendix C, Section 7) and other stakeholders. Many of these can lead directly to the development of user stories, product backlog, and requirements.

The system elaboration tasks include:

System Requirements Specification

The Vendor shall conduct a requirements walkthrough within one month of NTP with VDOT and its representatives to ensure that both have a common understanding of what will be built and what capabilities the system will include. VDOT has sole discretion on the acceptance of any changes to the requirements.

- After this walkthrough is completed, the Vendor shall update the System Requirements Specification with agreed changes and clarifications made during the requirements walkthrough.

AI-DSS Software as a Service Development Plan

Vendor shall develop a detailed AI-DSS Software as a Service Development Plan (SDP) for review and approval by VDOT for their base, expanded, and final services. The elements of the plan will include:

- *Network Development* – The SDP will define how the Vendor plans to use the available data to build the network geometry within the selected area for their prediction and evaluation services. In order to allow the prediction service to line up with the largest amount of systems it is anticipated that any existing transportation network models may be leveraged. All imports, and the processes used will need to be listed, and clearly defined. Any piece of the network that could not be created from available models must be clearly identified in the Gap Analysis along with the associated data needs.
- *Network Calibration Criteria* – The SDP will provide the details on how the network shall be calibrated to correctly represent the real-world operations and capacities. This will include types of data to be used for calibration, and techniques for data adjustment and calibration prior to real-time operation. This is to ensure that a sufficient level of calibration is being planned and that it meets with the accepted practices, at a minimum following the calibration standards and techniques in VDOT's latest Traffic Operations and Safety Analysis Manual (TOSAM), available at: <https://www.virginia.gov/business/manuals-default.asp>, any deviations to TOSAM must be identified during the planning phase. The calibration plan must be approved by VDOT prior to implementation.
- *AI-DSS Validation Criteria* – As a key part to any AI-DSS creation, it is important to document and agree on the Measures Of Effectiveness (MOEs) and their targets that will show that the AI-DSS is valid. These values typically reference the quality of the AI-DSS to represent the roadway flows, travel times and overall queue, and are done both statistically and visually. MOE targets will be proposed by the Vendor for review and approval by VDOT.
- *Gap Analysis* – Vendor will identify any gaps in the existing historical data provided by the DEP and work to address the severity of the gap, the impact of the gap and any potential solutions. It is likely that pieces of network may not be available in the existing transportation network models, and should be identified as part of the gap analysis.
- *Service Scope Planning* – Vendor will identify their phased service offering for their Base, Expanded, and Final service offerings which may include the following, b and c can be completed in any order with rationale provided:
 - a. *Base Service* – Vendor shall deploy a base service for prediction of incidents, congestion and parking availability for a minimum of one sub-region of the Northern Tier. This service will also include response plan elements for this sub-region, and a dissemination process to notify stakeholders when response plans should be enacted. This base service shall be operational no later than 12 months after NTP.
 - b. *Expanded NoVA Service* – Vendor shall expand its service for the additional Northern Tier sub-regions identified in its proposal. This shall be partially completed 18 months after NTP and all sub-regions 24 months after NTP.
 - c. *Fredericksburg Service* – Vendor shall expand its service to the Southern Tier. This service shall be operational no later than 24 months after NTP.
- *Epics Development Plan* – Vendor shall identify the functionality and sprints required for the development of each level of their service identified in the Service Scope Planning. At the conclusion of each sprint and Epic, the Vendor shall provide test results to VDOT on whether the sprints were successful and indicate any risks to the schedule developed.

Task 3 – System Build and Integration

The AI-DSS shall be built and integrated using an Agile Design and Development process for software development tasks. The selected Offeror/Vendor will identify the process for each component of its proposed solution. Once all system components and services have been developed or deployed, the full AI-DSS system integration will be performed to ensure all components and services work together.

The Vendor will be responsible for demonstrating to VDOT that development is progressing according to the schedule. VDOT and/or designated representatives from the oversight committee expect to take part in epic/sprint reviews regularly.

The Vendor shall propose an EPIC schedule at the outset of development. Since the proposed solution could include several potential technologies, the EPICs schedule will be a mixture of traditional engineering tasks (response plan workshops and creation), configuration of services, and Agile-based development.

The following are the expected subtasks VDOT has identified for developing the AI-DSS. However, depending on the technological approach the Offeror proposes, these tasks may be updated as part of its approach to doing this work.

Task 3A – Develop Response Plans

This subtask consists of using existing agency response plans, SOPs, and stakeholder workshops to develop response plan elements and rules for responding to various actual and predicted events within the RM3P region. These response plans should be developed in support of the corridors and hot spots proposed by the Offeror for its SaaS. VDOT expects that response plans will be developed for times of day (AM Peak, PM Peak, off-peak, and special events) and for various congestion levels. Since this task does not include development of a software or system, Vendor will not be required to use an Agile approach.

Response plan elements are to be evaluated by the Vendor using either an offline model, or its prediction engine technology to develop expected benefits for each response plan element for a typical scenario associated with the response plan (ex. Crash on EB I-495 south of US50 during the AM Peak with 2 miles of congested queue.) The evaluation tool shall be provided to VDOT as part of its service offering. This service can be an offline model or as part of its SaaS. The software packages for the offline models shall be identified as part of the AI-DSS SDP and approved by VDOT.

Based on the workshops and the response plans developed, the Vendor shall develop criteria for selection which can be used as part of the logic for the Response Engine development in Task 3B.

Once the Vendor has prepared the response plan elements, criteria for selection, and typical benefits, a workshop with VDOT and stakeholder operations will be performed to present the response plans and elicit feedback. Vendor will use the feedback to update and establish a baseline set of response plan elements, and criteria to be used in the development of Task 3B. This workshop may be repeated by the Vendor for each corridor/hot spot proposed as part of its service offering. At a minimum, a workshop for the Northern Tier and one for the Southern Tier shall be provided.

Task 3B – Implement Response Engine

This task will develop and implement a response engine through a minimum of three iterations of its service (base RM3P, expanded RM3P, Fredericksburg expansion). Vendor shall use the response plan elements and criteria developed in Task 3A as the basis for the logic and response of its Response Engine service.

Solution Elaboration

VDOT must have a clear picture of the user experience early in the process. The Vendor will prepare information on all of the following items which were not already described during Task 3:

- User interface screens for solution management functions (wireframes or other graphics.)
- Workflows, use cases, and/or user stories for major system tasks.
- Descriptions or examples of system reports.
- Additional detail for shared services ICD (e.g., identify individual data elements for those functional data exchanges identified in Task 3.)

The Vendor will create and update a System Design Document (SDD) during development with all new information. VDOT and the Vendor will review the SDD updates together and confirm that the user

experience is on the right track. It is understood that there may be modifications to the design throughout the Agile development process. This review serves as a checkpoint about the user experience.

Sample User Story

In order to assist with high-level understanding of the solution, the vendor shall develop various user stories to ensure agency understanding and agreement to the operational process that the system will provide. The following is an example of a user story for the AI-DSS program.

User Story: Managing an Incident Outside of the AI-DSS Region

Overview: Emergency and operating agencies within the region cooperatively manage the impact of an incident which occurs outside the AI-DSS region.

Concepts and Services Included: Data Fusion, Decision Support, Regional Traveler Information.

Story:

1. Through regional center-to-center (C2C) systems, VDOT and MATOC receive an incident report for an incident that has occurred on I-495 Inner-loop in Maryland.
2. The DEP/RITIS acquires the incident data from the regional C2C data feeds, and the AI-DSS analyzes the incident information, time-of-day, location, and current traffic conditions. Since the incident does not occur within the RM3P region, and currently has no impact on the RM3P area, the DSS does not select a response plan.
3. As the incident progresses, it begins to cause congestion and backup on I-495 into Northern Virginia, the RM3P region. Based on the updated information, the AI-DSS re-evaluates the rules based on the conditions every 15 minutes, until the conditions meet the rules within the Rules Engine to recommend a response plan.
 - a. The AI-DSS selects a response plan to be enacted based on the conditions, time-of-day, and location of the incident. The response plan directs VDOT to update DMS messages with incident information, available commuter lots at relevant locations and recommended detours for drivers traveling towards Maryland.
 - b. The AI-DSS selects a response plan element which sends a trigger API to the Dynamic Incentivization to reduce more vehicle traffic heading to I-495 impacted area.
4. Other strategies include providing pre-trip information through 511, and recommending that travelers either use a different route or to delay their trips. The event information is received by the Incentivization vendor through the Incentivization API, and the Incentivization initiative, in turn, provides users with incentives through the mobile app to change their routes, their modes, or delay their trips in order to reduce the impact of the incident on the local transportation network.

User Story: Managing an Actual Major Transit Incident

Overview: Emergency and highway & transit agencies within the region cooperatively manage the impact of an actual metro rail derailment incident.

Concepts and Services Included: Data Fusion, Decision Support, Regional Traveler Information.

Story:

1. Through regional center-to-center (C2C) systems, VDOT and MATOC receive an incident report from WMATA for a major Metro incident that a metro blue-line train derailment has occurred in a tunnel between Rosslyn and Arlington National Cemetery on Tuesday afternoon. Although another recent Metro rail derailment occurred on July 29, 2016 at the East Falls Church metro station, this major incident simply cannot be predicted by AI-DSS. Both VDOT operators and MATOC facilitators remembered the 2016 derailment incident and the significant impact on commuters and both metro and highway systems for days so they immediately geared up at a high alert and started preparing to manage the impact of the train derailment which could also last for days.
2. WMATA incident data made it to the DEP about the derailment. The DSS Rules Engine analyzes the incident information, time-of-day, location, and current traffic condition and selects a pre-defined response plan to be enacted based on the conditions, time-of-day, and location of the incident. The

response plan directs WMATA to implement bus-bridge between Rosslyn, Arlington National Cemetery and Pentagon stations, VDOT to update DMS messages, Arlington County to adjust local signal timing plans and enact transit signal priority to move buses, VSP and Arlington County Police to direct vehicular traffic away from areas where buses operate (e.g. Route 110) for moving strained commuters.

3. MATOC facilitator noticed that incident update is delayed in the system and coordinated with WMATA for more timely data update.
4. As the incident progresses, WMATA reduces more rail services the next day. Rail service was removed between Rosslyn and Foggy Bottom station in DC on the Blue Line the next day while investigation took place. More free bus bridge replaces train service which puts more demand on the roadway network. DSS Rules Engines recommends an updated response plan due to the expanded impact.
5. A week after the derailment incident, WMATA further updated the service change by drastically reducing rail service for another week as the investigation continues. This reduction not only impact Blue Line trains, but also Orange and Silver Line trains. Again, DSS Rules Engines recommends an updated response plan due to the expanded impact.
6. WMATA notified that service impact will last for another week. The Rules Engine selects a pre-defined response plan to send a trigger API to the Dynamic Incentivization to reduce demand on the already severely limited services. When the event information is received by the Incentivization vendor through the Incentivization API, and the Incentivization initiative, in turn, provides users with incentives through the mobile app to change their routes or cancel their trips to avoid roadways where WMATA bus bridge operates and rewards metro rail riders to telework in order to reduce the impact of the incident on the local transportation network and WMATA services. Other strategies include providing pre-trip information through 511, and recommending that travelers either use a different route or to delay/cancel their trips.

User story based on Metro derail incident that can't be predicted. Goal is to represent how the AI-DSS will help collaborate with multi-modal responses to a major transit incident.

1. Melanie was been busy at work as the clock ticked 5 PM on a Tuesday evening. Time to pack up her laptop bag and walk to the Metro Station to catch the train home.
2. She enters the Pentagon station, waits for her Blue Line train, and pops in her ear buds as she takes a seat on the arriving train. Melanie is listening to her favorite song as she is making her way from the King Street station, only two more stops to be home at Franconia-Springfield. All of sudden, something out the ordinary occurs. The lights in the train turn off and the emergency lights turn on. The train has derailed about a quarter-mile from the Van Dorn Street Station.
3. Thankfully, everyone is safe and emergency personnel escort stranded riders underground for the quarter mile walk to Van Dorn Street Station. Even though Melanie was involved in a stressful situation, she is pleasantly shocked to see that a bus is already awaiting, ready to take her to Franconia-Springfield so that she can continue her journey home. The bus flowed through the local signalized intersections effortlessly during afternoon peak period. How could this be?
4. While Melanie was being escorted, the AI-Based Decision Support System was in action alerting transportation operators from several modes of the derailment incident. The AI-Based Decision Support System suggested recommended response plans for each mode keeping in mind the holistic picture of a multimodal response. WMATA bus transportation operator Max, upon receiving the AI-DSS notification of the derailment, quickly put into action a bus bridge set up between Franconia-Springfield, Van Dorn Street, and King Street Stations.
5. Alexandria's Signal Engineer adjusts the signalized intersection timing to adjust for an increase in bus and as well as Uber and Lyft vehicles to aid the flow of traffic.
6. Even though Melanie was inconvenienced from the derailment, she is thankful transportation operators from various modes utilize the AI-Based Decision Support System looking at the bigger goal of providing coordinated responses!

Agile Development

VDOT anticipates that the Vendor will use an Agile development process and supports this approach, provided the Vendor understands that the final delivery dates for this project are firm. VDOT expects to be informed of the epic/sprint schedules and to participate in sprint review and sprint planning meetings periodically. If VDOT is not satisfied with the sprint review/planning process, then VDOT will request, and the Vendor will organize brief weekly meetings with VDOT's selected personnel to participate in epic/sprint activities. This schedule shall be reported in the form of an Agile Epic/Sprint Development Plan and will be updated as appropriate. Alternatively, the Vendor may provide VDOT visibility into the sprint management dashboard.

The Vendor will be responsible for demonstrating to VDOT that development is progressing according to the schedule. VDOT and/or designated representatives from the oversight committee expect to take part in epic/sprint reviews regularly.

The Vendor should propose an epic schedule at the outset of development. VDOT's notional schedule for this task includes:

- Epic 1: Data integration, workflow, and logic for selection of a response plan
- Epic 2: User interface and application programming interfaces
- Epic 3: RM3P base service
- Epic 4: Expanded RM3P service
- Epic 5: Fredericksburg expansion service

Deployment and Acceptance

The Vendor will provide at least two system environments (production and pre-production). The pre-production environment will be identical to the production environment and will be used for testing and training.

The Vendor will deploy the working solution to the pre-production environment and complete testing and acceptance. Once this is complete and accepted, the Vendor will migrate the solution to the production environment and validate its operation.

The solution will be used by the agency operators, so it is critical that the solution is available and functioning correctly. Once the solution is launched, the Vendor will be responsible for ensuring that the solution is functionally operational 99% of the time.

VDOT expects that working software will be deployed to the production environment at the conclusion of each epic per the release management processes.

Prior to new functionality being deployed to the production environment, the Vendor will prepare an Acceptance Test Plan for review and approval by VDOT. The acceptance testing will cover:

- Functional conformance with all requirements
- User experience
- Stress testing

The test plan will describe the schedule, environment, staff, and dependencies for the testing effort. Stress testing can make use of automated test systems.

The Vendor will prepare Acceptance Test Scripts. The scripts will have detailed instructions for running all tests. The Vendor will prepare a Requirements Traceability Matrix, associating requirements (using revised requirements from Task 3) with test scripts.

VDOT and the Vendor will conduct the tests together in a pre-production environment. Any failures or issues identified during testing will be logged and corrected by the Vendor. Re-testing of the failed test shall occur within 7 business days from test failure.

Vendor shall correct any non-conformities identified during Acceptance testing and re-submit the corrected Services for re-testing within 15 business days of receipt of written notice of non-conformance to vendor, or as otherwise agreed between VDOT and Vendor.

VDOT will work with the Vendor to verify corrections for issues identified during testing.

The Vendor will work with VDOT to determine the most thorough and efficient way to verify that the release does not introduce any regressions.

Deliverables

1. Solution Elaboration
 - a. User interface wireframes or graphics
 - b. Workflows and user stories
 - c. Updates to SDD and user experience checkpoint
 - d. Updated ICD
2. Agile Development
 - a. Agile Epic/Sprint Development Plan
 - b. Epic/Sprint Review and Planning Meetings
 - c. Weekly Epic/Sprint activity meetings if requested
3. Acceptance
 - a. Working solution for pre-production environment
 - b. Verified solution in production environment
 - c. Acceptance Test Plan
 - d. Acceptance Test Scripts
 - e. Requirements Traceability Matrix
 - f. Acceptance Testing
 - i. User Experience Testing
 - ii. Stress Testing
 - iii. Requirements Conformance
4. Task Closeout
 - a. Training Materials

Task 3C – Implement Prediction Engine

This task will develop and implement a Prediction Engine for predicting incidents, congestion, and parking availability. As previously stated, Vendor shall develop a base service for a minimum of a single sub-area of the NoVA region to pilot their incident and congestion prediction service and expand their service offering over time to include the other sub-regions for their full-service offering where data is sufficient based on the Vendor’s review. For parking prediction, Vendor shall propose grouping NoVA parking lots into base and expanded services and then Fredericksburg region parking lots last – this grouping can be based on available real-time and/or historical parking data. Vendor will identify corridors and hot spots with insufficient data and identify additional data that it needs or can obtain to improve the training and accuracy of its service. Additionally, the final service offering will be expanded to include Metropolitan Fredericksburg.

However, **the Offeror shall provide its recommended sub-regions and phasing as part of its technical proposal.** Offeror shall present the selection and sequential rationale to VDOT for approval.

Solution Elaboration

VDOT must have a clear picture of the user experience early in the process. The selected Offeror will prepare information for the following items for the prediction service:

- User interface screens for solution management functions (wireframes or other graphics).
- Workflows, use cases, and/or user stories for major system tasks.
- Descriptions or examples of system reports.
- Additional detail for shared services Interface Control Documents (ICD) (e.g., identify individual data elements for those functional data exchanges identified in Task 3).

The Vendor will create and update a System Design Document (SDD) during development with all new information. VDOT and the Vendor will review the SDD updates together and confirm that the user experience is on the right track. It is understood that there may be modifications to the design throughout the Agile development process. This review serves as a checkpoint about the user experience.

Sample User Story

In order to assist with high-level understanding of the solution, the Offeror shall develop various user stories to ensure agency understanding and agreement to the operational process that the system will provide. The following, is an example of a user story for the RM3P program.

User Story: Managing an Incident on I-395

Overview: Emergency and operating agencies within the region cooperatively manage an accident on I-395 supported by using predictive analytics and a decision support system.

Concepts and Services Included: Data Fusion, Decision Support, Prediction, Coordinated Signal Control, Regional Traveler Information.

Story:

1. Based on historical accident data, current traffic conditions, and time-of-day, the Virginia State Police (VSP) pre-positions police vehicles along I-395 near potential crash zones, as calculated by the prediction system.
2. From cellular or landline 911 reports, VSP is alerted to a possible incident on I-395 within Arlington County. The VSP dispatch creates a new incident and transfers the incident to a dispatcher for response. In the event of injuries or possible injuries, paramedic units (typical response is one paramedic truck and a transport ambulance) are notified via telephone.
 - a. An incident reporting source may be transit dispatchers receiving reports from bus drivers on routes. These reports become transit “incidents” and are passed to the DEP for further dissemination via 511 and agency websites.
3. VSP CAD System feed is sent to VDOT and VDOT PSTOC operators when receive alerts of VSP CAD alerts, verify and accept into ATMS (Open TMS). This incident is made available to DEP, and the RM3P AI-DSS receives the data from the DEP and analyzes the incident information, time-of-day, location, and current traffic conditions to recommend a coordinated response plan. The VDOT Traffic Operations Center (TOC) operator receives an automatic incident notification from the AI-DSS.
4. The VSP dispatcher confirms the existence of the incident, exact incident location, and associated supplemental information as received from investigating officers through online systems or other means. VDOT and DEP receives periodic CAD updates as they occur. Tow-and-recovery resources are called based on agreements.
5. Local jurisdictions exchange congestion and field device status information throughout the incident duration (via the AI-DSS system), including nearby incidents that might exacerbate the arterial incident or impact alternative roadway routing used in detours.
6. The AI-DSS User Interface/Data Interface provides local stakeholders with current congestion information from surrounding roadways, detours, and roadway device activation and associated messages. Transit providers are alerted to detour routes that may impact their transit routes. Recommendations for mode shift (transit, car pool, etc.) are disseminated through traveler information and mobile apps.
7. Filtered information concerning the arterial incident and the response actions may be disseminated to 511, mobile applications, and local websites (3rd-party websites, local agency websites, etc.)
8. The following additional actions may be taken for major incidents – the precise need for and order of action depend on the specific incident situation:
 - a. VSP may activate emergency road closures to isolate the incident. This, in turn, requires coordination with the local police departments, Arlington County traffic signal operators along detour routes and impacted arterials, VDOT, and other local operating agencies.
 - b. For extended blockages or closures (major incident), pre-computed signal timing plans may be activated on diversion routes by individual jurisdictions within the region.
 - c. The prediction engine evaluates the anticipated capacity at parking facilities and anticipated transit crowding to potentially modify response plan elements related to mode shift.
 - d. TOC operators may dispatch safety service patrol vehicles, leverage the use of the Towing & Recovery Incentive Program, or the Incident Management Coordinators.
9. The event information is received by the incentivization vendor through the Incentivization API, and the Incentivization initiative, in turn, provides users with incentives through the mobile app to change their route, their modes, or delay their trip in order to reduce the impact of the incident on the local transportation network.

Agile Development

Refer to Task 3B for full description of expected tasks, VDOT anticipates that the Vendor will use an Agile development process and supports this approach, provided the Vendor understands that the final delivery

dates for this project are firm. VDOT expects to be informed of the epic/sprint schedules and to participate in sprint review and sprint planning meetings periodically. If VDOT is not satisfied with the sprint review/planning process, then VDOT will request, and the Vendor will organize brief weekly meetings with VDOT's selected personnel to cover epic/sprint activities. This schedule shall be reported in the form of an Agile Epic/Sprint Development Plan and will be updated as appropriate. Alternatively, the Vendor may provide VDOT visibility into the sprint management dashboard.

Deployment and Acceptance

Refer to Task 3B for full description of expected tasks, the Vendor will deploy the working solution to the pre-production environment and complete testing and acceptance. VDOT will witness all acceptance testing, or perform acceptance testing prior to deployment. Once the software is complete and accepted by VDOT, the Vendor will migrate the solution to the production environment and verify it there.

Deliverables

1. Solution Elaboration
 - a. User interface wireframes or graphics
 - i. Workflows and user stories
 - b. Updates to SDD and user experience checkpoint
 - c. Updated ICD
2. Agile Development
 - a. Agile Epic/Sprint Development Plan
 - b. Epic/Sprint Review and Planning Meetings
 - c. Weekly Epic/Sprint activity meetings, if requested
3. Acceptance
 - a. Working solution for pre-production environment
 - b. Verified solution in production environment
 - c. Acceptance Test Plan
 - d. Acceptance Test Scripts
 - e. Requirements Traceability Matrix
 - f. Acceptance Testing
 - i. User Experience Testing
 - ii. Stress Testing
 - iii. Requirements Conformance

Task 4 – Service Enablement

The selected Offeror/Vendor shall deploy the AI-DSS into its VITA-approved production cloud environment, based on the Release Management Plan. This plan shall, at a minimum include:

- Deployment Diagram – Provide and describe a figure that depicts where all system products will reside within the operational site(s), and how they can be accessed by VDOT and their partners.
- Verification of Installation – Complete unit testing showing installation and service start-up was successful.

The Vendor shall conduct a service readiness meeting with VDOT prior to enablement of the SaaS solution, for verification and validation of the service.

Task 5 – System Training

The selected Offeror/Vendor shall develop training plans, perform training, and provide training materials for operations and maintenance of the AI-DSS. The Vendor shall provide training as early as it can be scheduled after each service implementation milestone is reached. Training materials will be provided to trainees to include an updated description of system functions, application procedures, and error troubleshooting guides including contingencies and/or alternative modes of operations (backup plan). This will include providing Updated End-User Training Materials, and Updated Technical User Manuals. Training will be provided using scenario-based training for operators using the AI-DSS service. In-person training is preferred and will be recorded and available online for viewing at a later time. All in-person training should follow CDC's guideline to prevent the spread of COVID-19 among staff and attendees. The training tasks include:

Training Plan

Vendor shall develop a Draft Training Plan, which will describe how the system operators and users will be trained prior to operation of the system and on-going training for routine scenario-based training. The draft plan will be provided to VDOT for review and comment. Once comments are addressed, a Final Training Plan will be developed and provided to VDOT for review and approval.

Training Schedule

As part of the project schedule, a high-level training schedule shall be included.

Training Manuals

Vendor shall develop and provide the Training Plan, Training Schedule, and Training Manuals corresponding to the subsystems being built, prior to System Testing and Acceptance.

Training Workshop

The Vendor shall provide an interactive training workshop (in-person and virtual formats) for each subsystem being provided as part of the AI-DSS. Scenario-based training will be used to train operators on using the AI-DSS.

Task 6 – Warranty Support and Operations

The selected Offeror/Vendor shall provide operational support of its service during the warranty period and any subsequent operations and maintenance periods. The services provided during this period shall include:

- Improvements to the accuracy of the prediction service (i.e., training with new data sources).
- Updates and creation of response plans and associated criteria.
- Monthly Service Level Report (compliance with service levels for previous quarter), due on the 5th business day of the month after the quarter ends. The SLA status summary will be developed in tandem by VDOT and the Supplier to be due monthly during the implementation phase, and quarterly during O&M for the term of the Contract. A template shall be provided 30 days after Contract award. The SLA Status Summary will be subject to validation and verification by VDOT.

Any remedies assessed by VDOT shall be due and payable to VDOT no less than 30 calendar days after Supplier's receipt of the notice of remedies owed and, if payment is not made by the due date, the amount of said remedies may be withheld from future payments by VDOT without further notice. The Supplier shall be liable for all remedies imposed by VDOT. Any dispute between the Supplier and provider/subcontractor regarding responsibility for any events giving rise to the imposition of the remedies shall not relieve the Supplier of their liability for said remedies. It is agreed by VDOT and the Supplier that the collection of remedies by VDOT shall be made without regard to any appeal rights the Supplier may have pursuant to this Contract; however, in the event an appeal by the Contractor results in a decision in favor of the Supplier, any such funds withheld by VDOT will be promptly returned to the Supplier.

- Monthly Reports via online dashboard to include:
 - Prediction accuracy for each type of service (incidents, congestion, parking)
 - Response plans implemented and results (expected versus actual)
 - Issues with service and resolution
 - Risks to the service accuracy (e.g., Pandemic, major construction projects, etc.)
- In the event of tool downtime or other event during which a tool is unexpectedly unavailable, support shall resolve this within sixty (60) minutes or less.
- The Vendor will also conduct necessary system maintenance and upgrades on a scheduled basis, with a minimum of five (5) business days advance notice to VDOT, to ensure the AI-DSS performs as designed. These activities include database management, operating system patches, and upgrades to servers, and applying updated security patches.

Other support

- Provide a web-based issue tracking tool for users to collaborate with support staff with the following functions and constraints:
 - Users will be able to report defects, issues, and enhancement requests.
 - This system shall be available 24-hours a day/7-days a week.

- Administrators and support staff will be able to respond to users, update issues with additional information, and log maintenance activities in accordance with the support hours.
- A tracking tool shall be used to track issue status, the staff that worked/is working on the issue, any comments recorded by the support staff, how the issue was resolved, and other issue information agreed upon between VDOT and the Vendor.
- Information collected by the issue tracking tool shall be the property of VDOT.
- The Vendor shall attend weekly operational review meetings with VDOT for the first two months after deployment, followed by monthly operational review meetings for the remainder of the Contract.
- The Vendor shall update all manually updated data sets within one week of when new data becomes available, per their data management plan.
- The Vendor shall provide warranty of its SaaS for the duration of the contract term.
- The Vendor shall provide a **Disaster Recovery Plan** for restoring service in case of failure. The plan shall, at a minimum, include:
 - Recovery Time Objective
 - Inventory of Hardware and Software Needed
 - Personnel Roles during DR
 - DR Sites
 - Outline of Response Procedures
 - List of Essential Documents and Data
 - Crisis Communications Plan – contacts and communication lines during emergencies.
- Vendor shall test its disaster recovery plan on an annual basis, with notification to VDOT on when the test will occur, results and amount of time for recovery of the service. A successful test will demonstrate the ability to fully restore service.

Task 7 – ATCMTD Documentation and Administrative Support

The selected Offeror/Vendor shall support VDOT by providing input and deliverables that are required as part of the federal ATCMTD grant for the Metropolitan Fredericksburg expansion of the AI-DSS and parking availability prediction. The Vendor shall provide necessary documentation supporting the ATCMTD grant for the Expansion to Southern Tier of the service. Deliverables shall be 508-compliant in accordance with the following standard regarding IT Accessibility and 508 Compliance:

<https://www.VDOT.virginia.gov/media/VDOTvirginiagov/it-governance/pdf/ETAITAccessibilityTopicReportGOV103.pdf>

ATCMTD deliverables shall include the following:

- Project Management Plan
- Data Management Plan
- Final Systems Requirements Document
- Final Systems Design Document
- Report Summarizing the Project and Outcomes

GLOSSARY

Acronym	Definition/Full Description
AI-DSS	Artificial Intelligence-Based Decision Support System
AMS	Analysis, Modeling, and Simulation
API	Application Programming Interface
ASD	Administrative Services Division
ATCMTD	Advanced Transportation and Congestion Management Technologies Deployment
ATMS	Advanced Transportation Management System
CAD	Computer-Aided Dispatch
CaBi	Capital Bikeshare
CDC	Centers for Disease Control and Prevention
CMP	Change Management Plan
COTS	Commercial Off-the-Shelf
CPIS	Commuter Parking Information System
C2C	Center-to-Center
DBE	Disadvantaged Business Enterprise
DEP	Data-Exchange Platform
DGS	Department of General Services
DHS	Department of Homeland Security
DI	Dynamic Incentivization
DMP	Data Management Plan
DPS	Division of Purchases and Supply
DRPT	Department of Rail and Public Transportation
DSBSD	Department of Small Business and Supplier Diversity
DTR	Dulles Toll Road
DUA	Data Use Agreement
EA	Enterprise Architecture
ECOS	Enterprise Cloud Oversight Service
EOI	Expression of Interest
FAMPO	Fredericksburg Area Metropolitan Planning Organization
FHWA	Federal Highway Administration
GUI	Graphical User Interface
GTFS	General Transit Feed Specification
GTFS-RT	General Transit Feed Specification – Real Time
ICD	Interface Control Document
IFB	Invitation for Bid
IFQC	Invitation for Qualified Contractors
IT	Information Technology
ITTF	Innovation and Technology Transportation Funds
LEP	Limited English Proficiency
MATOC	Metropolitan Area Transportation Operations Coordination
MMAP	Multi-Modal Analytical Planner
MOE	Measures of Effectiveness
NoVA	Northern Virginia
NTP	Notice-to-Proceed
NVTA	Northern Virginia Transportation Authority
N/A	Not Applicable
PDF	Portable Document Format
PII	Personally Identifiable Information
PM	Project Manager
PMP	Project Management Plan

Acronym	Definition/Full Description
PRTC	Potomac Rappahannock Transportation Commission
PSTOC	Public Safety and Transportation Operations Center
RFP	Request for Proposal
RFQ	Request for Qualification
RITIS	Regional Integrated Transportation Information System
RM3P	Regional Multi-Modal Mobility Program
RWIS	Road Weather Information System
SaaS	Software-as-a-Service
SAM	System for Award Management
SCC	State Corporation Commission
SDD	System Design Document
SDP	Service Development Plan
SLA	Service Level Agreements
SOP	Standard Operating Procedures
SPOC	Single Point of Contact
SWaM	Small, Women-Owned, and Minority-Owned Business
TBD	To-Be-Determined
TMS	Transportation Management System
TOC	Transportation Operations Center
TOSAM	Traffic Operations and Safety Analysis Manual
USDOT	United States Department of Transportation
VDOT	Virginia Department of Transportation
VITA	Virginia Information Technologies Agency
VPPA	Virginia Public Procurement Act
VSP	Virginia State Police
WBS	Work Breakdown Structure
WMATA	Washington Metropolitan Area Transit Authority