



Traffic Incident Management in Seattle: Observations and Recommendations

July 31, 2015

Sam Schwartz Engineering D.P.C.



July 2, 2015

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Re: Seattle Traffic Incident Management

Dear Director Kubly and Chief O'Toole:

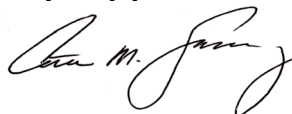
We thank you for the opportunity to assist with Seattle's Traffic Incident Management (TIM) program. The attached report and presentation reflect two plus months of interviews, research on best practices nationwide and the invaluable input of the National Operations Center of Excellence, which provided a peer review by traffic, police and systems experts in TIM from California, Arizona, Ohio, Virginia, Houston and the Federal Highway Administration. They complemented our backgrounds in traffic and enforcement in the State of Washington and New York City.

Quite often it takes a major incident such as the overturned fish truck to spark a jurisdiction to fully adopt the principles of TIM. Seattle wasted no time in starting the process; already there's been reported progress in response and clearance times. We were impressed with the unfettered access we had to interview personnel, visit sites and assess the state of TIM in the city. A lot of people in Seattle are working hard every day to keep the city moving. Nonetheless, the state of the art has progressed to the point where more can be gained through advanced technologies, better training, increased knowledge of the capabilities and tools of various agencies and setting goals on response and clearance times. For the most part these steps are low- to medium-cost and don't require long lead times. What is needed is commitment at the highest levels of government.

We are confident after meeting with both of you that you will provide the direction needed to bring Seattle's TIM program on par with the best in the nation.

Again, we were delighted to be of assistance to Seattle.

Very truly yours,

A handwritten signature in blue ink, appearing to read "Annette M. Sandberg".

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A handwritten signature in blue ink, appearing to read "Samuel I. Schwartz".

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Section A: Executive Summary

Sam Schwartz Engineering and TransSafe (the “consulting team”) were engaged by the City of Seattle in May 2015 to review national best practices in Traffic Incident Management (TIM), evaluate the state of TIM in the City, and make recommendations for improvements to Seattle’s TIM procedures. The project’s genesis was an incident during which slow clearance of an overturned tractor trailer rendered the Alaskan Way Viaduct (SR-99) closed to traffic for nine hours in March 2015. A lack of coordination among agencies in Seattle – including but not limited to the Seattle Police Department (“SPD”) and the Seattle Department of Transportation (“SDOT”) – was immediately identified as a recurring problem in Seattle’s TIM response. A major focus of this project, as a result, was examining how multi-agency responses to major traffic incidents could be improved in Seattle through stronger preparation, training, and agency cooperation.

Seattle’s typical TIM protocols are naturally constrained by the City’s geography—because of a limited number of vehicular crossings over the City’s numerous waterways, any major traffic incident will inevitably exacerbate resulting congestion in the road network. These constraints also can slow response times from City agencies and towing vehicles, and provide few options for detour routes when incidents occur on bridges, highways, or major arterials. And because the City’s “hourglass” shape features the highest job and population densities in and around its narrowest point (Downtown and neighborhoods surrounding it), the challenge to implement effective TIM becomes even greater. All of these constraints require the City to seriously address any internal gaps in its TIM framework and consistently aim to achieve quicker response and clearance times through coordinated efforts by all relevant stakeholders.

This project consisted of three distinct parts, described below, and which are included as sections B, C, and D of this report. A copy of the presentation given to Seattle Mayor Ed Murray on June 29, 2015 and a summary infographic on tiered incident response expectations for SPD and SDOT are included as appendices to this report.

1. **Review of national best practices in TIM (Section B).** The consulting team reviewed a wide variety of national documents that outline common approaches to TIM. Supporting documents from states and cities (including Washington State; Portland, Oregon; California; and New York, New York) supplemented national materials. Many of the documents reviewed from local jurisdictions (state and city) contained language mirroring federal guidelines. This consistency is a positive sign that shows a general consensus on TIM procedures nationwide, and Seattle would benefit from formally adopting its own TIM guidelines and implementing similar processes.

The best practice review looked at how a strong TIM program addresses all stages of TIM, including:

- a. Incident detection, verification, and notification;

- b. Incident response, site management, and clearance;
- c. Traffic management at and around incident sites;
- d. Dissemination of information to the travelling public;
- e. Communication among City agencies;
- f. After-action reviews, TIM evaluation, and consistent TIM training.

2. **Interviews with City personnel and a workshop with national experts to identify gaps in Seattle’s TIM process (Section C).** The consulting team interviewed numerous staff members from SPD and SDOT to gain a sense of the state of Seattle’s current TIM procedures. In mid-June, a workshop was held in Seattle to further identify gaps in TIM via an interactive session with national experts in TIM. Through a partnership with the National Operations Center of Excellence (“NOCoE”), seven experts from diverse backgrounds and geographies convened in Seattle for a roundtable discussion with participants from SPD, SDOT, the Seattle Fire Department (“SFD”), Seattle’s Department of Finance and Administrative Services (“FAS”), Seattle’s Office of Emergency Management (“OEM”), and the Port of Seattle (“Port”). The consulting team led a full-day discussion that touched on all aspects of TIM in Seattle and the NOCoE experts provided feedback on potential improvements.

Key findings from this evaluation that form the basis of the recommendations for TIM improvements include:

- a. Seattle lacks comprehensive plans and policies for TIMs.
 - b. TIM training is lacking or non-existent in all agencies.
 - c. SPD needs a better understanding of why “quick clearance” matters and how to make it happen.
 - d. SDOT needs to better coordinate with SPD before, during, and following incidents.
 - e. The current towing contract may be too restrictive and harm effective TIM.
 - f. The City lacks clarity on ordinances that are necessary for quick clearance and full enforcement against commercial vehicles.
 - g. A greater sense of urgency is needed at all levels when incidents occur.
3. **Recommendations for improvements to TIM in Seattle (Section D).** The consulting team used its research on best practices, its interviews with local officials, and the findings of the TIM workshop to inform a set of recommendations for Seattle to implement that would holistically improve its responses to future traffic incidents. These recommendations have been vetted and discussed with SPD and SDOT and the agencies are mutually in agreement of the need to implement them based on priority levels and timelines defined in this report.

Immediate next steps include:

- a. The City of Seattle will move forward in implementing high-priority recommendations.

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Section A: Executive Summary

- b. SPD, SDOT, Finance and Administrative Services (“FAS”), and the Seattle Fire Department (“SFD”) will form an interdepartmental team that meets monthly to develop an implementation plan for the recommendations.
- c. The interdepartmental team will report back to the Mayor on its progress in January 2016.

A summary of the consulting team’s recommendations is as follows. More detailed recommendations can be found in Section D of this report:

- a. Teamwork and Creating a Citywide Culture for Improved TIM: Changes to TIM must start at the top. SDOT and SPD personnel need constant reinforcement on the importance of communication on TIM.
 - i. Develop messages from leadership and from the executive level
 - ii. Share equipment among agencies
 - iii. Partner with private sector on information sharing
 - iv. Brand the TIM effort to the public
- b. Establishing a Citywide TIM Program: Seattle lacks a comprehensive, citywide approach to TIM and must establish a formal TIM program.
 - i. Start with an MOU among involved agencies: SPD, SDOT, SFD, OEM, and FAS
 - ii. Develop a mission statement for TIM in Seattle
 - iii. Develop a policy manual after best practices in TIM (federal and Washington State materials)
- c. Creating a Comprehensive TIM Training Program: Training is critical for effective response during incidents. Training in TIM is lacking across all levels in Seattle.
 - i. Train SPD Traffic Division officers and appropriate personnel at SDOT – with deadlines for completion
 - ii. Develop TIM “champions” at SPD and SDOT to ensure training occurs with the right people
 - iii. Conduct periodic multi-agency trainings and monthly multi-agency TIM meetings
- d. Leveraging Expertise from the State: Washington State has a model TIM program but Seattle does not participate in any activities. The City should take advantage of these resources.
 - i. Use Washington State Department of Transportation (WSDOT) and WA TIM Coalition certified trainers
 - ii. Partner with regional players for coordination on TIM
 - iii. Seattle should join Washington State’s “TIM Network”
- e. Improving On-Scene Response and Formalizing SPD’s Role: SPD is usually first on-scene and controls much of the TIM process on the ground, including clearance times and implementing detours.

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- i. Develop new policies for SPD responders on clearance priorities
 - ii. Team with SDOT personnel on major incidents
 - iii. Review the need for a city “Hold Harmless” ordinance and educate SPD on the law
 - iv. Stage locations for response vehicles
 - v. Develop agreement between city agencies on the appropriate deployment of Parking Enforcement Officers during a traffic incident
- f. Improving Transportation Operations Outcomes and Formalizing SDOT’s Role: Through the Transportation Operations Center (TOC), SDOT has the ability to support SPD and limit the impact of incidents.
- i. Provide “gridlock alerts” following major incidents that severely impact the road network
 - ii. Provide SDOT with access to SPD’s Computer-Aided Dispatch (CAD) logs to better respond and track data on incidents
 - iii. Create plans for re-routing after incidents on major arterials and bridges
 - iv. Modernize TOC to identify incidents more quickly and staff with a full-time SPD presence
- g. Evaluating Towing Contract and Operations: The City’s towing contract with one company may restrict its ability to clear incidents quickly. Towing must be incorporated into City efforts for effective TIM.
- i. Enforce terms of towing contract and consider creating incentives for quick response by tow company
 - ii. Incorporate tow companies in City TIM training
 - iii. Establish a “free tow” program to remove disabled vehicles immediately from SR-99, major arterials, and bridges
 - iv. Explore how new tow contracts and amendments can better serve clearance needs
- h. Creating Successful Commercial Vehicle Enforcement: Freight traffic causes the most severe incidents and a lack of commercial vehicle enforcement (CVE) hurts Seattle.
- i. Establish an MOU with the Port of Seattle (“Port”) and set regular meetings on TIM and CVE
 - ii. Team up with Port to improve CVE, since a high percentage of freight comes in and out of the Port
 - iii. Review which City agency should lead CVE
 - iv. Pass a City ordinance that mirrors federal and state regulations on CVE. Train City personnel to enforce.
 - v. Consider technology upgrades that can make CVE more realistic on a day-to-day basis
- i. Evaluating TIM through Data Collection: A robust TIM program must have performance measures in order to keep the focus on improvements in clearance times. It can also help with public awareness of efforts being made.

Seattle Traffic Incident Management
Section A: Executive Summary

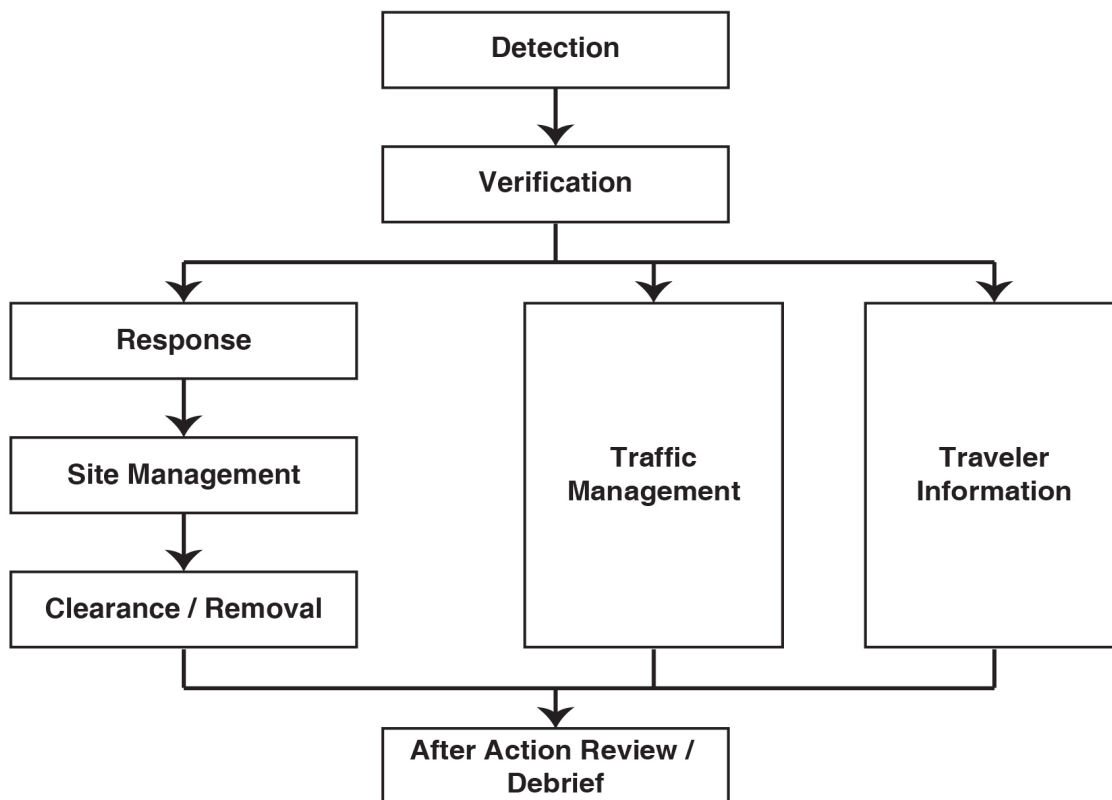
- i. Provide consistent media outreach and public information during incidents
- ii. SDOT to continue to expand its data collection, but needs technology upgrades and cooperation from SPD
- iii. Re-evaluate Seattle's TIM program in 6 months to 1 year following input of recommendations

Section B: Best Practices Report

Sam Schwartz Engineering and TransSafe (the “consulting team”) engaged in a review of relevant standards on Traffic Incident Management (TIM) through manuals, presentations, and other materials produced by federal government sources along with documents from states and cities across the United States. An overarching theme found in the review was the consistency of TIM best practices. Many of the documents reviewed from local jurisdictions (state and city) contained language mirroring federal guidelines. This consistency is a positive sign that shows a general consensus on TIM procedures nationwide. Seattle would benefit from formally adopting (if not already done) Federal Highway Administration (FHWA) TIM standards and, more importantly, implementing the processes recommended in those guidelines which are described in this best practices report.

While every incident is unique and requires condition-specific judgement on decision making, TIM guidelines aim to standardize the nature of responses to anticipated and unanticipated events that place a burden on transportation networks. These decisions should be governed by a set of Standard Operating Procedures (SOPs) and communication protocols that form the backbone of a strong TIM program. One classification of the stages of TIM, as defined by FHWA, is presented below:

Figure 1: Stages of Traffic Incident Management (TIM)



(Source: FHWA)

This best practices review presents elements of these protocols broken down by the different stages of a typical TIM response. It also includes other relevant information on a TIM program such as communication channels, the use of technology, and the need for regular TIM training and collaboration.

Seattle Traffic Incident Management
Section B: Best Practices Report

The report is divided into the following sections:

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I. Entities Involved in TIM

1. *[FHWA presentation to Portland, OR]*: The following is a non-exhaustive list of entities that could be involved in TIM. Not all are required for every incident:
 - a. Public Safety
 - i. Law Enforcement
 1. Local/municipal Police Departments
 2. State Police/Patrol
 3. County Sheriff
 - ii. Fire Departments
 1. Local/municipal Fire Departments, including volunteers
 2. Airport Fire Departments (as appropriate)
 3. Emergency Medical Service (EMS) providers
 - iii. State Environmental Agency
 - iv. Public Safety Dispatchers (9-1-1, Public Safety Answering Point, etc.)
 - v. Emergency Management (including Emergency Operations Center personnel)
 - vi. Medical Examiners/Coroners
 - b. Transportation
 - i. Local, State, and Federal Departments of Transportation
 1. Traffic Management/Operations Center personnel
 - a. Traveler information specialists
 2. Transportation Operations/Maintenance/Public Works
 - a. Traffic Engineering
 - b. Toll Authorities
 3. Service Patrols (contracted and/or agency-staffed)
 - a. May also be law enforcement affiliated
 - ii. Local or Regional Transit Agencies
 - iii. Planning Organizations
 1. Regional/Metropolitan Planning Commissions/Organizations
 2. Regional Transportation Authorities
 3. Regional Council of Governments
 - c. Towing, Recovery, and Specialized Clean-Up Services
 - i. Towing & Recovery companies (including those on law enforcement rotation lists and/or contracts)
 - ii. Heavy-duty wrecker providers
 - iii. Hazardous Materials (HAZMAT) clean-up specialists
 - iv. Waterway, natural resource specialists

- d. Media
 - i. Traffic Reporters

2. **[WSDOT WSP Joint Operations Policy Statement]**: Washington State categorizes involved entities as follows:
 - a. Washington State Department of Transportation (WSDOT) (Transportation)
 - b. Washington State Patrol (WSP) (Law Enforcement)
 - c. Fire/Rescue/EMS (Life Safety)
 - d. Tow & Recovery
 - e. Communications Centers (State)
 - i. WSP – Radio, Public Information Officer (PIO)
 - ii. WSDOT – Traffic Management Center, Radio, Closed Circuit Television (CCTV), 511, PIO
 - f. Communications Centers (Regional)
 - i. Regional 911

3. **[FHWA TIM Handbook]**: The traditional responders involved in TIM generally have the following roles. Further information on these tasks is provided throughout individual sections of this memo:
 - a. Emergency 911 (E911) Dispatchers: E911 personnel are normally the first responders to have knowledge that an incident has occurred. The mission of dispatchers is to quickly, accurately, and completely convey the necessary information to the proper agencies and field personnel to get the right personnel and equipment to the scene as quickly as possible. E911 personnel normally begin the data collection on an incident by recording information in a Computer-Aided Dispatch (CAD) system.
 - b. Law Enforcement: In many cases, law enforcement is the first to arrive at the incident scene. Upon arrival, the first officer on scene assesses the situation and calls for additional resources (fire, EMS, and towing and recovery, among others) as needed. The officer secures the scene for responder and motorist safety, and conducts traffic control as necessary. Law enforcement also conducts scene investigation and/or evidence collection as dictated by the incident scene and severity.
 - c. Fire and Rescue: In some cases, fire and rescue personnel may be the first responders to arrive at the incident scene. Upon arrival, fire and rescue personnel secure the scene to protect responders and motorists. Upon securing the scene, these personnel assess injured parties, and if warranted, request EMS support. Fire and rescue personnel provide first aid until EMS personnel arrive (if requested). Fire and rescue personnel

address any fire or potential fire hazards and assist in scene recovery. In most locations, they also assess the scene for hazardous materials (HM) and notify remediation or cleanup contractors, as needed.

- d. Emergency Medical Services: The primary responsibility for EMS is to assess injuries, administer triage on-scene as needed, and remove injured parties quickly to medical facilities for additional care. In those areas of the country where EMS is a fire-based function, the fire and rescue personnel provide EMS functions.
- e. Towing and Recovery: The towing and recovery personnel primarily remove disabled vehicles, clear incident debris, and clean up spilled cargo.
- f. Transportation Agencies: Within transportation agencies, it is the operational sections—Traffic Management Centers (TMCs), maintenance field staff, and Service Patrols—that play a critical role in TIM. TMCs serve as the hub for the collection and dissemination of incident information and play a critical role with incident detection and verification. At the incident scene, transportation agency responders focus on temporary traffic control, expedite scene clearance, and restore traffic flow. Transportation agency responders include maintenance personnel and specialized traffic incident responders, such as maintenance and service patrol personnel.

II. Incident Detection and Response Prioritization

1. *[FHWA – Best Practices in TIM]*: Detection is the determination that an incident of some type has occurred. Incidents may be detected in person by motorists or response personnel, or through automation using electronic loop detectors and associated incident detection algorithms, or traffic cameras.

2. *[WSDOT WSP Joint Operations Policy Statement]*: As they are detected, incidents can be categorized to determine prioritization of resources in response. This is especially important if multiple incidents occur simultaneously. A framework for prioritization of incident response, from most urgent to least, is as follows:
 - a. Injury collision blocking a travel portion of the roadway
 - b. Non-injury collision blocking a travel portion of the roadway
 - c. Disabled vehicle blocking a travel portion of the roadway
 - d. Abandoned vehicle blocking a travel portion of the roadway
 - e. Emergency traffic control operations
 - f. Debris blocking one or more travel lanes of the roadway
 - g. Collisions not blocking the travel portion of the roadway
 - h. Disabled vehicles not blocking a travel portion of the roadway
 - i. Abandoned (not occupied) vehicles not blocking the travel portion of the roadway presenting a hazard to the travelling public

3. *[WSDOT WSP Joint Operations Policy Statement]*: Prioritizing how responses are “triaged” is critical to limit the negative externalities of a delayed response. One study found the following for societal costs of: 1) general incidents; and 2) incidents that specifically result in a travel lane closure:
 - a. For every minute of an incident the average societal cost is \$244
 - i. A 15 minute incident would cost \$3,660
 - ii. A 30 minute incident would cost \$7,320
 - iii. A 90 minute incident would cost \$21,960
 - b. For every minute of an incident with a ‘Lane Closure’ the average societal cost is \$345
 - i. A 15 minute incident would cost \$5,175
 - ii. A 30 minute incident would cost \$10,350
 - iii. A 90 minute incident would cost \$31,050
 - c. These studies include delays on rural highways as well as urban areas. For travel lane closures in congested urban areas like Seattle, the cost of delay is likely far higher.

III. Incident Verification

1. **[FHWA – Best Practices in TIM]:** Verification is the determination of the precise location and nature of the incident. Accurate and detailed information about the incident can help to ensure that the most appropriate personnel and resources are dispatched to the scene. Verification can be accomplished in the field utilizing on-site response personnel or remotely using closed-circuit television (CCTV).
 - a. **Field Verification by Onsite Responders:** A common means of incident verification is through the initial dispatch of law enforcement personnel to the incident scene. Once on-scene, the officer assesses the incident, determines response needs, and requests appropriate response through dispatch. This method is particularly effective where traffic congestion does not unduly restrict travel time to the detected incident.
 - i. Service patrols can provide similar incident verification capabilities. Under congested conditions, roving service patrols may be quicker to arrive at an incident scene due to their closer proximity.
 - ii. In the Hudson Valley region in New York, Highway Emergency Local Patrol (HELP) vehicles are equipped with a live video stream back to the traffic management center (TMC) housing the New York State Department of Transportation and State Patrol. Onboard dash cameras relay real-time incident information to dispatchers ensuring the proper and expedited dispatch of equipment. The use of streaming video was found to be extremely helpful for remote transportation and law enforcement personnel in determining the incident characteristics and subsequent response needs.
 - b. **Closed-Circuit Television Cameras:** CCTV cameras provide limited-access video images for traffic-monitoring purposes. Improvements in picture quality, pan and zoom capabilities, and video data transmission rates have made CCTV a very useful incident verification tool.
 - i. The effectiveness of CCTV cameras is dependent upon the extent and adequacy of camera coverage. In 2007, the Intelligent Transportation System (ITS) Deployment Survey estimated that approximately 36 percent of all freeway miles across 76 U.S. metropolitan areas were equipped with CCTV cameras.
 - c. **Frequent / Enhanced Roadway Reference Markers:** Installing more frequent roadway reference markers can help to ensure that motorists accurately report incident location. Additional directional and route information can also be included on the markers.
 - d. **Enhanced 9-1-1 / Automated Positioning Systems:** Enhanced 9-1-1 systems—that automatically associate a physical address or location with

the caller's telephone number, display the caller's location information to the dispatcher, and route the call to the most appropriate Public Safety Answering Point (PSAP)—can improve both the accuracy of incident reports and help to alleviate dispatcher overload. For incoming calls made from cellular telephones, a variety of automated positioning techniques can be used.

2. **[Caltrans TIM Guidelines]:** Incidents under the purview of California's state Department of Transportation (Caltrans) and the California Highway Patrol (CHP) are detected, verified, and logged into databases: Caltrans' Major Incident Data Base (MIDB) and Transportation Management Center Activity Logging (TMCAL) and CHP's Computer Aided Dispatch (CAD) systems. The current agreement between Caltrans and the CHP is that incidents that are tracked and reported in the MIDB are all unplanned, non-recurring events that reduce highway capacity and require both agencies to respond to the incident scene.
 - a. Caltrans also recommends first responders to take photos for additional verification: "A picture is worth a thousand words":
 - i. Using smart phone, tablet or other device, take two to three pictures of the scene and transmit them to dispatch so they can transmit them to the other first responders. Focus on critical information requirements:
 1. Overall scene photo
 2. Placards for any possible hazardous waste
 3. Gross Vehicle Weight Rating (GVWR) placard on the vehicle's driver's side doorframe.
 4. Photo of any spilled load with a description of what was spilled
3. **[FHWA – Best Practices in TIM]:** Effective incident detection and verification can improve access to the scene for incident responders, support appropriate personnel and equipment dispatch to the scene, improve responder safety by alerting them to potentially dangerous conditions at the scene (i.e., fire or hazardous materials), reduce secondary incidents, and save lives by ensuring that vehicle crashes are detected on low-traffic roadways.

IV. Incident Definition

1. *[National Cooperative Highway Safety Research Program TIM Guidance]*: Once detected and verified, an incident should be categorized to determine the level of response and agencies or parties that will need to participate in the response. A hierarchy for categorizing incidents is as follows:
 - a. Major Incidents: Traffic incidents involving numerous vehicles, fatal crashes, HAZMATS, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding two hours. Traffic control is implemented.
 - b. Intermediate Incidents: Affecting travel lanes for a time period of 30 minutes to two hours and usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might be needed for short periods during incident clearance to allow incident responders to accomplish their tasks. Traffic control is implemented.
 - c. Minor Incidents: Disabled vehicles and minor crashes that result in lane closures of less than 30 minutes. On-scene responders are typically law enforcement and towing companies and occasionally highway agency service patrol vehicles. Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally possible or practical to set up a lane closure with traffic control devices for a minor traffic incident.
2. *[National Cooperative Highway Safety Research Program TIM Guidance]*: In addition, classifications for injury severity could be similarly used to assess TIM performance. Injury severity classifications might include:
 - a. Fatality
 - b. Injury
 - c. Property Damage Only
3. *[FHWA TIM Handbook]*: For incidents requiring traffic control (generally all major and intermediate incidents), a Traffic Incident Management Area (TIMA) can be created:
 - a. A TIMA is defined as an area of a highway where temporary traffic control (TTC) is imposed by authorized officials responding to a road user incident, natural disaster, hazardous material spill, or other unplanned incident. The TIMA extends from the first warning device (such as a sign, light, or cone) to the last TTC device, or to a point where vehicles return to the original lane alignment and are clear of the incident.
 - i. The Manual of Uniform Traffic Control Devices (MUTCD) chapter 6I contains detailed guidance on the recommended size of a TIMA, depending upon road configuration, vehicle speed, and weather conditions.

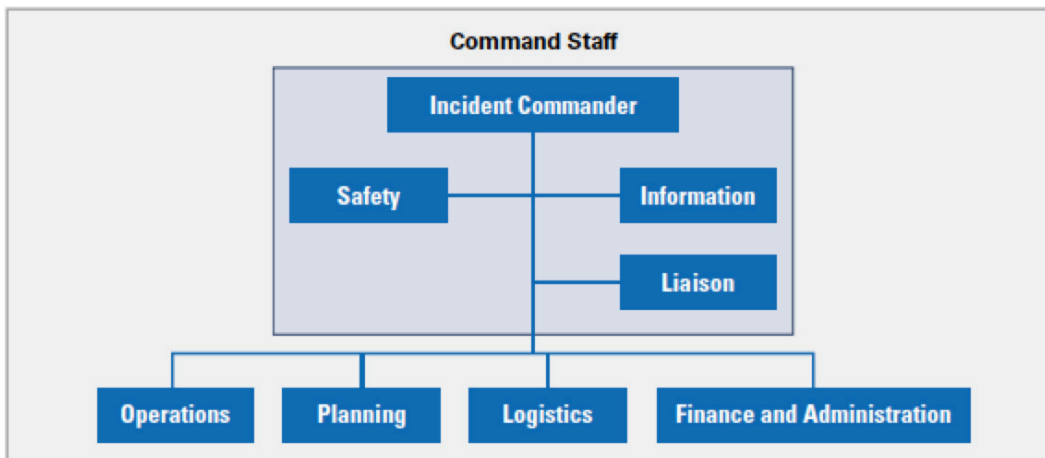
V. Incident Command Structure and Responsibilities

1. **[FHWA TIM Handbook]: Incident Command:** TIM activities should be run through an Incident Command Structure (ICS). Incident Command (IC) represents a function, not a person, and is responsible for all aspects of incident response including management of public affairs, health and safety, and liaison activities within the incident command structure. Command determines the size and structure of the ICS organization needed to respond to an incident and makes all decisions with respect to the need to implement all aspects of the ICS.
 - a. Members of an ICS include the following (also see flowchart below):
 - i. Incident Commander: Responsible for management and control authority over an incident, including setting incident objectives and ensuring that all responding entities meet these objectives. These responsibilities include:
 1. Has the authority to assume command.
 2. Knows agency policy.
 3. Ensures incident safety and establishing response priorities.
 4. Establishes an incident command post.
 5. Initiates and controls communications, and approves information released through the PIO.
 6. Determines incident objectives and strategies to be followed and approves, implements, and evaluates the Incident Action Plan.
 7. Coordinates traffic management and control operations.
 8. Approves resource requests.
 9. Oversees incident demobilization and reporting
 - ii. Public Information Officer (PIO): Interfaces with the public and media and/or with other agencies with incident-related information requirements, and monitors public information.
 - iii. Safety Officer (SO): Responsible to the IC for the set of systems and procedures necessary to ensure emergency responder safety, as well as the general safety of Incident Operations. The SO has emergency authority to stop and/or prevent unsafe acts during incident operations.
 - iv. Liaison Officer: Point of contact for representatives of other governmental agencies, nongovernmental organizations, and/or private entities.
 - v. Operations Arm: Responsible for all tactical operations.
 - vi. Planning Arm: Assists with the development of the Incident Action Plan (IAP), maintains resource use and situation status, and

provides technical resources needed to particular aspects of incident response activities.

- vii. Logistics Arm: Provides personnel, facilities, and materials support to the entire incident response effort.
- viii. Finance and Administration Arm: Tracks costs and accounts for reimbursements.

Figure 2: Incident Command Structure



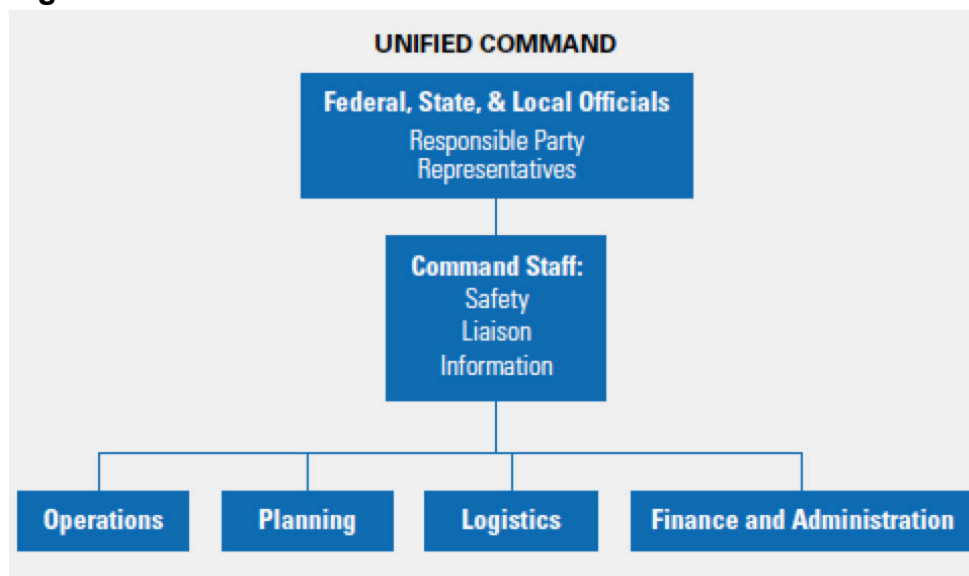
Source: FHWA

- 2. **[FHWA TIM Handbook]: Unified Command:** A single IC structure should be used when an incident occurs within a single jurisdiction, and there is no jurisdictional or functional agency overlap. When multiple jurisdictions or agencies are involved, Unified Command (UC) can be applied for incident management.
 - a. UC is recommended as the command structure when an incident response activity:
 - i. Involves two or more responding agencies within a jurisdiction that each has a functional responsibility for a major tactical activity related to incident response (e.g., traffic control, medical attention, or crash investigation).
 - ii. Impacts more than one political or legal jurisdiction (for example, a municipality and a county, or a municipality and a State), and requires response by multiple agencies from the same discipline (for example, county and/or municipal fire department, or State and/or local police).
 - b. UC differs from the sole incident command structure in that the IC function is handled by multiple participating agencies, and not a single Incident Commander. UC has the same Command function responsibilities as

does a single IC, but uses a different organizational structure to implement these responsibilities.

- c. Under a UC, each responder agency designates an official responsible for specific disciplines to serve as the agency's representative to the UC, and the UC, as a whole, establishes common objectives and strategies for incident response. In a UC, individuals designated by their jurisdictional authorities (or by departments within a single jurisdiction) jointly determine objectives, strategies, plans, and priorities and work together to execute the integrated incident operations.
- d. The proper "mix" of responding agencies within a Unified Command structure depends on the location and nature of the incident. While the UC generally makes decisions based on a consensus of the agencies included in the UC, the lead agency can make a final decision on any issue that the UC is not able to resolve on a consensus basis. This "lead agency" status may change as particular activities take priority during the course of incident response and as the IAP is executed.
- e. By jointly developing the IAP, UC enables agencies to develop a single set of objectives and strategies for responding to an incident, to avoid duplication of effort, and to coordinate the efforts and resource deployments across all responder agencies.
- f. The UC replaces the Incident Commander function and becomes an essential component of an ICS. In this way, the UC provides the organizational management tool to facilitate and coordinate the effective involvement of the various agencies; it creates the link between the organizations responding to the incident and provides a forum for these agencies to make decisions with which all responders can agree.
- g. The Command function is comprised of the multiple responder agencies—Federal, State, local—that meet the criteria of having a functional responsibility for a major tactical activity. Otherwise, the organizational structure is the same and the command staff and sections have the same duties and responsibilities as under the ICS. (See flowchart below):
- h. For information on preparation and implementation of a UC, see the Training section of this report.

Figure 3: Unified Command Structure



Source: FHWA

3. **[FHWA TIM Handbook]: Unified Command Example:** A hypothetical example of UC in action can be illustrated where two passenger vehicles are involved in a collision. One driver is not injured and is able to get out of the damaged vehicle. The other driver is severely injured and needs to be extricated from the vehicle.
 - a. Responders to the incident include a fire department and an EMS responder, law enforcement, a DOT Service Patrol and the local news media.
 - b. Law enforcement is the first to arrive at the incident and immediately implement the procedures for UC.
 - c. The incident involves multiple responders that have a functional responsibility for a major aspect of the incident, a criterion for implementing a UC:
 - i. Law Enforcement: Secures incident scene; first responder; crash investigation; traffic control.
 - ii. Fire Departments: Rescues/extricates victims; contains/mitigates a HM release; protects incident scene.
 - iii. EMS: Provides medical treatment to injured parties at the scene; transports victims for additional medical treatment; determines destination and transportation requirements for injured victims.
 - iv. DOTs: Protects incident scene; provides traffic information; develops and operates alternate routes; implements traffic control strategies.
 - d. Each agency has functional responsibility, and is able to provide assistance (resources, personnel) to support incident response

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operations. Each agency also is responsible for a major component of the command or coordination efforts involved in the incident response activities.

- e. A contracted tower who arrives on scene to remove the damaged vehicles is not included in the UC. This is because the tactical activities are directed by agencies already represented in the UC. The contracted tower's input into response activities is provided to the respective UC representatives, and the tower's role in the response activities are defined as "technical specialist".
- f. Initially, law enforcement is designated as the "lead agency" within the UC, since it meets the requirement of the primary mission. However, as the Incident Action Plan (IAP) is implemented and incident response activities change, the "lead agency" designation moves to other agencies as different tactical activities take priority during the response process.

VI. Communication among Agencies

1. **[FHWA Best Practices in TIM]:** TIM communications includes the exchange of information both on- and off-scene, and within and between participating agencies and private companies. Critical communication links include an agency's dispatch with agency responders in the field, an agency's field responders with another agency's field responders, and an agency's dispatch with another agency's dispatch.
2. **[FHWA TIM Handbook]:** The first step to achieving real-time communication and information exchange is development of a strong governance structure, an essential element to ensuring that a multi-jurisdictional and multi-disciplinary team maintains a shared vision. Guidance and involvement of high-level representation from each agency provides the experience and focused vision that helps an interoperability committee maintain focus.
3. **[FHWA TIM Handbook]:** In reviewing each responder's information needs, it is clear that much of the data collected by a particular agency also benefits other responding agencies. Communication and transfer of information during TIM events is a critical component to resolving the incident quickly, safely, and effectively.
 - a. While the use of data may be different—e.g., transportation focuses on cleanup and traffic management and law enforcement focuses on the potential public safety threat—obtaining this information on a realtime basis from the first responder can significantly improve TIM.
 - b. The most efficient way to accomplish real-time, accurate information exchange is to develop interoperable systems that can electronically exchange data. Real-time communication and information exchange requires institutional, technical, and operational coordination among agencies, operational support centers, and systems.
4. **[FHWA Best Practices in TIM]:** Standardized communications terminology and protocols are critical to effective partnering among agencies participating in TIM. Many challenges to effective incident related communications are procedural in nature. Often, these challenges relate to a lack of awareness regarding whom to call or how to call the appropriate person(s). The development of personnel or equipment resource lists, in use in more than 75 major metropolitan areas in the United States, can significantly enhance communications off-site or between dispatchers and on-scene personnel.
 - a. Accompanying standardized communications protocols can be developed to formalize and increase awareness of each agency's call-out procedures

and contact points around the clock. On-scene, use of a command post and other ICS principles can facilitate effective communications.

- b. Personnel from each responding agency are staged at the command post; information and directions are disseminated from the command post to each agency's respective personnel.
5. **[FHWA Best Practices in TIM]:** Communication can be vastly improved before, during, and following incidents through the establishment of a Joint Operations Center (JOC) or Traffic Management Center (TMC).
- a. Facilities that house multiple agencies, including associated dispatch centers, under a single roof have the potential to enhance agency relations, as well as reduce overall facility development and operating costs (i.e., costs are shared across multiple agencies). Effective joint TMCs require a high level of information sharing and cooperation from all agency participants.
 - b. TMCs are staffed by representatives from the transportation agency, law enforcement, and other emergency service agencies, whose personnel share space and which sometimes have interoperable systems in the center. The TMC is the heart of an effective TIM program, and for mature TIM programs, is the single point of contact among responder agencies for highway incidents. These centers use the transportation tools of facility surveillance and traffic monitoring. Using a TMC as the primary point of contact for all responder agencies confirms the concept that TIM also is about managing traffic affected by the incident that may impact not just one facility, but the overall transportation system or network.
 - c. Many jurisdictions staff TMCs on a 24 hour/7 day per week basis. A TMC uses Intelligent Transportation Systems (ITS) to monitor and manage real-time traffic conditions. Ideally, the TMC also receives and integrates data from the Public Safety Answering Point's (PSAP's) Computer Aided Dispatch (CAD) system, which enable faster and more efficient incident detection, verification, and response.
 - d. TMC operators can take steps to reduce congestion, dispatch resources, and make appropriate actions based on intelligence-driven decision-making data. Traffic engineers use automated traffic control signals and other devices to control traffic into, or divert traffic away from, congested areas. Instant access to decision-making data enables traffic engineers to respond to solve traffic problems quickly.
 - e. TMC staff use a combination of ITS (CCTV, fiber optic cables, loop detectors) to advise motorists (through changeable or variable/dynamic message signs [VMS/DMS], highway advisory radio [HAR], the Internet,

and other forms of traveler information) of current traffic conditions and alternate routes

- f. One example of a joint traffic/emergency management center is Chicago's Office of Emergency Management and Communications (OEMC). Housed within a single building, the OEMC is comprised of four distinct but coordinated centers:
 - i. The Operations Center, staffed by personnel from local law enforcement, fire and rescue, and transportation agencies tasked with managing traffic.
 - ii. The Joint Operations Center to support large-scale emergency management.
 - iii. The City Incident Center, responsible for reactive roadway maintenance (i.e., snow removal, broken water main/downed power wire repairs).
 - iv. The centralized 9-1-1/Dispatch Center for local police, fire and rescue, and EMS agencies.
 - v. Together, they form an integrated unit that directs all of Chicago's resources during local emergencies or large-scale catastrophes that require participation from State and Federal agencies. For first responders, the result is more accurate and timely direction in the field, better preparation for receiving casualties at the city's trauma centers, and enhanced safety and backup.
- g. Similarly, the TMC operated by the New York City Department of Transportation is located in the same facility with the New York Police Department, improving coordination for traffic incidents.
 - i. The facility includes representatives from New York City DOT, New York State DOT, and the NYPD.
 - ii. Using its Integrated Incident Management System (IIMS), incident response, personnel can transmit data about an incident to other responders and dispatchers on a real-time basis.
 - iii. When an incident is entered into IIMS, the system uses a Global Positioning System (GPS) to identify the incident's exact location. Using a digital camera, response personnel can take and transmit pictures of an incident. The system creates an incident log, including timestamps on incident duration, and enables responders to exchange data about the incident.
 - iv. Deployed in each New York City borough, IIMS is used by New York State and New York City transportation, law enforcement, and emergency response personnel. IIMS data exchange capabilities have helped to reduce incident response time by enabling

responders to verify incidents and identify what response assets they need.

- h. The Los Angeles Regional Transportation Management Center (LARTMC) is a high technology facility designed solely for purposes of managing traffic within the highly congested Los Angeles and Ventura County regions. The LARTMC serves forty three (43) distinct government functions and was designed with the technologies to support joint operations and act as the center for Intelligent Transportation Systems (ITS) and Emergency Response operations. The Center performs:
 - i. Roadway congestion monitoring on 525 miles of mainline roadway
 - ii. Real-time information postings to nearly 20 real-time traffic websites, 24/7
 - iii. Real-time traffic and video displayed on television stations daily
 - iv. Display of real-time incident and travel time messages on nearly 109 changeable message signs daily
 - v. Prompt motorist aid as well as incident detection, verification and clearance to improve travel flows and reduce secondary incidents.



(LARTMC)

- 6. **[FHWA Best Practices in TIM]:** Wireless technology can also be used to improve communications capabilities among TIM responders.
 - a. For example, the States of Maryland and Virginia and the District of Columbia operate a multi-state, multidiscipline interoperable public safety and transportation wireless data system—the Capital Wireless Information Net (CapWIN)—intended to allow law enforcement, transportation, and fire

- and rescue personnel to communicate across jurisdictions and disciplines, and access operational information.
- b. CapWIN allows secure one-to-one and group public and private discussions, provides a searchable directory of individual first responders, and provides access to regional transportation data and multiple State/Federal law enforcement criminal databases to support operations.
7. **[FHWA Best Practices in TIM]:** During large-scale, complex incidents, an on-site mobile unified communications vehicle equipped with a wide range of radio communications and interoperability equipment may more effectively support on-scene activities, particularly when on-scene responders are utilizing disparate radio systems. Mobile unified communications vehicles may also be utilized to “back up” fixed communications systems, should remote TMC/dispatch center capabilities be impeded.
- a. In Chicago, IL, a unified communications vehicle supports the efforts of the OEMC. In addition to being equipped with various radio communications and interoperability equipment, the vehicle can also uplink to satellites, capture and transmit real-time video, and support up to 100 telephone lines. If the OEMC loses functionality, the unified communications vehicle can largely replicate its capabilities.

VII. Communication to the Public

1. *[FHWA Best Practices in TIM]*: Traveler information is the communication of incident-related information to motorists who are at the scene of the incident, approaching the scene of the incident, or not yet departed from work, home, or other location. This information serves to reduce traffic demand and improve responder safety at the incident scene, reduce the potential for secondary incidents for motorists approaching the scene, and allow motorists to alter their travel plans on the basis of current traffic conditions. To ensure motorist cooperation, traveler information tools or strategies should:
 - a. Advise motorists of the nature and extent of the problem so that they may make intelligent choices about alternative routes or delayed trip departures.
 - b. Provide information on possible courses of action such as alternative routes.
 - c. When motorists are required to take certain actions (e.g., change lanes, reduce speed, or divert), describe those actions clearly.
 - d. Traveler information should be provided as early in the TIM process as possible and should continue until the incident has been cleared and the traffic backup has dissipated.

2. *[FHWA TIM Handbook]*: Delivering accurate and effective media communications are important functions that transportation agencies must develop and maintain to provide current roadway information that is valuable to travelers.
 - a. At any incident scene, both major and minor, one agency representative should be pre-selected to provide information to a central point of contact (POC). This policy serves three purposes:
 - i. Provides the media with a pre-determined POC from which to receive accurate and timely information to disseminate to the public.
 - ii. Allows responders and their agencies to continue with the task at hand, uninterrupted by repeated requests for information from multiple sources.
 - iii. Assures that the information is well-developed, accurate, and consistent.
 - b. An agency's Public Information Office and designated PIO can develop and distribute a Media Guide to assist in providing guidance on how to handle public communications. A Media Guide details policies and procedures for handling media access to an incident; establishes guidelines on timing and message content provided to the public; and

supplies guidance on how media relations are managed during an emergency. Even when a State agency has established formal working agreements with the media agencies, a Media Guide can help clarify the “ground rules” that govern how the working relationship is conducted. This ensures that the media agencies are able to receive the information needed to provide travelers with information on an incident or event without compromising incident response activities and responder safety.

- i. Oregon’s State Police provide a [Media Guide](#) that includes contact information for its PIO.
3. **[WSDOT WSP Joint Operations Policy Statement]**: Washington State’s public and media communication arms include one each from the state’s department of transportation and police force, along with joint responsibilities:
 - a. **WSDOT Lead: Communications Director**: Communicate travel information, alerts, road conditions, and safety messages through TMCs, Washington State Ferries (WSF) Operations Center, and Communication Consultants. Mediums used include: Highway Advisory Radios (HAR), Variable Message Signs (VMS), the internet, the 511 Phone System, and authorized media outlets.
 - b. **WSP Lead: Government and Media Relations Commander**: Provide road and travel information by referring citizens to the WSDOT Web site, the 511 Phone System, WSP’s District Communications Centers, and Communication Consultants. WSP will provide the WSDOT’s TMCs with accurate and timely information on the status of emergency responses and traffic and road conditions.
 - c. **Joint responsibility**: Coordinate any public messages that mention both agencies. For real time traffic, travel, and road conditions, the public should be notified within 10 minutes of a significant condition change.
4. **[FHWA TIM Handbook]**: Information to the travelling public on minimizing the impact of incidents on the transportation network is provided in “Safe, Quick Clearance” (SQC) laws and policies. SQC is defined as the practice of rapidly and safely removing temporary obstructions from the roadway, and should be a key feature of all responder actions. A number of States, regions, and localities have implemented SQC laws to assist traffic incident responders. Three core laws, in particular, provide a necessary foundation for facilitating the safe and expedited removal of traffic incidents:
 - a. **Driver Removal or “Move It”**: These laws require motorists involved in minor crashes, where the vehicle is drivable and there are no serious injuries, to move their vehicles out of the travel lanes to the shoulder or

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other safe area before initiating the exchange of insurance information, or while awaiting the arrival of law enforcement and/or a tow truck. A policy in Washington State communicates these requirements to motorists via signs.

- b. Authority Removal: These laws provide authority (and generally immunity from liability) for designated public agencies to remove vehicles and spilled cargo from the roadway to restore traffic flow.
- c. “Move Over”: Designed to protect incident responders and stranded motorists alike, Move Over laws require motorists approaching incident responders and vehicles to slow down and move over to an adjacent lane, when possible, to provide an increased safety buffer.

VIII. Incident Management Priorities

1. **[Caltrans TIM Guidelines]:** Priorities during incident response are categorized into three major categories. From most importance to least, they are:
 - a. **Priority 1: Life Safety:** Initial efforts are to preserve lives, including those of responders, incident victims and passing motorists. Safety is the highest priority throughout the incident
 - b. **Priority 2: Incident Stabilization:** Using best practices, stabilize the incident scene to prevent fire, eliminate ignition sources, contain hazardous materials and stabilize vehicles involved in the incident. This includes:
 - i. **Prevention of Secondary Incidents –** Responders should use available traffic control devices and, if possible, position apparatus to divert traffic around the crash scene. Special attention should be paid to the end of the traffic queue, using permanent and portable Changeable Message Signs (CMS) to warn motorists of slow or stopped traffic as they approach the end of the queue.
 - ii. **Protection of Evidence –** All incident sites are potential crime scenes and must be treated accordingly. Responders must make every effort to minimize the impact of their presence on the crash scene.
 - iii. **Safe, Quick Clearance –** It should be the goal of all responders to clear the scene as soon as practical and to restore traffic flow to limit the diversion of traffic to less desirable and/or more hazardous routes.
 - c. **Priority 3: Protection of Property and the Environment:** Responders should attempt to protect and preserve the highway infrastructure and limit damage to vehicles involved in incidents to what is necessary to stabilize and remove victims trapped in the vehicles. Property salvage operations should be conducted as soon as safely possible. For hazardous materials and/or potential hazardous materials scenes, responders with the proper personal protective equipment and training should strive to contain the spilled product while minimizing exposure.
2. **[FHWA presentation to Portland, OR]:** Priorities in Indiana’s IN-TIME program are detailed in its “Open Roads” philosophy, which stresses the need to relieve congestion and reduce the strain of incidents on the road network:
 - a. “...having all First Responders, after ensuring their own personal safety and the safety and security of any incident victims, will have as their top priority reducing congestion and the higher risks of secondary incidents for public/motorist safety.”

IX. Towing Responsibility

1. *[FHWA TIM Handbook]*: The need to quickly remove damaged vehicles from the roadway necessitates that governmental agencies generally will enter into service agreements with towing contractors based on capabilities, geography, and regulated pricing. This is referred to as “non-consensual” towing, because the consumer has not been able to negotiate and establish the terms and conditions, including pricing, for a tow service.
 - a. For example, the Colorado Department of Transportation (CDOT) and the Colorado Motor Carrier Association developed the *CDOT Heavy Tow Program* along the I-70 corridor between Denver and Vail. Under the program, heavy tow units are staged at strategic locations along the I-70 corridor during high traffic flow conditions, or when storms are anticipated. When a Class 8 or commercial vehicle becomes disabled, the heavy tow unit in the area quickly responds and removes the vehicle to a safe haven at no cost to the trucking fleet (at this point, the fleet is then responsible to move the vehicle).
 - i. The success in the first season of this program is documented in the data as lane clearance times were cut in half from previous seasons to an average of 27 minutes. The economic benefit is reported by CDOT at over a 20:1 return on investment on a program that cost the State approximately \$500,000 to fund per year.

X. Technology

1. *[FHWA Best Practices in TIM + FHWA TIM Handbook]*: Technology plays an important role in every aspect of TIM. In a number of instances, the use of technology can be demonstrated to directly increase the efficiency and, in some cases, the effectiveness of responders performing their duties. For example:
 - a. CCTV: Access to CCTV images of an incident prior to arriving on-scene supports both the dispatch of appropriate equipment and quicker dispatch of resources (i.e., instant tow dispatch).
 - b. Automatic Vehicle Location (AVL): AVL, along with geographic information system (GIS) technologies, can identify and mobilize resources that are closest in proximity to the incident scene, reducing overall travel times.
 - c. Traffic Detectors: These devices monitor the flow and volume of traffic, and when combined with CCTV, identify anomalies in traffic flow.
 - d. Ramp Meters: These devices are used to increase freeway volumes, trip reliability, and freeway speeds, while decreasing travel time and the number of crashes. The TMC can use data from lane and ramp metering to control flow into an incident scene and to facilitate a more rapid response of an emergency vehicle to an incident scene.
 - e. Variable or Dynamic Message Signs (VMS/DMS): These devices are used to alert motorists about incidents, direct them to alternative routes, or provide estimated travel time past an incident.
 - f. Responsive Traffic Signal Control (RTSC): To maintain traffic flow along an alternate route, use of RTSC to manage traffic around the incident scene relieves law enforcement personnel from this duty and allows them to perform other tasks for which they are trained (i.e., crash investigation). Additionally, traffic signal priority systems can reduce delay for emergency vehicles en route to the incident scene.
 - g. Total Station Surveying Equipment (TSSE): When an incident requires investigation by law enforcement personnel, the use of TSSE or photogrammetry can dramatically reduce investigation time while increasing the quality and quantity of measurements captured.
 - h. 511 Traffic/Traveler Information Number: FHWA obtained approval from the Federal Communications Commission (FCC) to dedicate the 511 phone number to traveler information. 511 is implemented at the State level, and offers travelers the option of touchtone and/or voice-activated prompts to obtain information on travel conditions for specific routes or route segments, as well as for special events. This single nationwide number allows travelers to decide on routes of travel; select means of travel; or make the basic choice of whether to begin or delay travel.

- i. Internet-Based Traveler Information: Travelers rely upon the transportation information provided by government agencies, media and other private sector firms. Transportation agencies are most often the initial supplier of information to commercial information service providers. Information service providers can send information directly to communication devices or to a designated State, regional, county, city, or other local Web site.
2. **[FHWA Best Practices in TIM]**: Using technology as a means to share data on TIM can improve both actual TIM responses as they occur along with agencies' ability to measure performance afterwards (see next section on evaluation). Cities and states should aim to set up multi-agency data exchange protocols in conjunction with investments in a common technology for data input:
 - a. The information-sharing process and each agency's role in that process can be initially defined in a multi-agency data use concept of operations document. After TIM program performance measures are defined and associated targets and goals are set, it is necessary to specify what data will be used to measure each objective, how the data will be collected and analyzed, and who will be responsible for the data. Specific considerations may include methods for reconciling inconsistencies in performance metric definitions; filtering unnecessary data; efficiently assimilating data from disparate agency databases developed under different data standards; and performing analysis, evaluation, and reporting with varying levels of aggregation to target different audiences.
 - b. As data exchange expands between multiple agencies, development of an accompanying data dictionary may be required. A data dictionary is a centralized repository of information about data—its meaning, relationships to other data, origin, usage, and format. TIM agencies can benefit from a common data dictionary that catalogs the organization, contents, and conventions of one or more databases owned and maintained by the various TIM agencies. Enhanced knowledge about each agency's databases will not only enhance ongoing TIM program performance measurement that requires data originating from multiple agencies but may also identify and encourage additional data-sharing opportunities.

XI. Incident Response Evaluation and Improvement

1. *[National Cooperative Highway Safety Research Program TIM Guidance + FHWA Best Practices in TIM]*: Performance measurement provides the necessary feedback to TIM responders to allow them to improve operations. Equally important, performance measurement provides decision makers with the data to demonstrate the value of TIM programs and justify their related expenditures. The following list highlights key benefits from evaluation:
 - a. Demonstrating accountability – a TIM program could demonstrate to decision makers how funds spent on expansion of the program resulted in a reduction in overall incident clearance times.
 - b. Demonstrating process efficiency – TIM partners could monitor performance outcomes resulting from changes in response strategies to determine which processes result in greater efficiency.
 - c. Demonstrating program effectiveness – a TIM program could demonstrate to the public how implementation of a program, such as a freeway service patrol, resulted in a reduction in the clearance of minor incidents.
 - d. Improving communications – The need for gathering and organizing data from various organizations could help to improve communications amongst responder groups.
 - e. Demonstrating improvements over time – Using performance measures to monitor TIM performance could assist TIM partners in demonstrating their continued improvements from one year to the next.
 - f. Supporting future planning – By analyzing TIM performance overall and at more disaggregate levels, an agency could identify certain areas in the region, certain roadways, or certain types of incidents where clearance times are longer as compared to others. This knowledge could lead to the development of tactical ways in which to better respond to incidents in these areas/locations or these particular types of problematic incidents.
 - g. Overall, the greatest benefits to an effective TIM program result from reduced incident duration, which is achieved through (1) reducing the time to detect incidents, (2) initiating an expedient and appropriate response, and (3) clearing the incident as quickly as possible. TIM activities supporting the overall reduction of the incident timeframe directly affect safety, including secondary crashes and responder safety.

2. *[FHWA Best Practices in TIM]*: Performance measurement is provided at the national level through National Unified Guidelines (NUG). Through an FHWA focus initiative, three uniformly defined, TIM-specific objectives and associated performance metrics were created:

- a. Reduce roadway clearance time—the time between the first recordable awareness of the incident by a responsible agency and the first confirmation that all lanes are available for traffic flow.
 - b. Reduce incident clearance time—the time between the first recordable awareness of the incident by a responsible agency and the time at which the last responder has left the scene.
 - c. Reduce the number of secondary incidents—the number of unplanned incidents beginning with the time of detection of the primary incident where a collision occurs as a result of the original incident either within the incident scene or within the queue in either direction
3. *[National Cooperative Highway Safety Research Program TIM Guidance]*: The following list provides a non-exhaustive set of measures for TIM evaluation:
 - a. Number of incidents.
 - b. Frequency of incidents.
 - c. Incident delay.
 - d. Times related to the closure/opening of individual lanes.
 - e. Severity of incidents.
 - f. Number of fatalities.
 - g. Service patrol statistics (e.g. roadway miles covered, number of assistance calls, etc.).
 - h. After-action statistics (e.g. number of reviews, percent of participating agencies, etc.).
 - i. Travel delay.
 - j. Queue length.
 - k. Incident detection time.
 - l. Incident verification time.
 - m. Incident response time.
 - n. Time to return to normal flow.
 - o. Number of secondary incidents as a result of a primary crash.
 - p. Number of secondary incidents involving first responders.
 - q. Percentage of fatal crashes that are secondary
4. *[National Cooperative Highway Safety Research Program TIM Guidance]*: The most prevalent issue facing most TIM programs is the availability of data and data sharing between agencies responsible for incident response. Discussions of the challenges with performance measurement data list several common themes, including:
 - a. Does the performance measure represent a key concern?

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- b. Inconsistent definitions.
 - c. Data availability.
 - d. Cost of data collection.
 - e. Data quality/completeness.
 - f. Data sharing.
 - g. Data exchange.
 - h. Data integration.
 - i. Assuring appropriate comparisons to other operations.
 - j. Extrapolating from partial coverage.
 - k. Understanding extraneous influences in the data.
 - l. Conflicts with other measuring programs – which is “right”?
 - m. Timeliness of data.
 - n. Use of performance measures in the allocation of funding.
 - o. Liability for action (or lack thereof) based on performance measurement results.
 - p. Responsibility for measures for which there may be limited control.
5. **[FHWA Best Practices in TIM]:** The link between TIM performance (via robust evaluation) and funding for TIM programs is strong:
- a. Similar to performance-based incentive programs instituted at the employee level, TIM can be evaluated at the program level with performance tied to continued or increased program support. Performance measures defined explicitly for TIM should also reflect broader agency-wide or statewide goals related to increased productivity, cost-efficiency, and improved quality in the delivery of services.
 - b. Incorporating performance measures into formal long-range plans can help to ensure that TIM programs receive adequate attention in prioritization of projects for funding.
 - c. For example, states that were early to adopt, track, and report improvements in average incident clearance time as a TIM-specific performance metric describe it as a powerful tool for communicating with their State legislatures and with the public. Departments of transportation in both Maryland and Washington have made progress in securing more consistent, reliable TIM program funding from their State legislatures as a result of TIM performance measurement. WSDOT also reports notable success in improving public perception of their agency.

XII. Incident Response Training

1. *[FHWA TIM Implementation Guide]*: Training for parties involved in TIM should be held regularly. A committee should be established early in the planning process to guide implementation of the training program. Each of the core TIM disciplines should be represented to assure that training needs are accurately identified. A chair should be appointed to lead the committee.
2. *[FHWA presentation to Portland, OR]*: TIM training should focus on three important elements:
 - a. Identify, involve, encourage participation from all responding agencies and stakeholders (i.e., TIM Committee) - “get folks to the table”
 - b. Identify a “champion” to lead program development (and ongoing program administration)
 - c. Establish and maintain relationships
3. *[FHWA presentation to Portland, OR]*: TIM training should include regular (monthly, quarterly) meetings with all agencies to:
 - a. Establish, confirm, reinforce goals/objectives
 - i. Consider a vision or mission development activity and subsequent “charter” or “MOU” signed by all participants
 - b. Identify, discuss problem areas, needs (e.g. TIM Self-Assessment)
 - c. Collaborate in developing solutions, strategies
 - d. Conduct after-action reviews, debriefs
 - e. Promote awareness of ongoing TIM-related activities and initiatives
 - f. Monitor training requirements
4. *[FHWA presentation to Portland, OR]*: Being creative with regular training sessions can keep TIM committee meetings worthwhile and all agencies engaged:
 - a. Rotate meeting locations, have other agencies “host”
 - b. “What’s new in TIM?” - Present topics on new strategies from other locations, national developments, technology/equipment demonstrations, guest speakers, etc.
 - c. Give awards such as Responder of the Month, special “Thank You” for service, goal attainment, etc.
 - d. Use TIM Committee meetings as venue for enhancing responder awareness of construction and other activities

5. *[FHWA TIM Handbook]*: Advance planning and ongoing practice on how to set up a Unified Command in the event of major incidents that require response of multiple agencies is a critical piece of regular TIM training. Each agency needs to know and understand in advance the roles and responsibilities of the other responder agencies. Four key issues to address in UC training are:
 - a. All responder agencies should learn ICS and the roles IC and UC have in ICS.
 - b. Responder agencies should conduct the necessary advance planning to define the roles and responsibilities of each responder agency, and to include guidance on when and how to implement IC and UC:
 - c. The structure must be agreed to by all responder agencies, and ICS functions and responsibilities should be well defined. Individuals should be designated for each function, with a reporting mechanism and contingency plans put in place.
 - d. All responder agencies should understand the criteria and conditions necessary to implement UC as early as possible in the incident response process to avoid unnecessary delay and confusion.

XIII. Conclusions on Best Practices

1. *[National Cooperative Highway Safety Research Program TIM Guidance]:*

Through interviews with agencies nationwide on their TIM programs, the NCHSRP developed a summary of TIM best practices and actions required to create excellence in TIM:

 - a. Focus on all incidents, not just major incidents or those involving fatalities. Apply TIM strategies to all incidents, because big incidents happen infrequently.
 - b. The DOT and the state police should be joined at the hip on TIM.
 - i. One could interpret this conclusion on a city level as referencing the relationship between a city's DOT and its police department.
 - c. Data mining software and expertise is essential to understand how to continually focus and improve TIM program and strategies.
 - d. The executive level must be engaged – to sell TIM, use a 1-2 page summary with executive talking points.
 - e. Use a single point of entry for all data.
 - f. Many DOT personnel feel that co-location with the state police is absolutely key to successful TIM programs.
 - g. Data sharing is also essential and a first step. Co-location can help with joint dispatch and more effective TIM strategies.
 - h. Use a TMC dashboard to allow operators to see and visualize the information, beyond just data entry into a database.
 - i. TIM performance measures suffer when there is no active focus on TIM and no field operational units (e.g. freeway service patrol).
 - j. Training is key. What is a secondary incident? What is quick clearance? What is the result of implementing quick clearance?
 - k. Focus on saving the lives of first responders.
 - l. Involve the media in the TIM program.
 - m. For effective data sharing, when CAD data are not available, the [state/city] police must pass along all incidents to the [state/city] DOT, no matter how minor the incident.
 - n. For success, make TIM uncomplicated, invaluable, and applicable to everyone.
 - o. Look deeper into performance measures, and relate the measures to traffic volumes and travel times. Get the deeper picture.

XIV. Documents Referenced

1. US Federal Highway Administration (FHWA) Traffic Incident Management (TIMS) materials:
 - a. Best Practices in TIM (2010)
 - b. TIM Handbook (2010)
 - c. TIM Implementation Best Practices (2014)
 - d. TIM Presentation to the City of Portland, OR (2015)
 - e. Strategic Highway Research Program 2 Report: Publication Number FHWA-HOP-12-044
 - f. National Cooperative Highway Research Program 07-20: Guidance for Implementation of Traffic Incident Management Performance Measurement (2014)
 - g. USDOT Senior Executive Transportation & Public Safety Summit Report (2012)
 - h. Analysis, Modeling, and Simulation for Traffic Incident Management Applications (2012)
 - i. Traffic Incident Management Cost Management and Cost Recovery Primer (2012)
 - j. Field Operations Guide for Safety/Service Patrols (2010)
 - k. Traffic Incident Management in Hazardous Materials Spills in Incident Clearance (2009)
 - l. Advancing TIM in Transportation Planning: A Primer (2013)
 - m. Safety Highway Research Program (SHRP) TIM Training Materials
 - n. Additional multi-disciplinary training course materials

2. Washington State materials:
 - a. Washington State Patrol Commercial Vehicle Division Standard Operating Procedure Manual
 - b. Washington State Department of Transportation, Washington State Patrol, Washington Fire Chiefs – Joint Operations Policy Statement (2014)
 - c. Materials from the Washington Traffic Incident Management Coalition (WaTIM Coalition)
 - d. WSP roadway closure detour guides – Thurston and Lewis County. Joint guide for local LEA, Fire, Tow, WSDOT to use

3. Other materials:
 - a. NYC DOT Communication Center Standard Operating Procedures (2014)
 - b. Caltrans Traffic Incident Management Guidelines (2014)

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Section B: Best Practices Report

- c. Bay Area Incident Management Task Force I-880 Demo Project Evaluation (2010) + lessons learned PPT presentation
- d. City of Los Angeles Automated Traffic Surveillance and Control (ATSAC) and Los Angeles Regional Transportation Management Center (LARTMC) information
- e. Portland, OR, TIM meeting notes and ideas (2015)
- f. Portland, OR, Disaster Debris Management (2014)
- g. Oregon State TIM information

Section C: Workshop Summary

On June 16, 2015, a group of seven Traffic Incident Management (“TIM”) experts convened in Seattle for a one-day peer exchange. Sam Schwartz Engineering and TransSafe (the “consulting team”) led a conversation between these experts and stakeholders involved in TIM in the City of Seattle. The experts traveled to Seattle on behalf of the National Operations Center of Excellence (“NOCoE”), a partnership of the American Association of State Highway and Transportation Officials (“AASHTO”), the Institute of Transportation Engineers (“ITE”), and the Intelligent Transportation Society of America (“ITSA”), with support from the Federal Highway Administration (“FHWA”).

The experts in attendance representing NOCoE were:

- **Captain F. Daniel Glick**, Safety Division, Bureau of Field Operations, Virginia State Police
- **Thomas (Tim) Lane**, Chief of Enforcement, Enforcement and Compliance Division, Arizona Department of Transportation
- **Patrick F. McGowan, PE**, Vice President of Business Development for Surface Transportation, Serco, Inc.
- **Carl D. Merckle**, Statewide Emergency Operations Coordinator, Division of Operations, Ohio Department of Transportation
- **Joseph (Joey) Sagal**, Traffic Incident and Event Management Specialist, Office of Technical Services, Federal Highway Administration Resource Center
- **Jeffery S. Weatherford, PE, PTOE**, Deputy Director of Public Works and Engineering, City of Houston
- **Lawrence W. Wooster, PE**, Branch Chief, Incident Management Branch, Division of Traffic Operations, California Department of Transportation

Attendees from the City of Seattle included:

Seattle Department of Transportation

- Scott Kubly, Director
- Rodney Maxie, Director, Maintenance and Operations Division
- Mike Estey, Interim Director, Transportation Operations Division
- Adiam Emery, Transportation Operations Center Manager
- Lawrence Eichhorn, Emergency Management and Security Advisor
- Heather Marx, Street Use Division

Seattle Police Department

- Chief Kathleen O’Toole
- Assistant Chief Perry Tarrant
- Captain Michael Nolan, Traffic Section
- Captain Thomas Ovens, Training
- Brian Maxey, Chief Legal Counsel

Seattle Fire Department

- Captain Brady O'Brien
- Battalion Chief Paul Foerster

Department of Finance and Administrative Services

- Bill Edwards, Director of Code Compliance/Enforcement & Consumer Protection
- Bruce Hori, Risk Management

Office of Emergency Management

- Barb Graff, Director

Port of Seattle

- Geri Poor, Government Relations
- Christine Wolf, Government Relations

The consulting team was very impressed, as were the representatives from Seattle, in the quality, diversity and knowledge of the selected experts. The NOCoE team included individuals with experience in law enforcement, transportation, firefighting and the private sector, which provided a diversity of views on best practices in TIM. The NOCoE lived up to its goals of "best practice peer exchange" and "assistance to states and other organizations to identify best practice."

The experts provided commentary on the importance of teamwork, "buy-in" at the highest levels of government, training (including multi-agency joint training exercises), shared stories (such as the usefulness of "free tow" programs for quicker clearance), and listened to Seattle's many issues and helped focus problems and offer solutions. Following the City sessions, the consulting team convened with the experts and allowed each of them time to talk about their major takeaways from the workshop and recommendations. These thoughts were then shared in brief with City officials, and refined over the following two weeks into a final report.

The NOCoE experts enjoyed the experience as well, and came away from the workshop with ideas of their own to incorporate as future best practices. It was clear to all in attendance that all experts were highly knowledgeable in TIM and they represented NOCoE admirably. The City appreciated the effort to put together such an excellent panel, and it was discussed that any changes to TIM in Seattle could be revisited in six months or a year by the same NOCoE team to evaluate improvements in the program.

*Seattle Traffic Incident Management
Section C: Workshop Summary*



(NOCoe attendees, City of Seattle representatives, and the consulting team in SDOT's Traffic Management Center on June 16, 2015. Source: SDOT)

Section D: Recommendations Report

Based on best practices research, interviews with Seattle agency personnel, and discussions during the June 16, 2015, peer review workshop, Sam Schwartz Engineering and TransSafe (the “consulting team”) developed a set of recommendations for improvements in Seattle’s Traffic Incident Management (“TIM”) practices. For each recommendation, the priority, potential timeframe, and expected financial investment are listed. These recommendations should be further developed into a formal implementation plan by an interdepartmental team composed of members of the Seattle Police Department (“SPD”), the Seattle Department of Transportation (“SDOT”), Finance and Administrative Services (“FAS”), and the Seattle Fire Department (“SFD”).

[A] Establishing a Citywide TIM Program

The City of Seattle has no TIM program nor does it have a formal Memorandum of Understanding (MOU) among City Departments regarding adoption of and formalization of TIM protocols. Additionally, current policies in various city agencies are lacking in specificity regarding TIM and the necessary co-operation between agencies related to traffic incidents.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|---|----------|--------------------------|------------------|
| A1. Formally enter into an MOU with relevant city agencies. Include specific TIM roles and responsibilities. Stakeholders should work together to create the MOU, and it should also be signed by relevant outside tow companies. | High | Immediate (August 2015) | None |
| A2. In conjunction with an MOU, develop a mission statement for TIM in Seattle that is signed by all relevant city agencies. | High | Immediate (August 2015) | None |
| A3. Following the development of an MOU, create a comprehensive citywide TIM Policy Manual and distribute to all relevant city agencies and other parties. | High | Short-term (2015) | Minimal |
| A4. Adopt new policy and procedures for each agency as they relate to TIM and the MOU to institutionalize Seattle’s TIM response. Train relevant personnel in each agency on the MOU, TIM policy and associated procedures. | High | Short-term (2015) | Minimal |

[B] Comprehensive TIM Training

The City of Seattle’s response to major traffic incidents, in particular the responses of SDOT and SPD, are impaired by a lack of formal training in TIM at all levels. Training in a TIM framework is critical for effective response during incidents when decisions must be made quickly and command may need to be escalated upward. Training needs to occur on a regular basis from the top down at SPD and SDOT. Additionally, other entities, such as SFD, the Port of Seattle, King County Metro and the City’s official towing contractor (Lincoln Towing) are not involved in any TIM training, but they should be, going forward.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|---|----------|--------------------------|------------------|
| B1. Require in-person TIM training for all SPD traffic unit personnel and managers. For existing officers, enforce training completion deadline. For new traffic officers, coordinate with the Criminal Justice Training Center (CJTC) to incorporate TIM training at the basic academy. If this is not feasible, then make training mandatory, once the officer has graduated from CJTC in Post Academy Field Training Officer (FTO) training. | High | Short-term (2015) | Significant |
| B2. Provide basic TIM training on quick clearance of incident scenes, escalation of command and other important TIM concepts to all SPD patrol officers in short one-hour blocks (“roll call training”). Patrol officers are usually first responders to incidents and need to understand the basics of managing a scene from the outset. | High | Short-term (2015) | Minimal |
| B3. Train SPD Dispatchers on towing protocols and quick response. | High | Short-term (2015) | Minimal |
| B4. Expand recent TIM trainings at SDOT and ensure all relevant personnel are included in TIM training. Impose deadlines for initial training to be completed. | High | Short-term (2015) | Significant |
| B5. Identify training officers within SPD and SDOT, ensure they receive the TIM training immediately and also ensure they become TIM trainers to facilitate future trainings. | High | Immediate (August 2015) | Minimal |

*Seattle Traffic Incident Management
Section D: Recommendations Report*

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| B6. Engage in multi-agency trainings including tabletop exercises or simulated incidents. Consider major citywide joint training exercises annually to test and improve response capabilities and identify gaps. Conduct training using actual heavy-duty equipment to simulate real clearance events. Include SDOT, SPD, SFD and other agencies. Include the City's tow contractor so it can use its equipment during the simulation | High | Short-term (2015) | Significant |
| B7. Continue monthly citywide TIM meetings and include representatives from SDOT, SPD, SFD, the Port of Seattle, King County Metro and other agencies | High | Immediate (August 2015) | None |
| B8. Better integrate the traffic focus (TIM) into general Office of Emergency Management (OEM) NIMS (National Incident Management System) training sessions. | Medium | Short-term (2015) | Minimal |
| B9. Bring SDOT into relevant SFD / SPD training courses as appropriate (i.e. for course on HAZMAT cleanup). | Low | Short-term (2015) | None |
| B10. Have trainees play different roles during tabletop trainings to gain an understanding of other agencies' needs. | Medium | Short-term (2015) | None |
| B11. Include TIM in standard training calendars for SPD and SFD, even if everyone cannot be trained immediately. | High | Long-term (2016 and beyond) | Minimal |
| B12. Identify champions for TIM training at SDOT and SPD to ensure the TIM training programs are well-attended and useful to the City and to the respective agencies. | High | Immediate (August 2015) | None |

[C] Best Practices in TIM and Leveraging the State’s Expertise

The general TIM framework is well established at a national level, and significant materials for understanding, implementing and training personnel on TIM are regularly available from the Federal Highway Administration (FHWA) and other entities. Furthermore, the State of Washington has a model TIM program recognized as a national best practice. SPD, SDOT and SFD are lacking in TIM trainers within their organizations and have not looked to outside parties for assistance.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|---|----------|-----------------------------|------------------|
| C1. Distribute the memo on “Best Practices in TIM,” which was provided as a part of this project, to those responsible for implementing TIM programming at SDOT and SPD. Require those staff to read it and spread messages contained within throughout their organizations. Do the same with Washington State’s Joint Operations Policy Statement (JOPS) on Incident Management. | High | Immediate (August 2015) | None |
| C2. Identify trainers outside of SPD/SDOT to assist in official TIM training. Contact the Washington Department of Transportation (WSDOT) to request its assistance in setting up TIM training and using its TIM trainers. Also reach out to the Washington Traffic Incident Management Coalition (WaTIMCo.org) for assistance. | High | Immediate (August 2015) | None |
| C3. Establish a pool of trainers in Seattle from SPD, SDOT and SFD and utilize them for future trainings. | Medium | Short-term (2015) | Minimal |
| C4. Once TIM is strengthened in Seattle, partner with regional players. Create a regional entity for coordination on traffic incident management (e.g. an “I-5 Coalition”) and foster better partnerships with WSDOT’s traffic management center located in Seattle. | Medium | Long-term (2016 and beyond) | Minimal |
| C5. The City of Seattle should join the State’s TIM Network for best practices and better coordination. | Medium | Short-term (2015) | None |

[D] Responding at the Scene (and SPD’s Role)

SPD officers are generally the first on-scene during traffic incidents. SPD needs to standardize and improve its initial response for both traffic and patrol officers. SPD is also unaware whether the state’s “Hold Harmless” agreement (which removes liability for any damage to property that occurs during scene clearance) applies to it. Having a City ordinance to follow is critical for most incidents. SPD needs to develop policies and procedures to allow all personnel to understand the importance of clearing the roadways in a quick fashion without jeopardizing safety.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|---|----------|--------------------------|------------------|
| D1. To quickly move disabled vehicles away from travel lanes, the City of Seattle should work with the City Attorney to ensure that state “Hold Harmless” laws apply in Seattle. RCW 46.52.020 (2) (b) | High | Short-term (2015) | None |
| D2. Ensure all personnel in SPD and SDOT are made aware of the “Hold Harmless” laws and that they understand the importance of clearing the roads to prevent secondary collisions. | High | Short-term (2015) | None |
| D3. Establish policy and procedures for clearing traffic with push-bars. Engage in follow-up training with SPD and SDOT first responders in the proper methods of using push-bars to clear an incident. Review and research the ability to insert push-bar training during traffic week at the Washington State Patrol (WSP) Academy or during CJTC traffic week. If these options are not available, this training should be added to post-academy FTO training. | Medium | Short-term (2015) | Minimal |
| D4. Establish a policy and procedures for both SPD traffic and patrol units when responding to major blocking incidents, and provide these units with action plans to assist in detours, signal control, activating OEM’s Emergency Operations Center (EOC) and other on-scene tasks. | High | Short-term (2015) | Minimal |
| D5. Create staging locations for response vehicles (such as safety service patrols) to | High | Short-term (2015) | Minimal |

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| quicken response to incidents as they occur. | | | |
| D6. Consider institutionalizing policy adjustments outlining how initial response occurs and the importance of traffic circulation (for example: preservation of crash scene vs. re-opening lanes to traffic, where applicable). | High | Immediate (August 2015) | None |
| D7. To quickly move disabled vehicles away from travel lanes, the City of Seattle should work with the City Attorney to ensure that the state's "Steer It, Clear It" law applies in Seattle. Consider posting signs and using public service announcements to inform the public of "Steer It, Clear It" messages during key times or prior to major events. All major choke points should have "Steer It, Clear It" signage consistent with WSDOT signage on interstate highways. | Medium | Short-term (2015) | Minimal |
| D8. Develop a field guide to assist both patrol and traffic officers in handling a wide variety of incidents, from minor to intermediate to major. | Medium | Long-term (2016 and beyond) | Minimal |
| D9. Qualified personnel (from SDOT and/or SPD) should be on scene to make decisions as to how a crash scene is cleared, with a clear escalation of command. Major decisions should not be left to the towing operator. | High | Immediate (August 2015) | None |
| D10. Utilize SDOT Emergency Laborers (E-Laborers) and cross-train with WSDOT Incident Response personnel to supplement on-scene response to incidents. Outfit SDOT E-Laborers with sirens, extra gas and other equipment to provide more services on-site. | Medium | Long-term (2016 and beyond) | Significant |
| D11. Create cross-departmental teams with members from SPD and SDOT to investigate major scenes, where applicable. Include a forensic traffic engineer on teams responding to scenes of serious and fatal incidents. | Medium | Short-term (2015) | Minimal |
| D12. Expand and roll out a COMPSTAT-like system to anticipate traffic crash locations and speed response. | Medium | Long-term (2016 and beyond) | Significant |

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| D13. Equip City vehicles with streaming video cameras to provide SDOT's Traffic Operations Center (TOC) with additional information from incident scenes. | Medium | Long-term (2016 and beyond) | Significant |
| D14. Jointly develop outcomes for incident-based traffic control response using existing resources, such as Parking Enforcement Officers (PEOs). Redeploy existing resource or identify additional resources as needed to achieve outcomes. | Medium | Long-term (2016 and beyond) | Significant |

[E] Traffic Operations and SDOT’s Role

Effective communication is a key component of TIM and clear channels and procedures should be established. The quick and accurate sharing of information within and between SDOT, SPD, and the public are critical to ensuring rapid response to incidents and management of traffic.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|--|----------|-----------------------------|------------------|
| E1. SDOT should complete its “Tiered Response” map and protocols to better define escalation of command during traffic incidents. | High | Immediate (August 2015) | None |
| E2. Formalize the full-time presence of traffic division officers from SPD in the SDOT TOC to coordinate in real-time as incidents occur. Consider placing portions of the 911 dispatch function in the purview of officer(s) stationed in the TOC. Provide guidelines to define when other relevant agencies should be present in the TOC, as needed. | High | Short-term (2015) | Minimal |
| E3. Create a 24/7 Joint Operations Center dedicated to TIM staffed by SDOT and SPD; include representatives from WSDOT, WSP, King County Metro, SFD and others as required. Include links to media through a dedicated Media Center. | Low | Long-term (2016 and beyond) | Significant |
| E4. SDOT should provide “SigAlerts” or “Gridlock Alerts” that provide citywide notice of either major planned events that will cause congestion or following a major traffic incident that causes widespread strain on the road network. Consider “emergency level” communications that can reach most cell carriers. | High | Short-term (2015) | None |
| E5. Improve communication structure between SDOT personnel in the TOC and SPD dispatchers in terms of incident detection, verification and notification. SPD should share and integrate the full version of its Computer Aided Dispatch (CAD) system with SDOT for use in SDOT’s TOC to automate notification of incidents and | High | Short-term (2015) | Minimal |

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| reduce the amount of time needed to disseminate information. SPD should provide training on the CAD system to SDOT personnel. Review WSDOT's similar arrangement with WSP for reference on implementation. | | | |
| E6. SDOT should pre-plan for major incidents and integrate this with its ability to make dynamic traffic signal changes to create detour routes. SPD and SDOT should create pre-set re-route plans for all major arterials. Plans should be in place for minor, intermediate and major incidents. | High | Short-term (2015) | None |
| E7. Expand the TOC's camera program to cover additional streets and areas in Seattle not currently covered. | Medium | Long-term (2016 and beyond) | Significant |
| E8. Using available travel time and traffic flow data, SDOT should identify typical days of the week or times of the year with high congestion in certain locations, and put extra focus on quick incident response times for them at those times. Share this data in advance regularly with SPD. | High | Short-term (2015) | None |
| E9. SDOT should use real-time travel time and flow data for incident detection and share information with SPD. | Medium | Immediate (August 2015) | None |
| E10. SDOT should create a media coordination area within the TOC for briefings on major incidents. | Low | Short-term (2015) | Minimal |
| E11. Provide SDOT Emergency Laborers (E-Laborers) authority to shut down work sites during major incidents when detour routes are required to process higher-than-normal volumes. | Medium | Immediate (August 2015) | None |
| E12. SDOT and SPD should jointly create a TIM plan to be enacted when the tunnel replaces the existing viaduct along SR-99. The plan should include planned re-routes for those times when an incident occurs in the tunnel itself. | Low | Long-term (2016) | Minimal |
| E13. SDOT's TOC should increase coordination with similar traffic management centers housed in WSDOT (for the Seattle region) and King County Metro. These locations are generally more active through the course of the week than | Medium | Short-term (2015) | Minimal |

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| SDOT's TOC, which is not a 24/7 operation. | | | |
| E14. Modernize SDOT's TOC to identify incidents more quickly through upgraded technology and better use of available resources: install a screen showing vehicle speeds in real time with travel time estimates displayed between key points; display a map with all current Variable Message Sign (VMS) displays; display signal patterns for real-time analysis and updates; roll forward planned "Active Traffic Management" investments for use in TIM. | High | Short-term (2015) | Minimal |

[F] Towing Contract and Operations

The City current has a towing contract with one company; this is restrictive and may hinder the City’s TIM outcomes. Response times can be slow because the use of a single-company contract may result in tow trucks being required to travel long distances to reach incident scenes, often through congestion. SPD and SDOT typically do not coordinate routing to scenes with tow vehicles, and the City’s current tow company has not participated in any TIM training. There are no performance measurements or incentives for quick responses by the tow company, which could result in slower response times than those ultimately possible.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|---|----------|-----------------------------|---------------------|
| F1. Explore how new tow contracts and amendments can better serve the City’s incident clearance needs. Consider amendments to the tow contract, opening up the contract to multiple tow companies through a competitive bidding process, and/or shifting tow responsibility (in part or in full) to SDOT or to SPD. An amended contract could also separate light-duty from heavy-duty tow responsibilities. It could also result in a “tow rotation” system on a regional level, based on the types of equipment type held by various tow contractors. | High | Long-term (2016 and beyond) | None to Significant |
| F2. With any new tow contract with multiple operators, ensure that tow contract terms are followed to allow the closest appropriate and available tow vehicle to respond to incidents. Implement clear regulations and recommendations on what towing options are available and make them available to all responding agencies. | Medium | Long-term (2016 and beyond) | None to Significant |
| F3. Integrate the towing company into regular TIM training (including tabletop exercises) and include training in TIM requirements in any new tow contract for tow operators. | High | Short-term (2015) | Minimal |
| F4. Create a Tow Officer position within SPD to coordinate training with the tow contractor and manage/enforce the contract. | Medium | Short-term (2015) | Minimal |
| F5. Create a performance measurement | High | Long-term | Minimal |

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| framework and incentive programs for tow contractor(s), such as rewards based on quick response times. | | (2016 and beyond) | |
| F6. SDOT and SPD should work with tow companies to ensure quickest possible response times (via routing assistance, traffic control, and/or escorts to scene) | High | Short-term (2015) | Minimal |
| F7. Consider a “free tow” program to remove disabled vehicles from major highways (SR-99), arterials and bridges at no cost to the motorist. Conduct public outreach on the program to encourage its use. | Medium | Long-term (2016 and beyond) | Significant |
| F8. Ensure that responding officers are aware of which tow companies are allowed to move vehicles. Implement policies that allow the City to move vehicles using companies other than Lincoln Towing. Identify additional towing co(s) that can handle heavy loads and arrive quickly. | High | Short-term (2015) | None |
| F9. To save time, allow SDOT to call in a tow from the TOC instead of waiting for a responding officer to arrive at the scene, when applicable. | Medium | Immediate (August 2015) | None |
| F10. Ensure that the existing tow contract is fully enforced by having the City’s contracted tow company improve all aspects of its incident response, closest assets properly dispatched and complete cleanup of incident scenes that have impacted the right of way. | Medium | Immediate (July 2015) | None |

[G] Commercial Vehicle Enforcement

SPD and SDOT lack guidelines, appropriate authority, funding and policies for their Commercial Vehicle Enforcement (CVE) officers. Significant freight traffic in commercial vehicles has its origin or destination at Port of Seattle facilities, so improvements to CVE must include some Port of Seattle participation.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|--|----------|-----------------------------|------------------------|
| G1. Review relevant City ordinances to ensure full enforcement capability of all state/federal commercial vehicle regulations. Consider writing a new City ordinance that mirrors federal regulations on CVE. Train SPD's CVE unit on these regulations. | High | Short-term (2015) | None |
| G2. Review which agency should supervise and oversee CVE and the duties and responsibilities of enforcement personnel. Identify a lead agency for CVE. Currently there is a lack of clarity on the roles of SPD and SDOT roles in CVE. Determine appropriate roles for armed and unarmed CVEs – this should include safety and enforcement considerations. | High | Short-term (2015) | Minimal to Significant |
| G3. Appropriately fund and equip CVE activity within the City, in whichever agency ends up owning it. | High | Long-term (2016 and beyond) | Significant |
| G4. Establish a policy and procedures for CVE officers to follow regarding training, re-certification and responsibilities during commercial vehicle collisions. Deploy CVE officers to scenes where a commercial vehicle is involved and consider mandatory post-crash inspections of commercial vehicles in major incidents. | High | Short-term (2015) | Minimal |
| G5. Work with the WSP Training Academy on CVE training and re-certification of CVEs. Ensure at least one to two CVE officers obtain certifications in hazardous materials regulations and enforcement. | Medium | Short-term (2015) | Minimal |
| G6. Identify possible technologies that may assist in CVE, such as weigh-in-motion, license plate readers and other automated enforcement systems already used by | Medium | Long-term (2016 and beyond) | Significant |

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| WSP. | | | |
| G7. SDOT should share its CVE permit data with SPD so SPD's CVE officers can access the information. | High | Immediate (August 2015) | None |
| G8. The Port of Seattle can assist with CVE by working with the City on any revisions to the CVE program, such as: leveraging SDOT's inspection equipment to perform CVE inspections on Port property; pursuing off-hour freight activity options; facilitating future meetings between City agencies and Port tenants; and participating in planning for a "Heavy Haul Corridor" in order to obtain federal funding for CVE officers and equipment. | Medium | Short-term (2015) | Minimal |
| G9. SPD/SDOT and the Port of Seattle should establish a joint operating agreement like the one established between WSDOT and WSP (JOPS) to clarify CVE roles | High | Immediate (August 2015) | None |
| G10. Involve the Port of Seattle, Port of Seattle Police, WSP and Harbor Patrol in tabletop exercises for disaster preparedness as it relates to CVE. | Low | Short-term (2015) | None |
| G11. Develop procedures for handling commercial vehicle backups on city streets: pre-plan staging areas, traffic control, etc. SDOT can provide permits to the Port of Seattle for traffic control on adjacent City streets. | Medium | Long-term (2016 and beyond) | Minimal |
| G12. Cross train Port commercial vehicle inspectors with WSP CVE officers in joint operations near and around the Port to reduce equipment violations and protect the City's roadway infrastructure. | Low | Long-term (2016 and beyond) | None |

[H] Data Collection and Elevating the Perception of TIM

The performance of response personnel during incidents must be accurately and consistently measured to continuously evaluate current procedures. This should be recorded in a quantitative manner and include variables or metrics such as tow-response time, vehicle-clearance time, and adjacent congestion levels.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|--|----------|-----------------------------|------------------|
| H1. Under a formalized TIM policy, create specific performance measures to track clearance times and set goals for incremental improvements. SDOT should continue its data collection on clearance times and automate the process in conjunction with CAD upgrades at the TOC. | High | Short-term (2015) | None |
| H2. Begin tracking secondary collisions that occur downstream of incident scenes. | High | Immediate (August 2015) | None |
| H3. Collect data on clearance times by defining the start time as the time at which a 911 call comes in. This data is currently unavailable at SDOT's TOC but it can be made available with CAD upgrades. | Medium | Short-term (2015) | None |
| H4. Integrate Bluetooth travel time data into the TIM program and use this to evaluate scene-clearance effectiveness. | Medium | Long-term (2016 and beyond) | Minimal |
| H5. During major incidents, provide consistent media outreach and transparent information to the public on alternate routes as well as the status of incident-clearance efforts. | High | Immediate (August 2015) | None |
| H6. Promote self-evaluation efforts and provide data successes to the public and local media. | High | Short-term (2015) | None |

[I] Evaluation of TIM

Implementing the recommendations from this review will be more effective if evaluated and reported back to the public through independent parties. Benchmarks for effective TIM will change with the introduction of new technology. Benchmarks will also evolve in Seattle as travel preferences shift and expectations for information-sharing increase. Continuing to leverage outside expertise for evaluation can elevate this exercise into a national best practice.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|--|----------|-----------------------------|------------------|
| I1. Create an external evaluation group for citywide TIM performance (potentially consisting of members of FHWA's National Operations Center of Excellence). | High | Short-term (2015) | None |
| I2. Following the issuance of this report, conduct holistic reviews, at the six-month and one-year marks, of wholesale changes made to TIM in Seattle. f | High | Long-term (2016 and beyond) | None |
| I3. In these reviews, identify both TIM successes and continuing problem areas, and then adjust these recommendations as needed. | High | Long-term (2016 and beyond) | None |

[J] Teamwork and Creating a Citywide Culture for Improved TIM

A cultural shift is required for Seattle to reach a level of predictable and effective TIM. Leadership from relevant agencies, along with a push from the Mayor's office, is needed to truly affect change within SDOT and SPD, in particular. By creating TIM teams among City agencies, Seattle can realize TIM benefits without making significant financial investments.

| Recommendation | Priority | Implementation Timeframe | Financial Impact |
|--|----------|--------------------------|------------------|
| J1. TIM training and messaging should saturate all levels of staff to ensure buy-in across relevant agencies. Leadership buy-in is critical for effective TIM practices to take hold. | High | Immediate (August 2015) | None |
| J2. Identify and define thresholds for which TIM-level incidents are worthy of the activation of citywide Emergency Operations Center (EOC), and share these thresholds among SDOT, SPD and SFD. | High | Short-term (2015) | None |
| J3. Individual agencies should be encouraged to escalate command upward in severe incidents and work together on major decisions (through the citywide EOC if necessary). | High | Immediate (August 2015) | None |
| J4. SDOT, SPD and SFD can partner with King County Metro on roadway clearance practices and the use of Metro's equipment. | Medium | Immediate (August 2015) | None |
| J5. SFD should elevate its level of collaboration with SDOT and SPD to the type of working relationship SFD now has with WSDOT and WSP. | High | Immediate (August 2015) | None |
| J6. SDOT and SPD can utilize SFD resources for large crashes where rescue equipment could be useful for scene clearance. | Medium | Immediate (August 2015) | None |
| J7. SFD should share its incident-response training videos with SDOT and SPD, and SFD should also create a multi-agency and multi-jurisdictional training video. | Medium | Short-term (2015) | Minimal |
| J8. City agencies should partner with the private sector to create apps and spread information on travel conditions to private-sector employees (i.e. to switch to transit or | High | Short-term (2015) | None |

*Seattle Traffic Incident Management
Section D: Recommendations Report*

| | | | |
|--|--------|-------------------------|------|
| work off-site). | | | |
| J9. The Port of Seattle can engage with SDOT and SPD on potential use of Port property to store vehicles after their removal from nearby crash scenes. | Medium | Short-term (2015) | None |
| J10. Pursue an MOU agreement between SDOT/SPD and Port of Seattle (via the Port's tenants) on the potential sharing of forklifts and other equipment needed during incidents or disasters. | High | Immediate (August 2015) | None |



Appendix 1: Presentation to the Media July 31, 2015

Sam Schwartz Engineering D.P.C.



Traffic Incident Management in Seattle

Findings and Recommendations



Press Conference

July 31, 2015

**Sam
Schwartz
Engineering
D.P.C.**



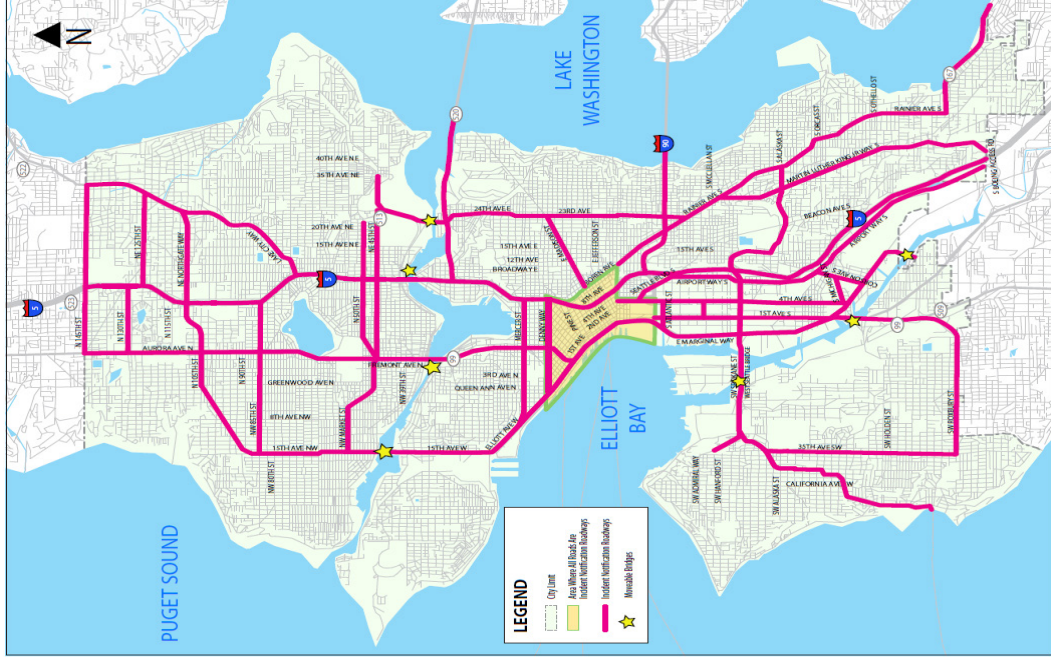
Project Background

- In March 2015 a commercial vehicle roll-over incident blocked traffic on SR-99 prompted the review
- The Mayor engaged external consultants to ensure the City implements best practices
- Focus on coordinating multi-agency responses




Seattle's Geographic Constraints

- “Hourglass” shape of city with highest density at narrowest points in and around Downtown
- Limited number of crossings over waterways exacerbates congestion due to incidents
- Response times can be slowed due to limited alternate routes
- Few options for detour routing following incidents on bridges, arterials or highways



Project Elements

- Best practices in TIM review - May
- Review City collision response practices; interviews with relevant personnel at SDOT, SPD, and others - early June
- Workshop with national experts - June 16
The logo for NACO (National Association of City and County Officials) features the word "NACO" in a bold, grey, sans-serif font. The letter "O" is replaced by a stylized green graphic of a road or path leading to a horizon line, with a white arrow pointing to the right.
- Draft recommendations and report – due June 30



Key Findings



Key Findings

- Seattle lacks comprehensive plans and policies for Traffic Incident Management (TIM)
- TIM training is lacking or non-existent in all agencies
- SPD needs a better understanding of why “quick clearance” matters and how to make it happen
- SDOT needs to better coordinate with SPD before, during, and following incidents
- Current towing contract may be too restrictive and harm TIM
- The city lacks clarity on ordinances that are necessary for quick clearance and full enforcement against commercial vehicles
- A greater sense of urgency is needed at all levels when incidents occur

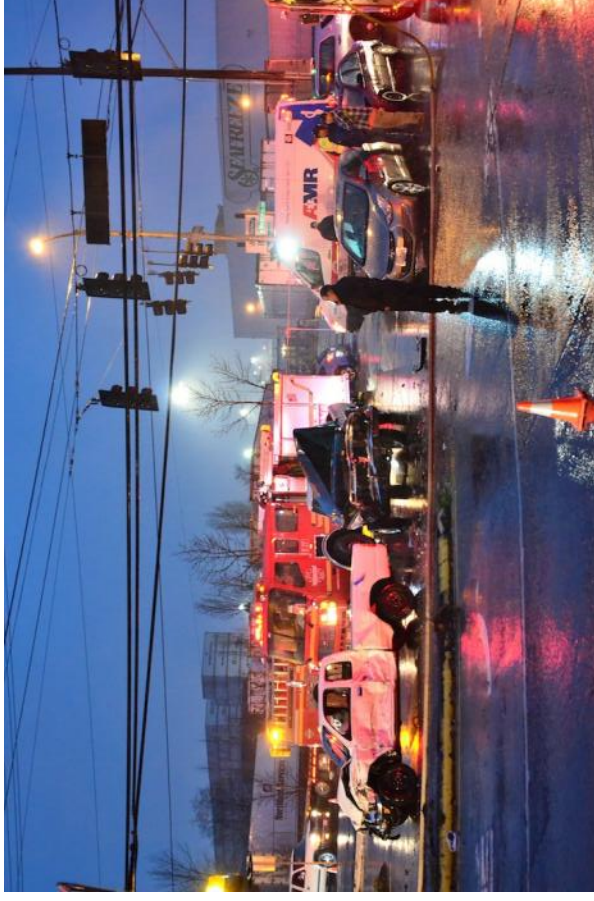
Recommendations



Teamwork and Creating a Citywide Culture for Improved TIM

Changes to TIM must start at the top. SDOT and SPD personnel need constant reinforcement on the importance of communication on TIM.

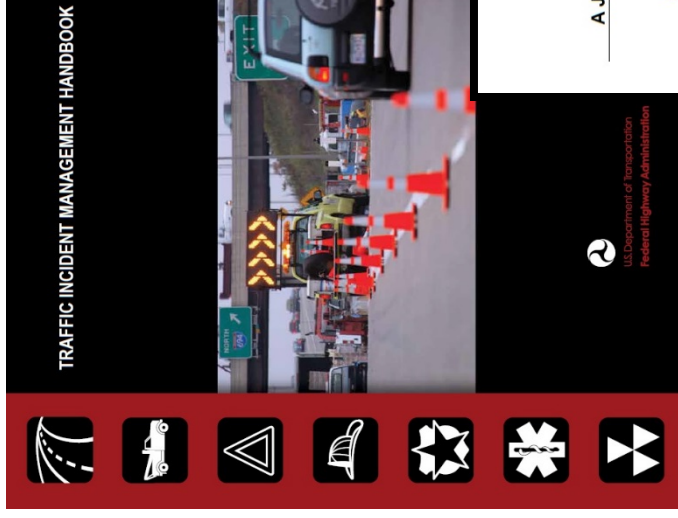
- Develop messages from leadership and from executive level
- Share equipment among agencies
- Partner with private sector on information sharing
- Brand the TIM effort to the public



Establishing a Citywide Traffic Incident Management (TIM) Program

Seattle lacks a comprehensive citywide approach to TIM.

- Start with an MOU among involved agencies: SPD, SDOT, SFD
- Develop a mission statement for TIM in Seattle
- Develop a policy manual after best practices in TIM (federal and WA materials)



Comprehensive TIM Training Program

Training is critical for effective response during incidents.
Training in TIM is lacking across all levels in Seattle.

- Train SPD Traffic Division officers and appropriate personnel at SDOT – with deadlines for completion
- Develop TIM “champions” at SPD and SDOT to ensure training occurs with the right people
- Conduct periodic multi-agency trainings and monthly multi-agency TIM meetings



Leverage Expertise from the State

Washington has a model TIM program but Seattle does not participate in any activities. Take advantage of these resources.

- Use WSDOT and WA TIM Coalition certified trainers
- Partner with regional players for coordination on TIM
- Seattle should join WA's "TIM Network"



On-Scene Response and SPD

SPD is usually first on-scene and controls much of TIM process on the ground, including clearance times and implementing detours.

- Develop new policies for SPD responders on clearance priorities
- Team with SDOT personnel on major incidents
- Educate SPD on the state's "Hold Harmless" law
- Stage locations for response vehicles

Transportation Operations and SDOT

Through the Transportation Operations Center (TOC), SDOT has the ability to support SPD and limit the impact of incidents.

- Provide “gridlock alerts” following major incidents that severely impact the road network
- Provide SDOT with access to SPD’s Computer Aided Dispatch (CAD) logs to better respond and track data on incidents
- Create plans for re-routing after incidents on major arterials and bridges.
- Modernize TOC to identify incidents more quickly and staff with a full-time SPD presence

Towing Contract and Operations

The City's towing contract with one company may restrict its ability to clear incidents quickly. Towing must be incorporated into City efforts for effective TIM.

- Enforce terms of towing contract and consider creating incentives for quick response by tow company
- Incorporate tow companies in City TIM training
- Establish a "free tow" program to remove disabled vehicles immediately from SR-99, major arterials, and bridges
- Explore how new tow contracts and amendments can better serve clearance needs.

Commercial Vehicle Enforcement

Freight traffic causes the most severe incidents and a lack of commercial vehicle enforcement (CVE) hurts Seattle.

- Establish an MOU with the Port and set regular meetings on TIM and CVE
- Team up with Port of Seattle to improve CVE, since a high percentage freight comes in and out of the Port.
- Review federal and state regulations on CVE, pass city ordinances as needed. Train City personnel to enforce.
- Consider technology upgrades that can make CVE more realistic on a day-to-day basis

Data Collection and Evaluating TIM

A robust TIM program must have performance measures in order to keep the focus on improvements in clearance times. It can also help with public awareness of efforts being made.

- Provide consistent media outreach and transparent public information during incidents
- SDOT to continue to expand its data collection, but needs technology upgrades and cooperation from SPD
- Re-evaluate Seattle's TIM program in 6 months to 1 year following input of recommendations

Recommended Next Steps

- The City of Seattle moves forward in implementing recommendations
- SDOT, SPD, FAS and SFD form a monthly interdepartmental team to develop an implementation plan
- Interdepartmental team will report back to the Mayor with progress in January





Appendix 2: Traffic Incident Management Tiered Response Framework for SPD and SDOT

Sam Schwartz Engineering D.P.C.

 **TransSafe** CONSULTING LLC

Traffic Incident Management (TIM): Tiered Response Framework for SPD and SDOT

