Deployment of the:

WASHINGTON STATE VIRTUAL COORDINATION CENTER

for Multimodal Integrated Corridor Management

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Washington State Department of Transportation

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Half of all traffic congestion is due to non-recurring incidents—accidents, disabled vehicles, flooded roadways, trucks losing their loads. In 2018, 302 extraordinary traffic incidents impacted highways in the Seattle area, each lasting 90 minutes or longer to clear. For every minute a highway lane is blocked, 4 to 10 minutes of traffic congestion results, costing the region millions of dollars. Nationwide, traffic incidents result in 1.3 billion vehicle hours of delay at a cost of almost $10 billion a year. Congestion also lead to secondary collisions, increased fuel consumption, and air pollution.

The greater Seattle region is making significant investments in transportation systems management and operations to help manage demand and reduce the impact of incidents. From increased agency collaboration to major highway infrastructure upgrades and expanding non-drive alone options, such as light rail and public transit, State and local governments have invested billions of dollars in capital transportation improvement and safety projects. Private businesses are funding new employee commute solutions to help reduce non-drive alone options and private mobility providers are entering the market providing on-demand and shared mobility services that are quickly growing in scale and impact.

To most effectively leverage these investments, the region recognizes it must coordinate operations, improve communications, and more effectively deploy the resources of the entire transportation community to increase safety and maximize throughput. Technology can greatly assist in this work.

**The Virtual Coordination Center: Enabling integrated corridor management —**

Managing the region transportation system—particularly during major roadway incidents—is a complex, multi-agency responsibility involving state and local transportation agencies, transit providers, law enforcement, and emergency responders. Currently, siloed information systems and legacy communication channels limit agencies’ ability to provide an effective, coordinated response that fully leverages the region’s collective resources and capabilities. Agencies often wait for information before they can act and have little visibility into each other’s decisions. The traveling public is often confused by missing, out-of-date, or conflicting traveler information.

The Washington State Department of Transportation (WSDOT) and its partners are requesting Federal funding to deploy a cloud-based Virtual Coordination Center (VCC) to enable real-time data sharing and coordinated response to quickly clear roadway incidents and reduce congestion. The VCC will pull in real-time data from seven public agencies responsible for transportation management in the greater Seattle area. The data will be shared in a common dashboard that will allow responders across all agencies to see incidents as they happen, make more informed decisions, collaborate in real time to coordinate response and distribute a unified public message. By creating a robust pool of shared data, the VCC will also harness advances in data analytics, machine learning, and predictive modeling to improve regional planning and operations.

The VCC is critical to enhancing regional mobility and safety and is supported by leadership from WSDOT, Washington State Patrol, Seattle Department of Transportation, Seattle Police Department, Seattle Fire Department, King County Metro Transit, and Sound Transit. In 2018, these agency leaders executed a charter establishing the Seattle Area Joint Operations Group, committing to work together to advance the VCC.
During the last two years, these agencies have developed a shared vision of a common virtual work environment for regional mobility management. The vision identifies that three integrated operational components—1) INCIDENT MANAGEMENT, 2) CONGESTION MANAGEMENT and 3) POPULATION MOVEMENT—must work together to effectively manage a complex multimodal system. Collaboration across these three operational communities relies on relationships and processes built and maintained during daily operations. These relationships and shared processes are at the heart of the VCC, providing the region benefit on a daily basis and critical support during major incidents.

Since March 2017, agencies in the Seattle Area Joint Operations Group have jointly participated in the VCC design process, facilitated by the University of Washington Center for Collaborative Systems for Security, Safety & Regional Resilience and private sector partners. They have articulated a preliminary Concept of Operations for how agencies will work together to address specific roadway incidents and mitigate congestion, agreed on essential elements of the VCC, and developed visual representations of the VCC dashboard (see Figure 1).

With critical design work and planning complete and technology partners committed, the VCC is now ready to be deployed. These stakeholders are working to develop, operationalize, evaluate and implement the VCC to ongoing operational status.

- **Develop**: the team will use a participatory, iterative process to deliver the technological capabilities that have been identified by regional mobility managers. In addition, this process will achieve community adoption, buy-in, use, and ownership of the VCC.

- **Operationalize**: Regional mobility managers will use the VCC capabilities within the context of a shared concept of operations. These operational plans will clarify how operators from multiple agencies, working together within the VCC, will leverage the region’s assets—smart signals, transit vehicles and routes, ramp meters, electronic messaging, text alerts, incident response units, traffic officers— to keep the region moving. In addition, detailed governance agreements among State, city, and county leadership will provide joint governance of the VCC and address policy issues, such as data security and privacy.
• **Evaluate and Implement:** The team will formally evaluate the use of VCC capabilities to meet the goals of improved agency coordination, congestion management, and responder and public safety. The team will complete all activities (contractual, funding, maintenance) necessary to transition the VCC to permanent operational status by the “go-live date.” The team will also begin the process of expanding the VCC to serve other regions across Washington state and the nation.

The VCC will have three integrated sets of components to support three key groups of agency users:

### INCIDENT MANAGEMENT TOOLS:

These elements of the VCC will provide real-time information about a specific incident on or off the roadway that is affecting traffic. Data from multiple Computer Aided Dispatch (CAD) sources will be integrated and combined with information from first responders at the scene to provide all agencies with map-based situational awareness of the incident and response as it unfolds. An alert system will quickly ensure all key agencies are notified of incidents and their potential impact on operations.

### CONGESTION MANAGEMENT TOOLS:

During an incident, different agencies have jurisdiction over different tools that could be used to mitigate traffic impacts. For example, WSDOT controls ramp metering and on-highway signage, KC Metro can adjust buses to alternate routes, and Seattle Police can send traffic police to key intersections. The VCC’s Congestion Management tools will create a shared system that allows agencies to deploy these tools in concert and jointly monitor and manage congestion-improving safety by clearing roadways quickly, guiding first responders to incident sites more efficiently, and ensuring regional mobility continues during incidents. The VCC will also provide predictive analysis tools to support the development and refinement of regional response and traffic/transit management plans.

### POPULATION MOVEMENT TOOLS:

Effective communication with the traveling public is a critical element of managing incidents and congestion. The VCC’s Population Movement Tools will support secure interagency communication and trusted information sharing in order to coordinate communication with the public, major employers, and private-sector mobility providers. By providing travelers with timely and unified messaging about service disruptions and recommendations for other modes of travel, the VCC can help make travelers part of the solution, rather than the problem.
The following Project Timeline shows the schedule of completion for each deliverable.

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<th>Project</th>
<th>2020</th>
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<td>Concept of Operations</td>
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<td>Map-based Situational Awareness</td>
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<td>Population Movement Integrated Messaging</td>
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<td>Secure Collaboration Spaces</td>
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<td>Coordinated Regional Response Plans</td>
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<td>Predictive Analysis Tools</td>
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<td>Evaluation and Implementation to Ongoing Operational Status</td>
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![Figure 3: Project Timeline](image)

The VCC project is of great interest to the region’s private sector. The economic benefits of improved corridor management will benefit businesses throughout the region. Private mobility providers see the VCC as an opportunity to provide enhanced multimodal options and improve the traveler experience. Additionally, technology firms recognize that Seattle is not alone in struggling with how to effectively pool and use transportation data—a challenge that will only grow as the transportation industry advances. Given the implications for communities across the US and worldwide, key technology providers have stepped forward with significant private contributions to this project, including leading cloud providers Amazon Web Services (AWS) and Microsoft (Azure).

The VCC will greatly increase the efficiency and effectiveness of interagency operations during major incidents and will enable data-driven traffic management coordination on a day-to-day basis. When deployed, the VCC will:

- **Improve incident response** by reducing communication delays, improving information flow, and leveraging the assets of all agencies. The VCC will enable coordinated agencies to more quickly, effectively, and safely clear major roadway incidents.

- **Reduce congestion** by improving coordinated congestion management strategies, such as quickly opening detour routes, prioritizing and rerouting transit and freight, coordinating with private sector for real time commute trip reduction, and providing the traveling public with actionable information and options.

- **Provide continuous improvement** by allowing agencies to leverage shared data to assess the effectiveness of response strategies and make future improvements.

- **Improve safety** by clearing roadways quickly, guiding first responders to incident sites more efficiently, and coordinating incident and congestion management operations.

- **Increase integrated management of mobility services** by utilizing a robust regional concept of operations supported by shared data and a common working environment.

- **Provide more accurate and actionable information** to the public, freight carriers, businesses, transportation providers and all who rely on the area’s transportation system.