



Photos courtesy of FHWA



# Improving Business Processes for More Effective Transportation Systems Management and Operations (TSMO) – Traffic Incident Management

*Northeast Ohio Areawide Coordinating Agency (NOACA)*

March 14, 2019



U.S. Department of Transportation  
Federal Highway Administration

AMERICAN ASSOCIATION  
OF STATE HIGHWAY AND  
TRANSPORTATION OFFICIALS

**AASHTO**

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

# Workshop Overview

## **Purpose:**

Learn how to apply business process improvements to enhance transportation systems management and operations (TSMO)

## **Objectives:**

- Understand business processes in the context of TSMO
- Understand how enhanced business processes can lead to improved TSMO and Traffic Incident Management activities
- Apply available tools to improve a specific business process:
  - ***Arterial management during freeway incidents***
- Understand how to apply these principles and tools to enhance other business processes in the future

# Agenda



- Welcome and Introductions
- Business Process Applications and Tools – for TSMO and Traffic Incident Management
- Improving Business Processes
- Intro to Business Process Improvement for Today  
*Arterial Management During Freeway Incidents*
- Lunch Break (on-site)
- Business Process Mapping Exercise
  - Small group work
  - Report-out and discussion
  - Action planning
- Applying What You've Learned and Next Steps

# SHRP2 Overview



## Background on SHRP2 and Reliability Research

- Pam Hutton, AASHTO

# Introductions

## Self-Introductions by Participants

- Name and Organization
- One thing you'd like to learn from this workshop





***Feel Free to Comment or  
Ask Questions at Any Time***

# Pre-Workshop Poll

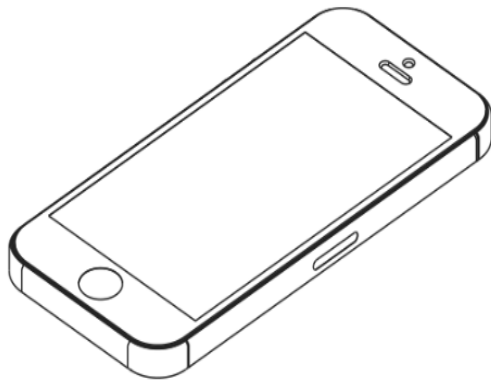


Your first TEST!

- 1. How often do you think you use business processes in your work?**
  
  
  
  
  
  
  
  
  
  
- 2. How important do you think business processes are in your work?**

# Pre-Workshop Poll

Go to [www.menti.com](http://www.menti.com) and use the code **37 86 23**



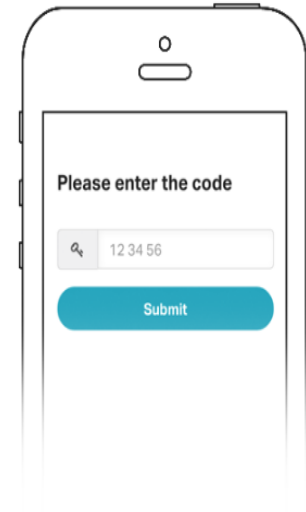
1

Grab your phone

[www.menti.com](http://www.menti.com)

2

Go to [www.menti.com](http://www.menti.com)



3

Enter the code 68 93 70 and vote!



# Pre-Workshop Poll

## Use and Importance of Business Process

Participant Poll Results

<https://www.mentimeter.com/public/ddb49eee2bb1fa36e848f7cef2581221>



***Business Processes and  
Application to TSMO***



## *Overview of Business Process*

# What is a Business Process?

*A series of logically related activities or tasks performed together to produce a defined set of results.*



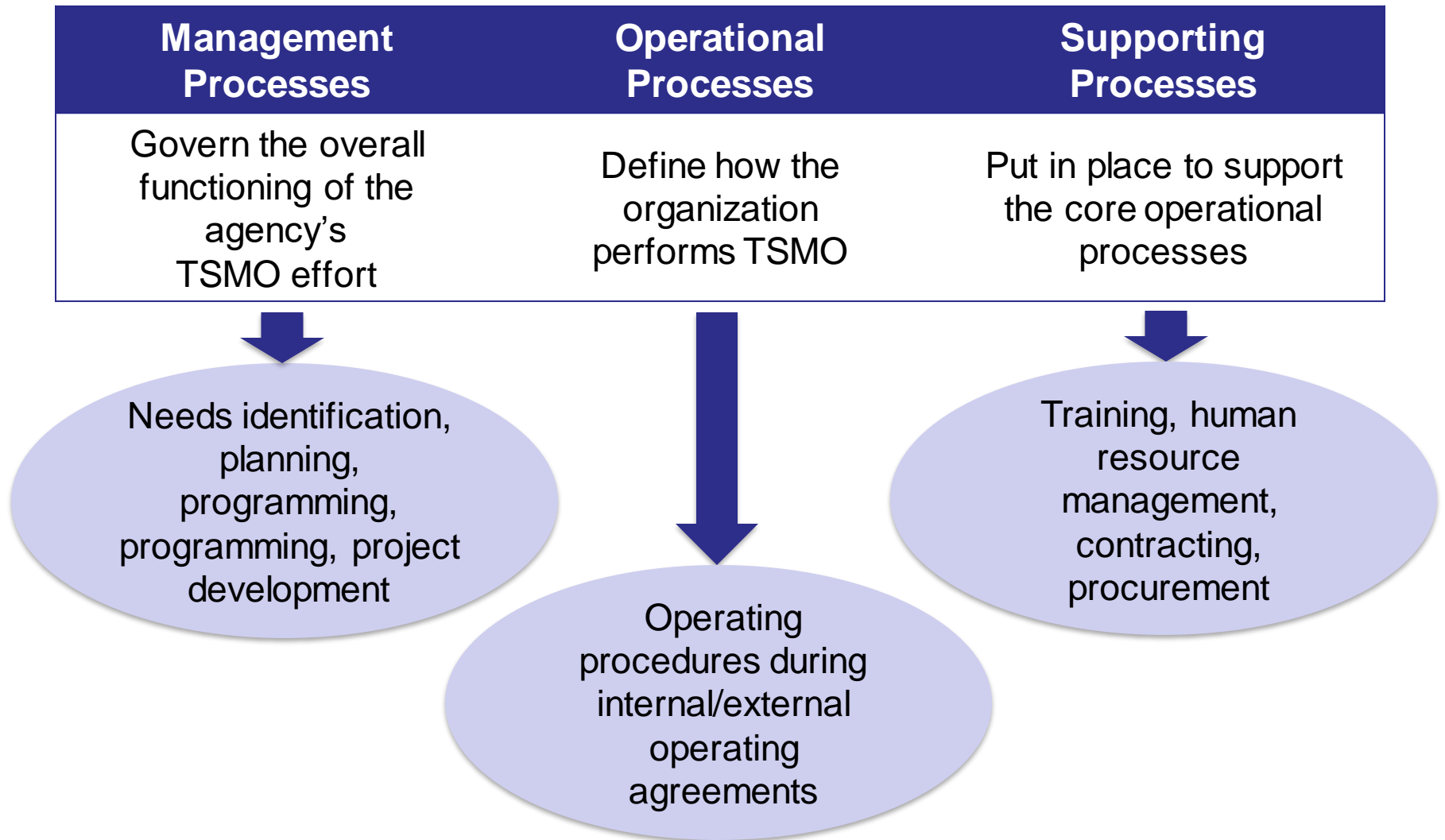
# What is a Business Process?

## Process Matters!

Several “processes” may be in place, but may not be followed

Change is ever-present (e.g., staff, leadership, technology, operations, reporting needs)

# Types of Business Processes





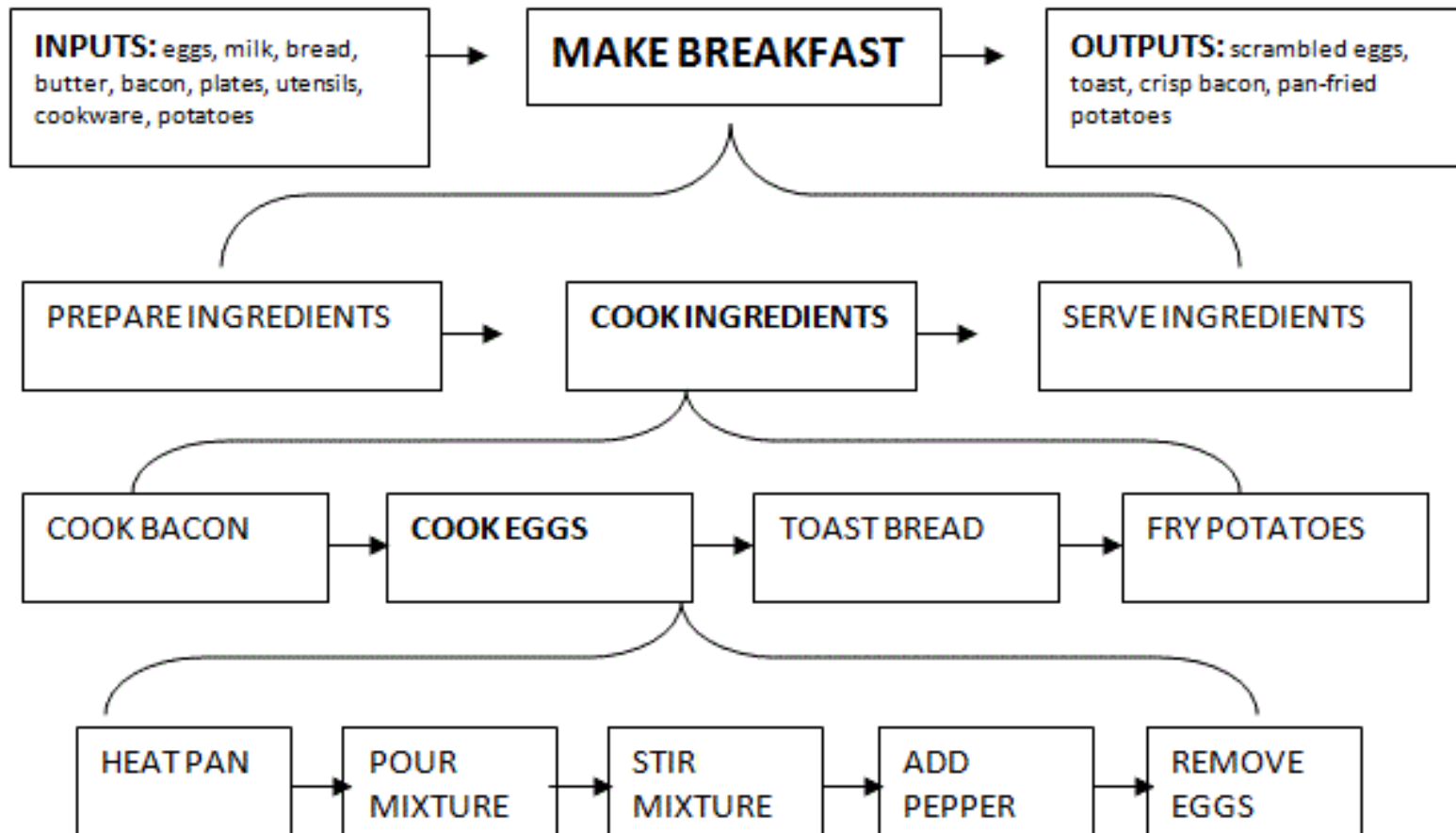
# ***Business Processes Mapping***

# Business Process Mapping

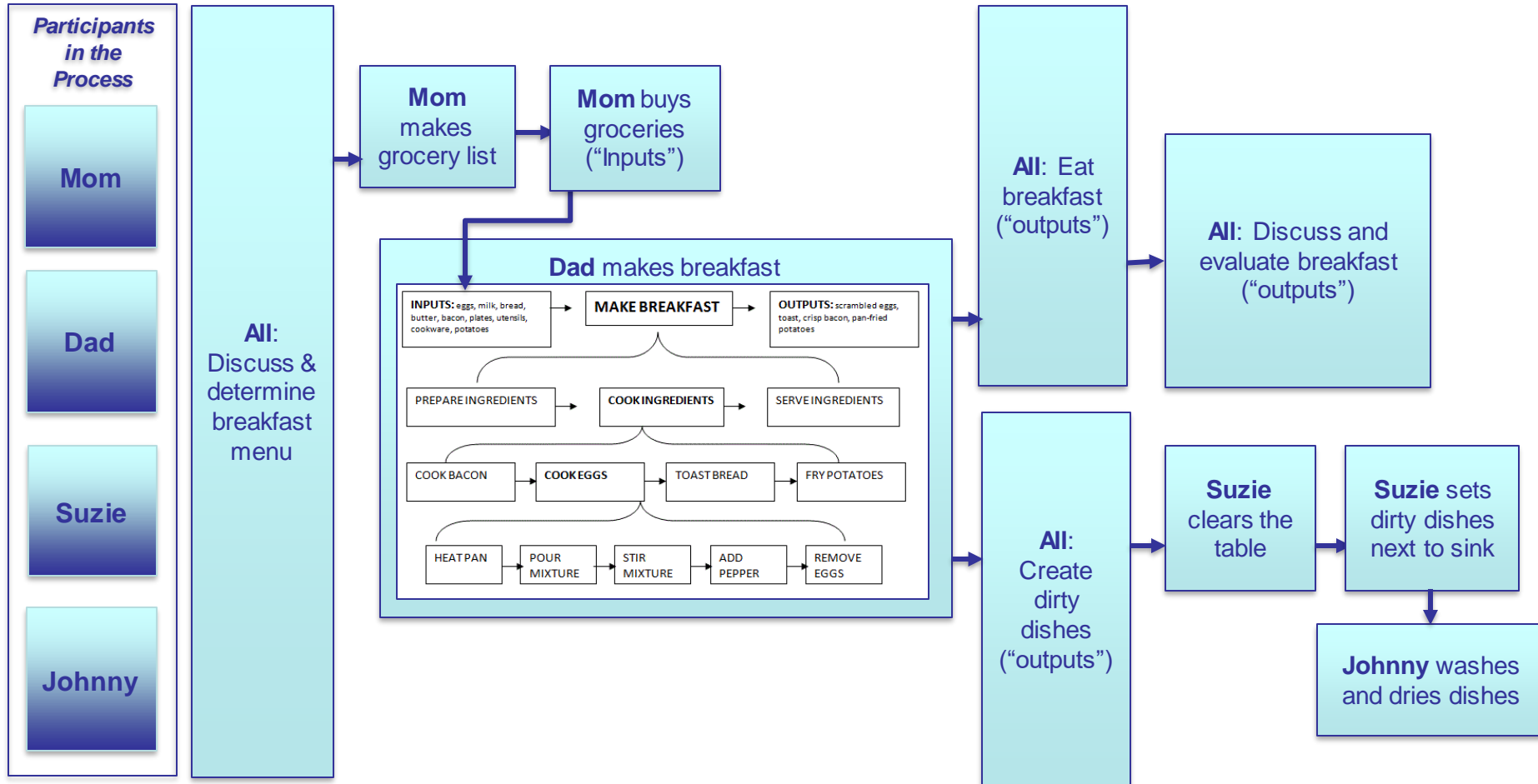
- **Visual representation** of steps, connections, information flows, and responsibilities from start to finish
- Concise picture of the **sequences of tasks**
  - Indicates **decision points**
  - Identifies **when** the process takes place, **why** it takes place, and **who** is involved in the process & responsible for decisions
- A good business process map:
  - Can be **validated**
  - Helps identify **where delays exist**, where smooth handoffs are not taking place, and what steps may be eliminated
  - Helps to **improve** processes



# Business Process Mapping Example



# Business Process Mapping Example (with interactions)





***Business Processes - Application to TSMO and  
Traffic Incident Management***

## Transportation Systems Management and Operations (TSMO)

“**Integrated strategies to optimize the performance** of existing infrastructure through the implementation of **multimodal and intermodal, cross-jurisdictional systems**, services, and projects designed to **preserve capacity and improve mobility, safety, and reliability of the transportation system.**”

*\*Supported by ITS technologies\**

# Application to TSMO

## TSMO Strategies

- **Traffic incident management**
- Road weather management
- Planned special events
- Work zone management
- Traveler information (511)
- Arterial management
- Managed Lanes
- Integrated Corridor Management (ICM)
- Active Traffic Management (ATM)
- Transportation Demand Management
- Ramp metering

# Application to TSMO

## Traffic Incident Management Strategies

- Pre-planning responses for various scenarios
- Relationships, coordination, communication among responding parties
- Traveler information during incidents
- Performance measures to drive improvements (e.g. clearance times)

### TIM Partners:

- Transportation agencies
- Emergency responders
- Law enforcement
- Towing companies
- TMC operators


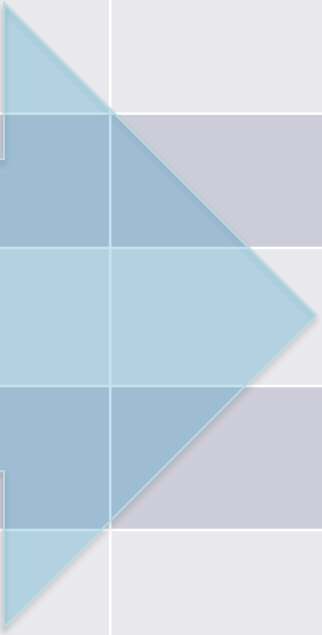
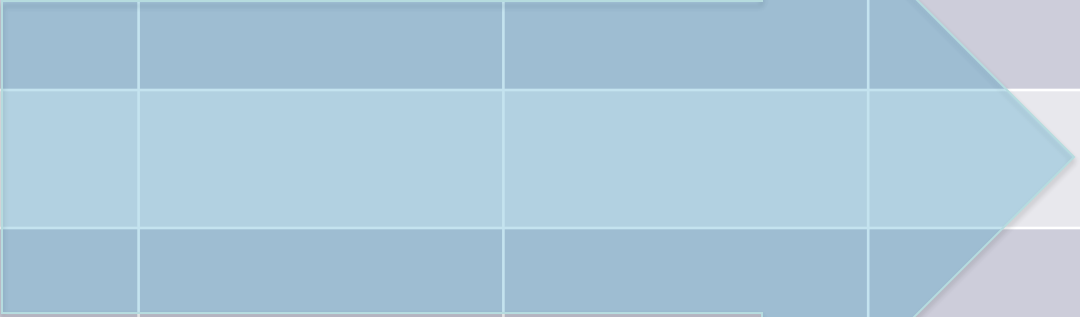
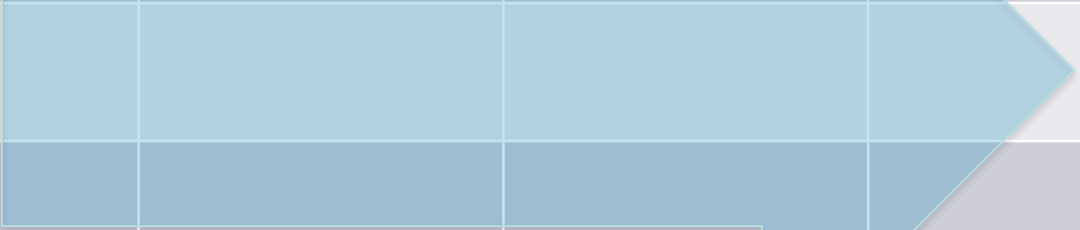
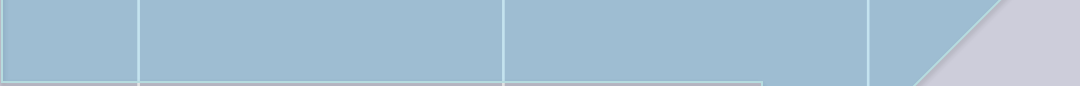
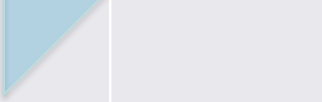


# Why are Business Processes Important to TSMO?

- Successful **operational activities and relationships** are highly dependent upon effective business practices.
- Helpful in **breaking down organizational barriers**, improving **coordination**, and increasing **efficiency**.
- Documentation of business processes **enables efficient transition with staff turnover** and new partners.
- **Lack of effective business processes** can **hinder an agency's capacity** to perform complex operational strategies.

# Why are Business Processes Important to TSMO?

Goal to move from one level to the next

	1 - Performed	2 - Managed	3 - Integrated	4 - Optimized
<b>Business Processes</b>				
<b>Systems &amp; Technology</b>				
<b>Performance Measurement</b>				
<b>Culture</b>				
<b>Organization &amp; Staffing</b>				
<b>Collaboration</b>				



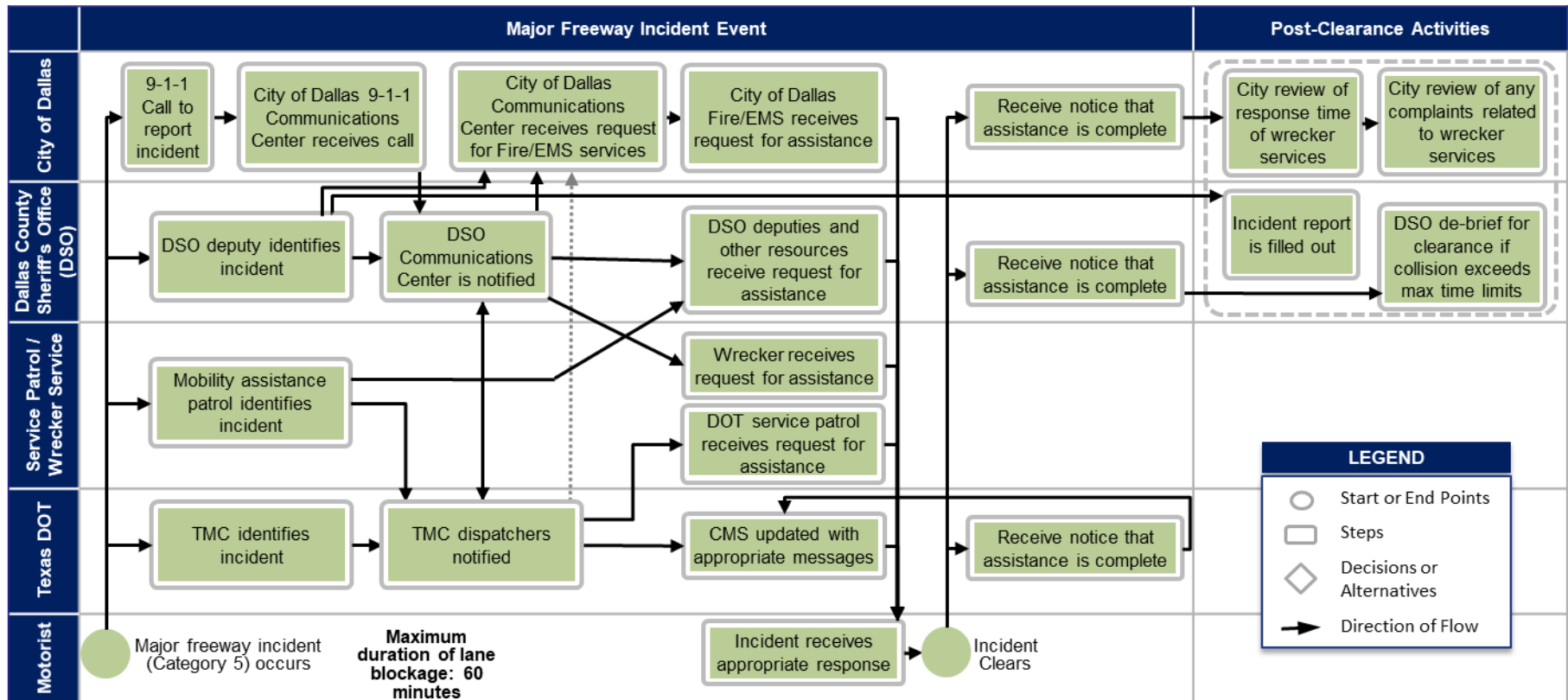
# Examples of TSMO Business Processes

- Include TSMO in **planning and programming** processes
  - Traffic management plans, checklists, key points of contact
- Establish **lines of communication**
  - Regional committees - NOACA Safety & Operations Council
- Develop **agreements** with partners and stakeholders
  - Resource sharing
  - Working relationships (DOT, law enforcement, local agencies)
- Enhance **organizational support** to accommodate TSMO
  - TSMO divisions established
  - TIM training
- Create or revise **operating procedures & processes**
  - SOPs for various traffic management scenarios

# TIM Business Process Examples

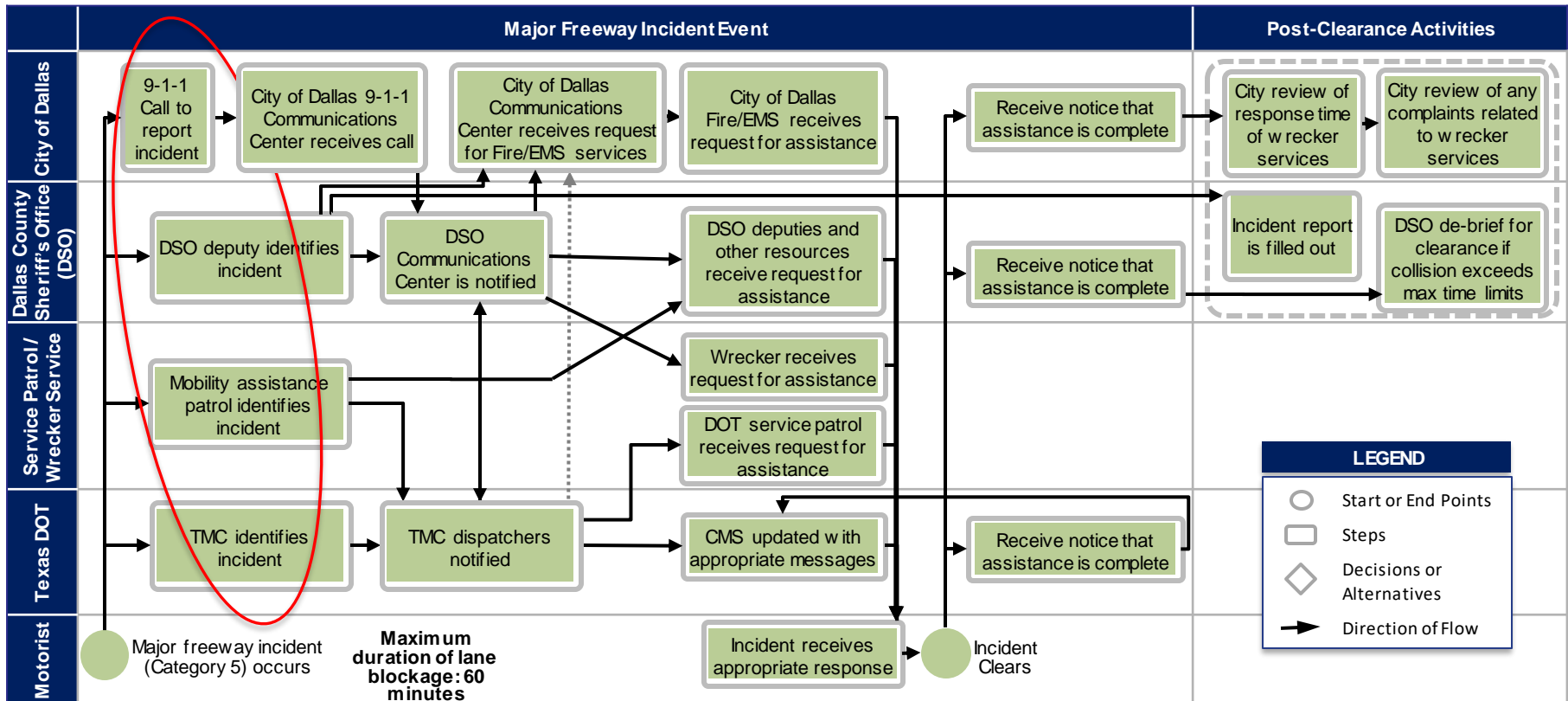
***North Central Texas Council of Governments (NCTCOG)  
Dallas Major Freeway Incident Clearance***

# Example: NCTCOG Dallas Major Freeway Incident Clearance



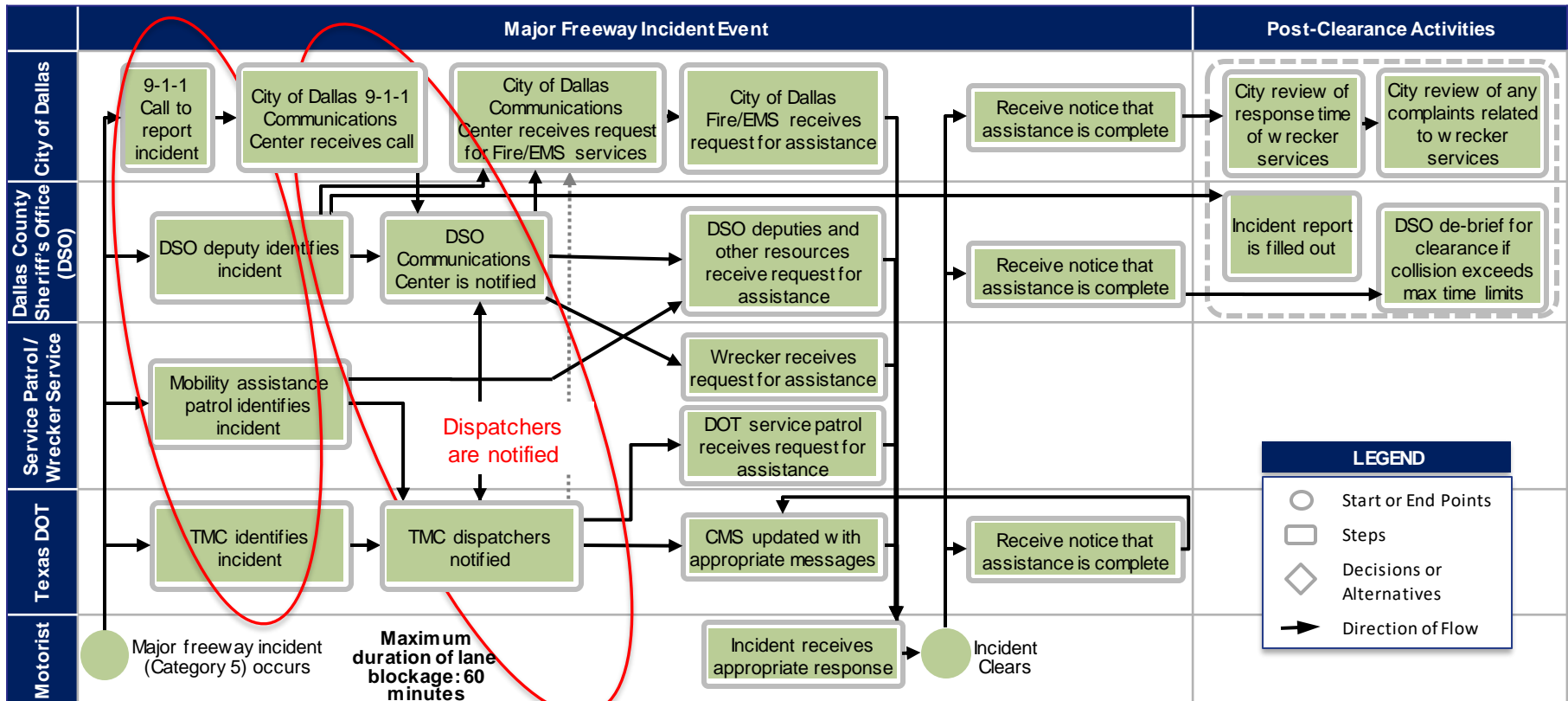
# Example: NCTCOG Dallas Major Freeway Incident Clearance

The incident is identified by one or more entities



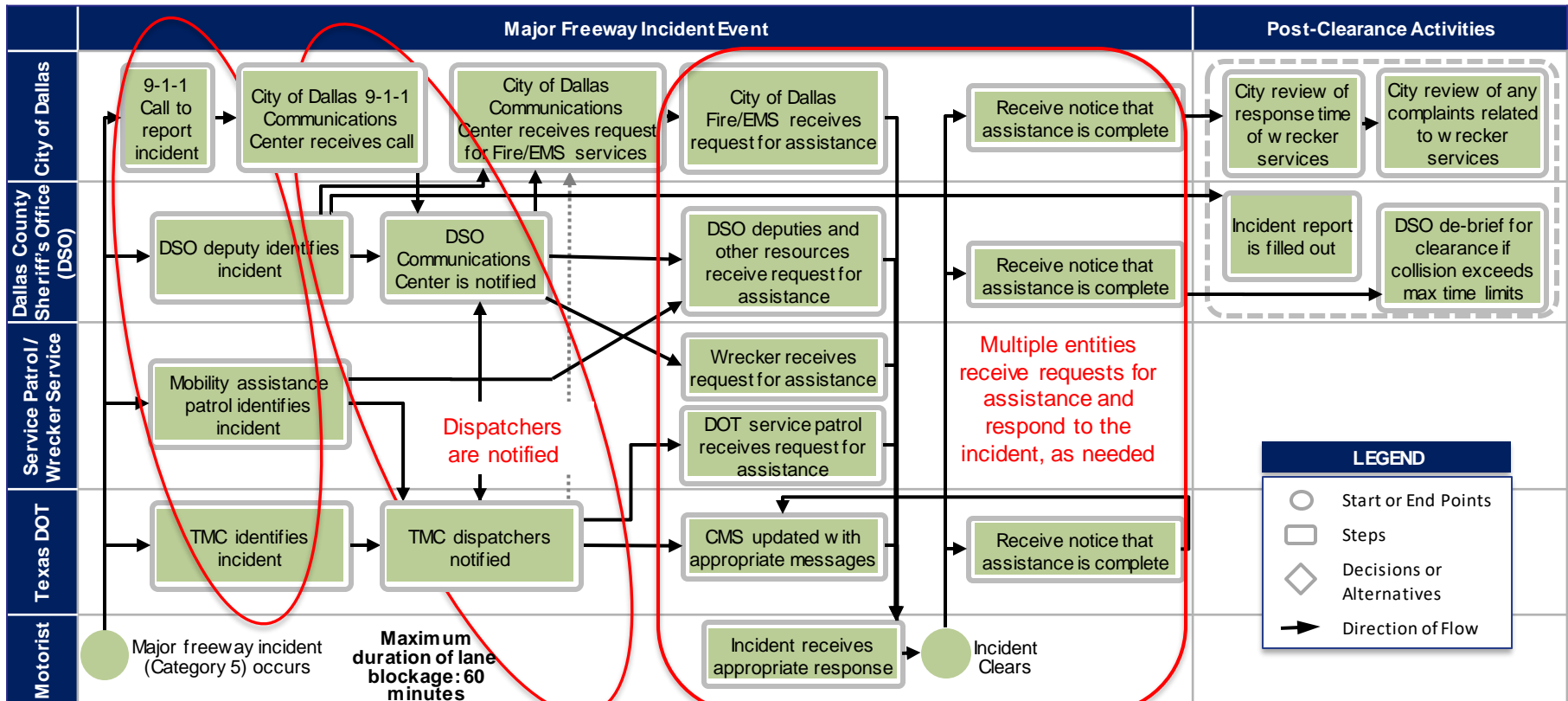
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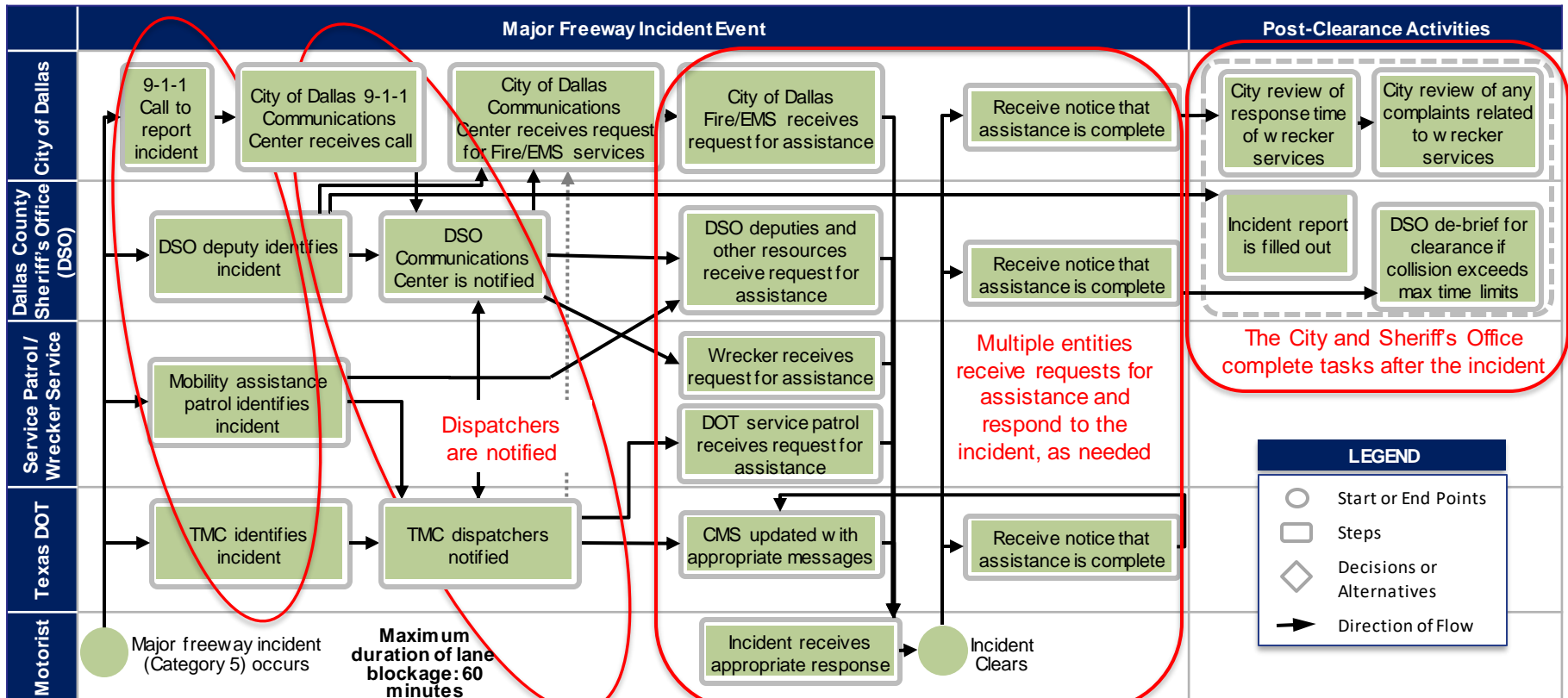
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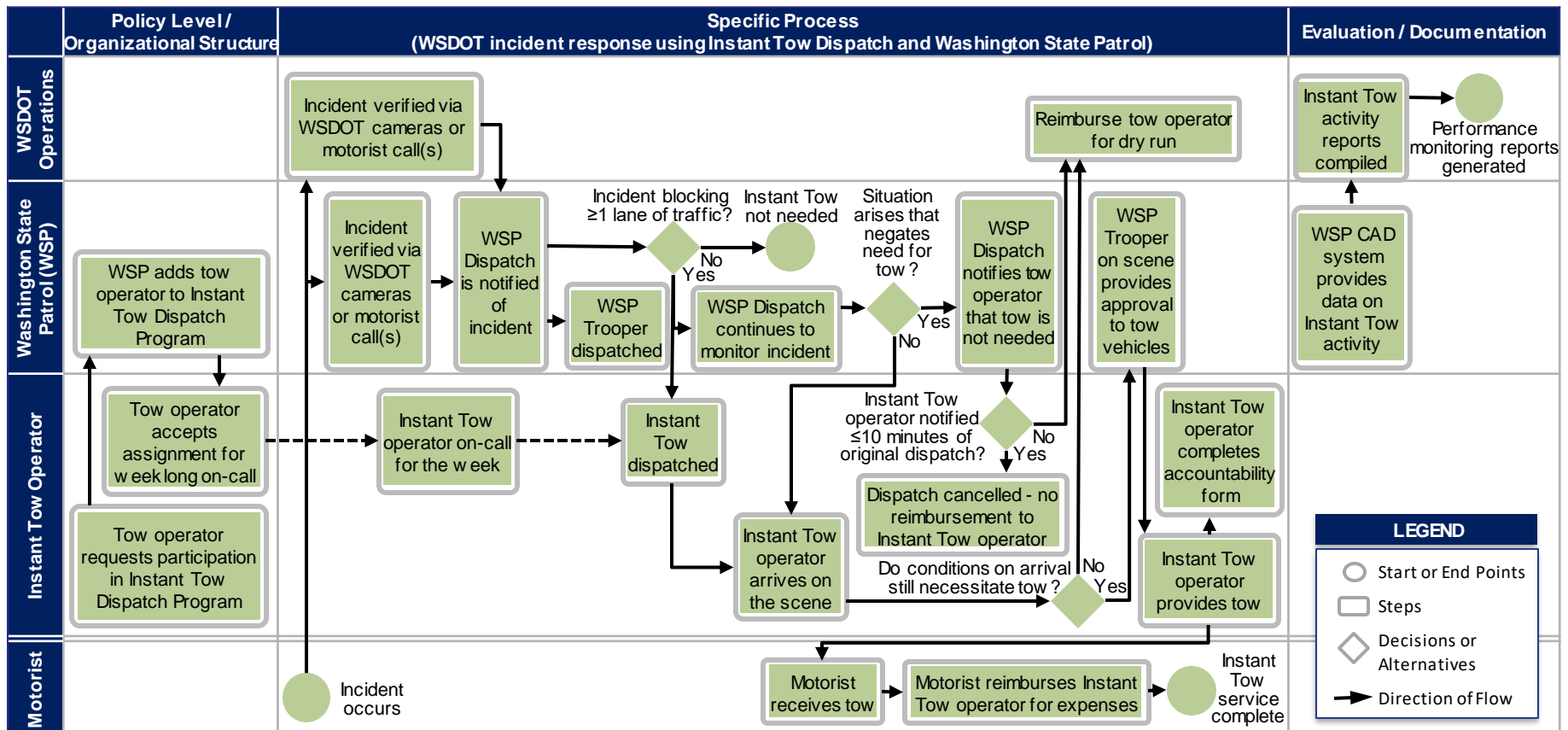


# TIM Business Process Examples

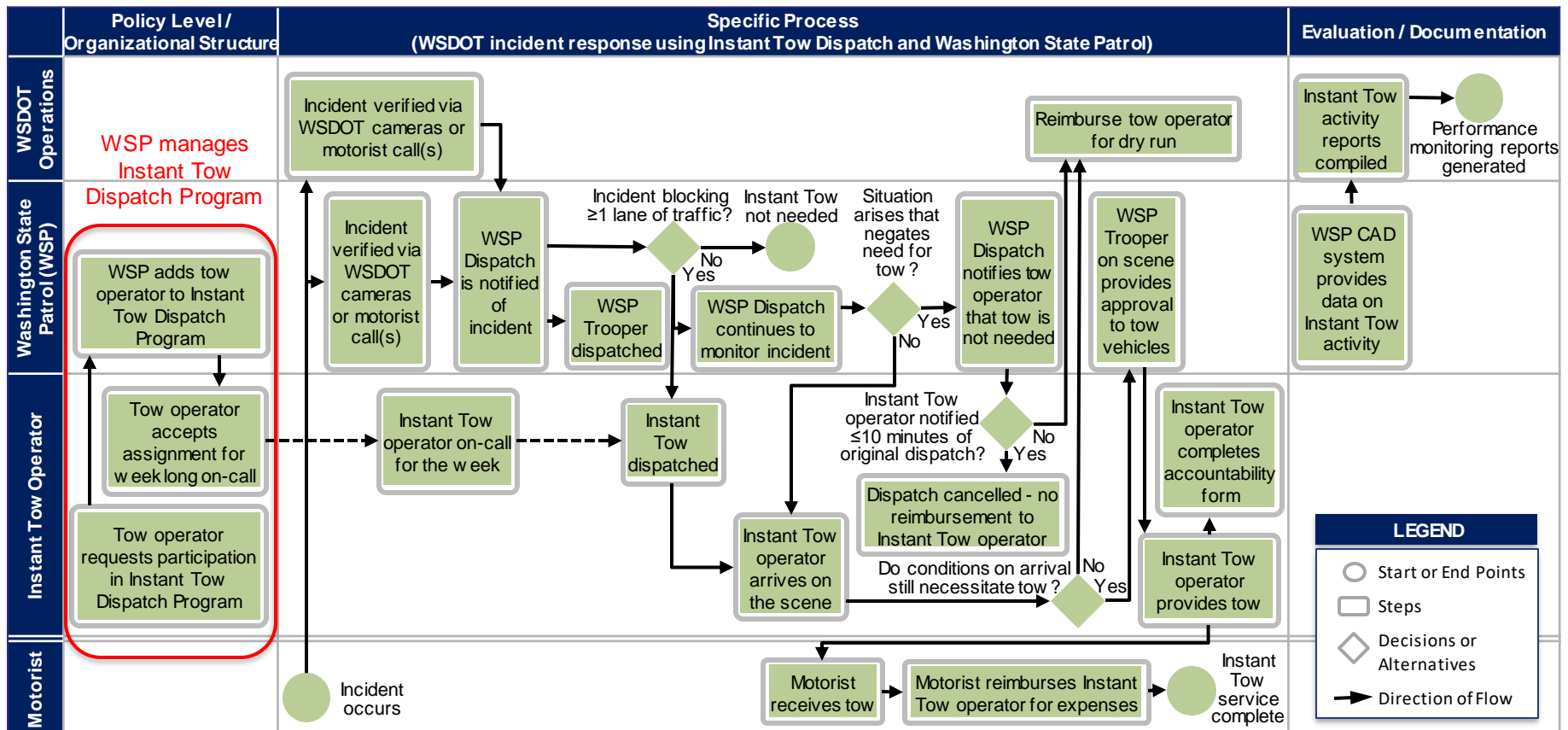
## *Washington State DOT - Instant Tow Program*



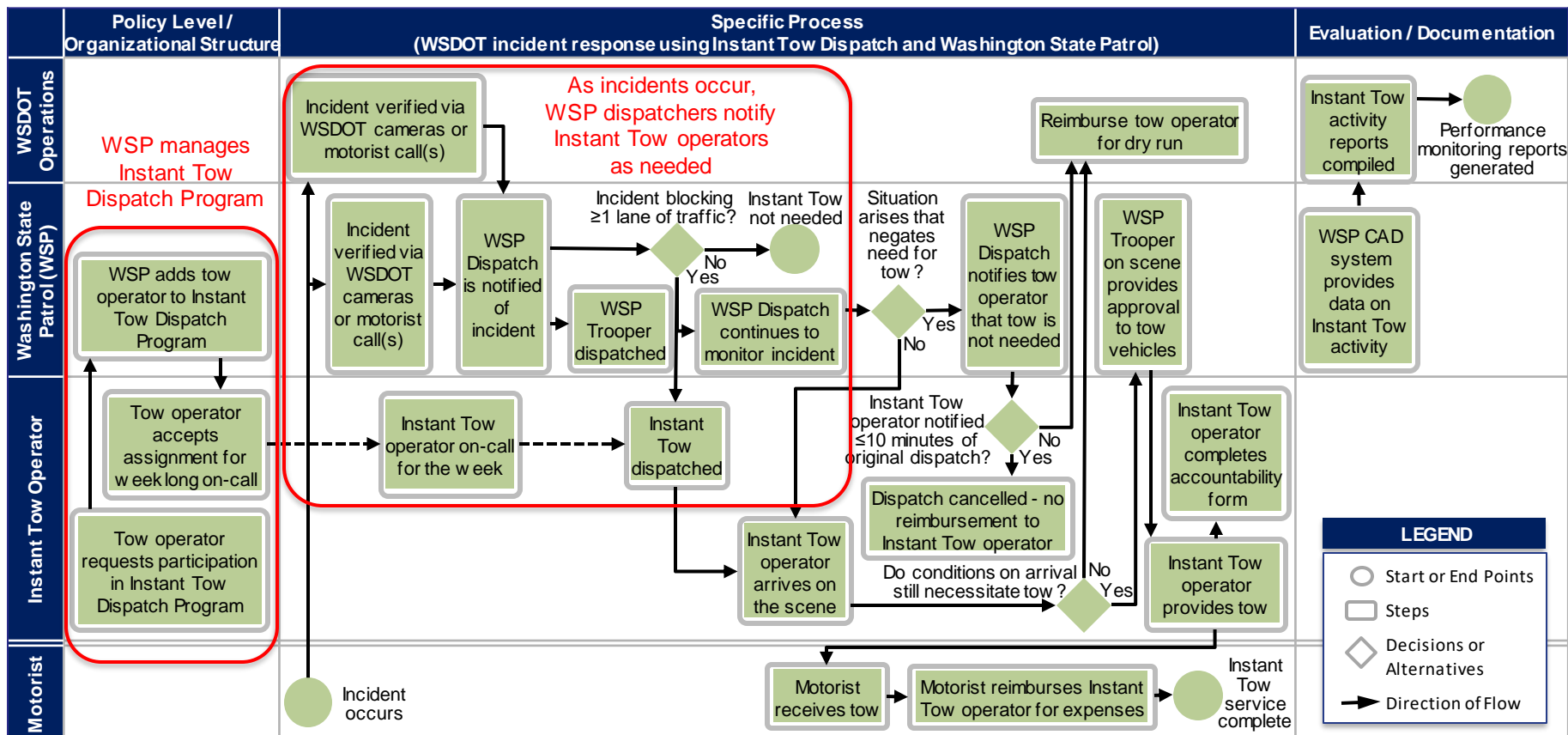
# Example: WSDOT Instant Tow Dispatch Program



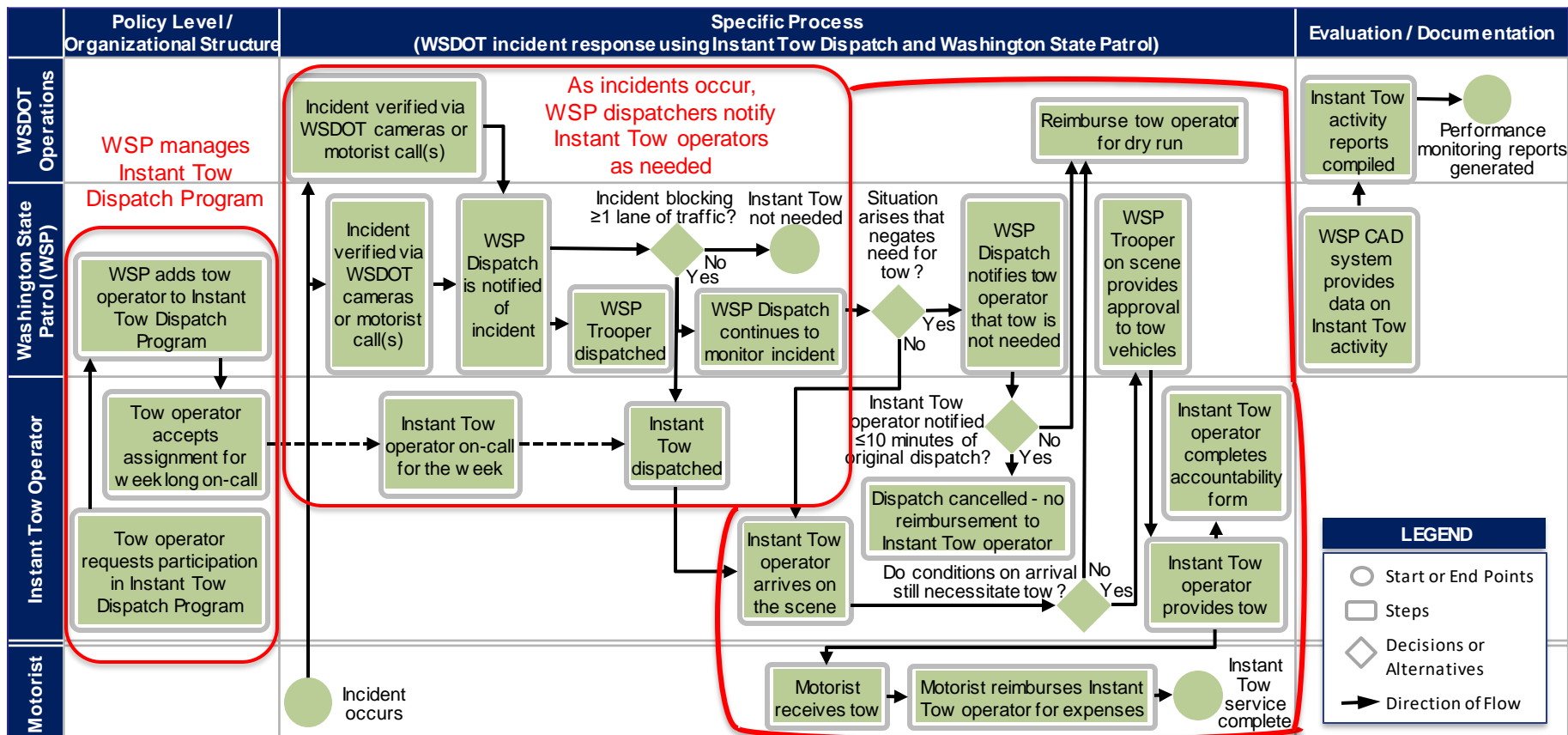
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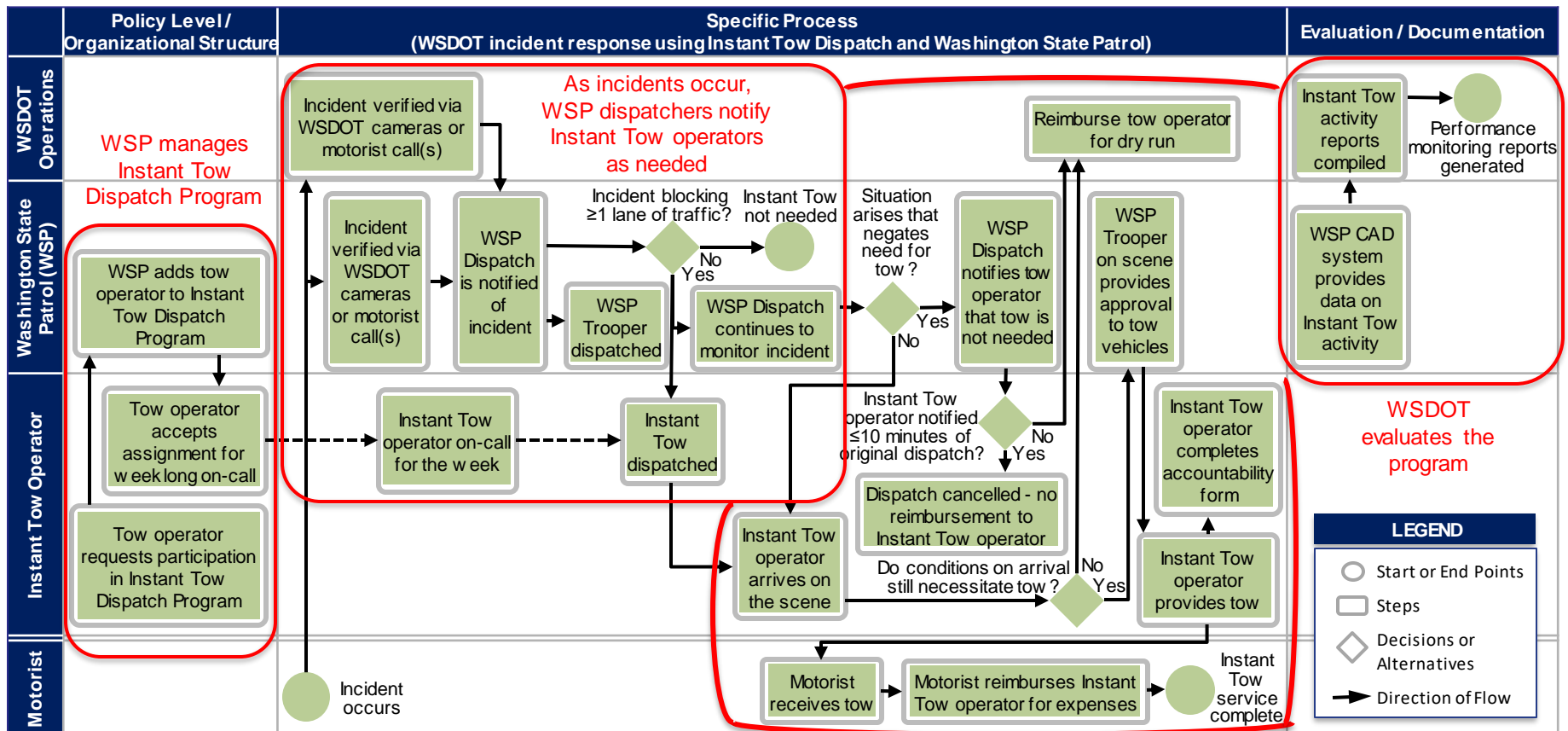


# Example: WSDOT Instant Tow Dispatch Program



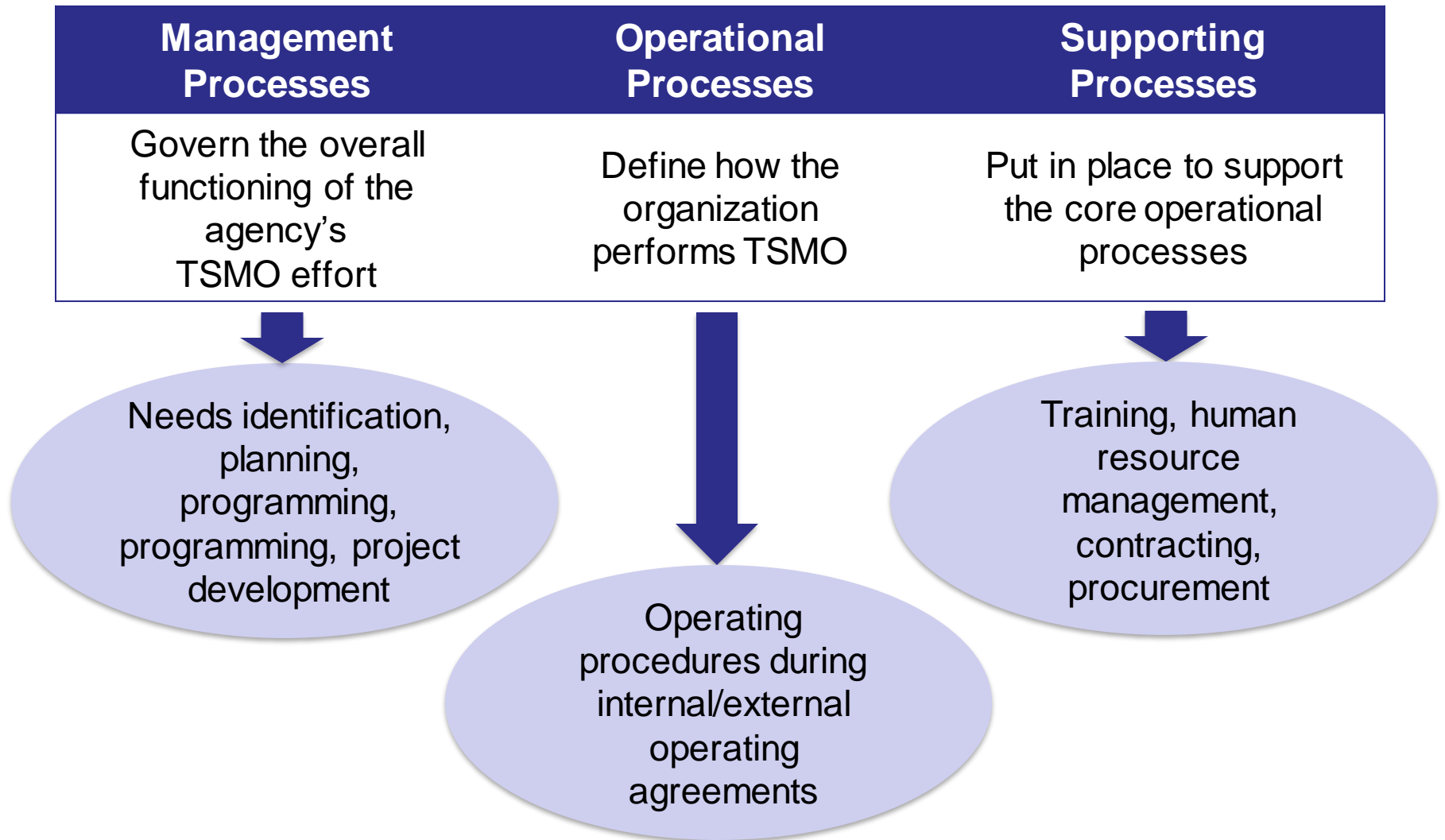
Timing of notifications is used to determine reimbursement

# Example: WSDOT Instant Tow Dispatch Program



Timing of notifications is used to determine reimbursement

# What Business Processes Do You Use in Your Work?





# *Tools for Developing Business Processes*

# Tools for Developing Business Processes



- Business processes **can be developed at a relatively low cost!**
- However they can be difficult to accomplish
  - Requires input of multiple individuals
  - Current processes are often entrenched
  - People generally don't like change
  - Need to make the case for business processes
- No two agencies or regions are alike
  - Unique institutional policies and cultures
  - Different organizational structures / reporting relationships
  - Variation in stakeholders



# Tools for Developing Business Processes



*There is **no one-size-fits-all solution** to developing and improving business processes...*

*But there are tools agencies can use to  
**IDENTIFY / DEVELOP / IMPROVE**  
business processes within unique environments*

# Tools for Business Processes

- **FHWA Capability Maturity Frameworks (CMF)**
  - Online self-assessment tools to identify actions & business process improvements
- **Primer: “*Improving Business Processes for More Effective Transportation Systems Management and Operations*”**
  - Guidance with 7-step approach to improve business processes
- **E-Tool for Business Processes to Improve Travel-Time Reliability**
  - Use in group setting to create or improve a business process

# Capability Maturity Frameworks

**Assess capabilities, identify improvements, select actions**

**Online Assessments:** Work Zone Management, Traffic Management, Signal Management, Special Event Management, Incident Management, Road Weather Management

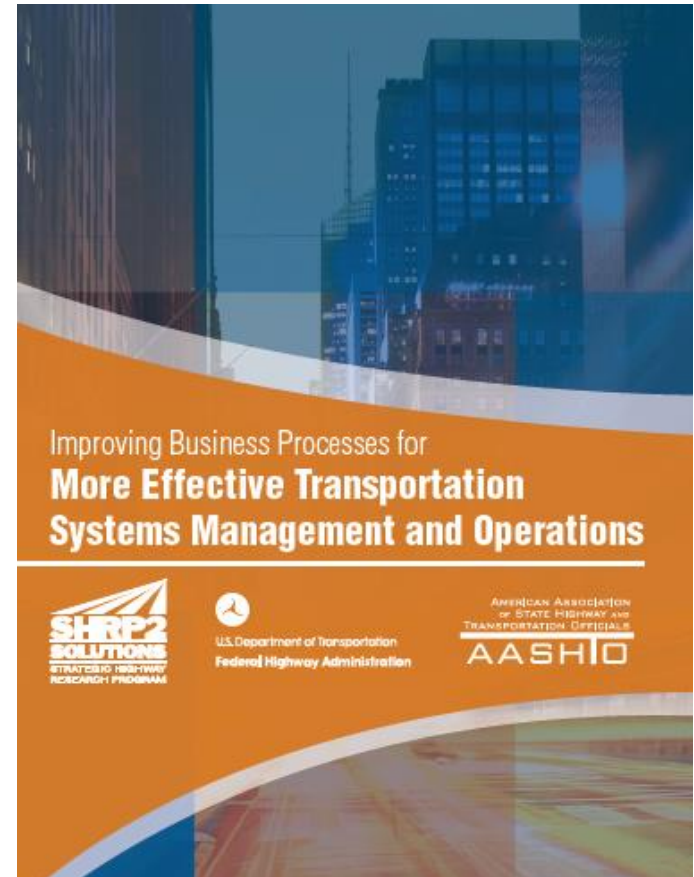
Process Improvement Areas		Capability Levels			
Dimensions or Process Areas	What is it	Level 1 Ad-Hoc, Low Level of Capability	Level 2 Managed, Medium Level of Capability	Level 3 Integrated, High Level of Capability	Level 4 Optimized, Highest Level of Capability
Business Process	Plans, Programs, Budgets	Statement of Capability			
Systems & Tech	Approach to Building Systems		Step 1 Self-Assessment. Work with your stakeholders to assess where you are in terms of the capabilities in each area		Step 2 Identify areas of improvement and the desired levels of capability to improve program effectiveness
Performance Measurement	Use of Performance Measures				
Workforce	Improving Capability of Workforce				
Culture	Changing Culture and Building Champions		Step 3 Identify actions that you need to take to move to the desired levels of capability		
Collaboration	Improving Working Relationships				

Available at: <https://ops.fhwa.dot.gov/tsmoframeworktool/index.htm>

# TSMO Business Process Primer

Helps transportation agencies accomplish the following:

- Understand the **importance of sustainable business processes** to effectively advance TSMO
- Assess **business processes**
- Identify **constraints and gaps** within current processes
- Engage **the right stakeholders** to help improve business processes



# TSMO Business Process Primer

1. Introduction
2. Business Process Development
- 3. Traffic Incident Management**
4. Work Zone Management
5. Planned Special Events
6. Road Weather Management
7. Traffic Management
8. Checklist for Getting Started
9. Available Resources

- Business process issues
- Case studies
- Questions to identify business process issues
- Potential stakeholders

# E-Tool - Discussion Guide

- Developed as a follow-up to SHRP2's *Integrating Business Processes to Improve Travel Time Reliability (L01)* research
- E-tool used as a discussion guide to:
  - Define and evaluate current business processes
  - Identify improvements
  - Capture inputs and action items
- Orientation module and application module
- Available at:  
[www.fhwa.dot.gov/goshrp2/Solutions/Available/L06\\_L01\\_L31\\_L34/Organizing\\_for\\_Reliability\\_Tools](http://www.fhwa.dot.gov/goshrp2/Solutions/Available/L06_L01_L31_L34/Organizing_for_Reliability_Tools)





***Improving Business Processes***



# *Preparing for Business Process Development*



# Preparing for Business Process Improvement

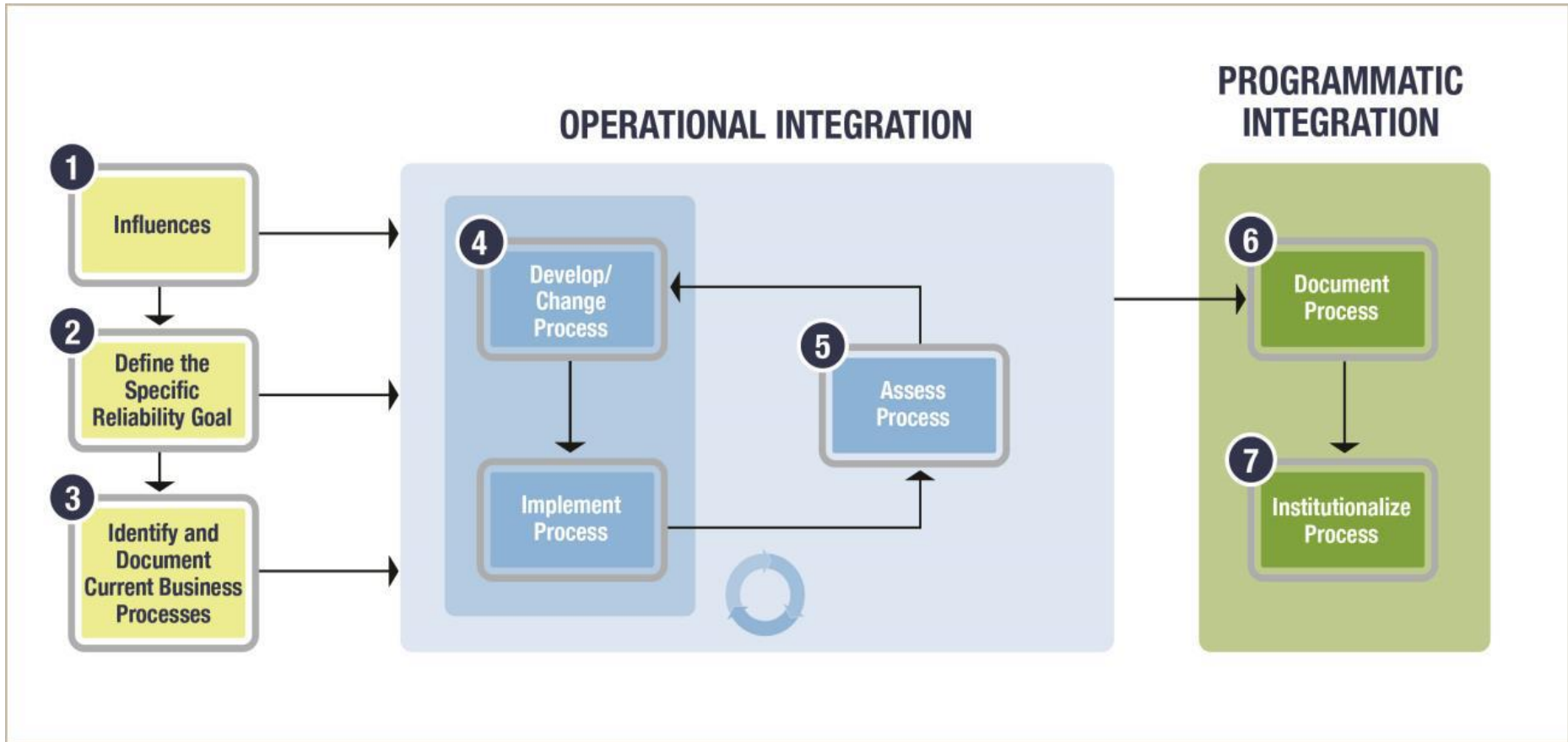


- **Engage Stakeholders**
  - Critical for effective process improvements
  - Raises awareness of issues that might not otherwise be identified
- **Assemble Relevant Materials**
  - Planning documents (TSMO plans, ITS architecture)
  - Organizational structures (org charts, levels of authority)
  - Agency mission statement, goals, objectives
  - Performance measures and data
  - Agreements, policies, guidelines
  - Current operating procedures
- **Facilitate a forum for examining business processes**
  - Workshop or structured discussions



***7-Step Approach  
for Improving Business Processes***

# 7-Step Approach for Improving Business Processes



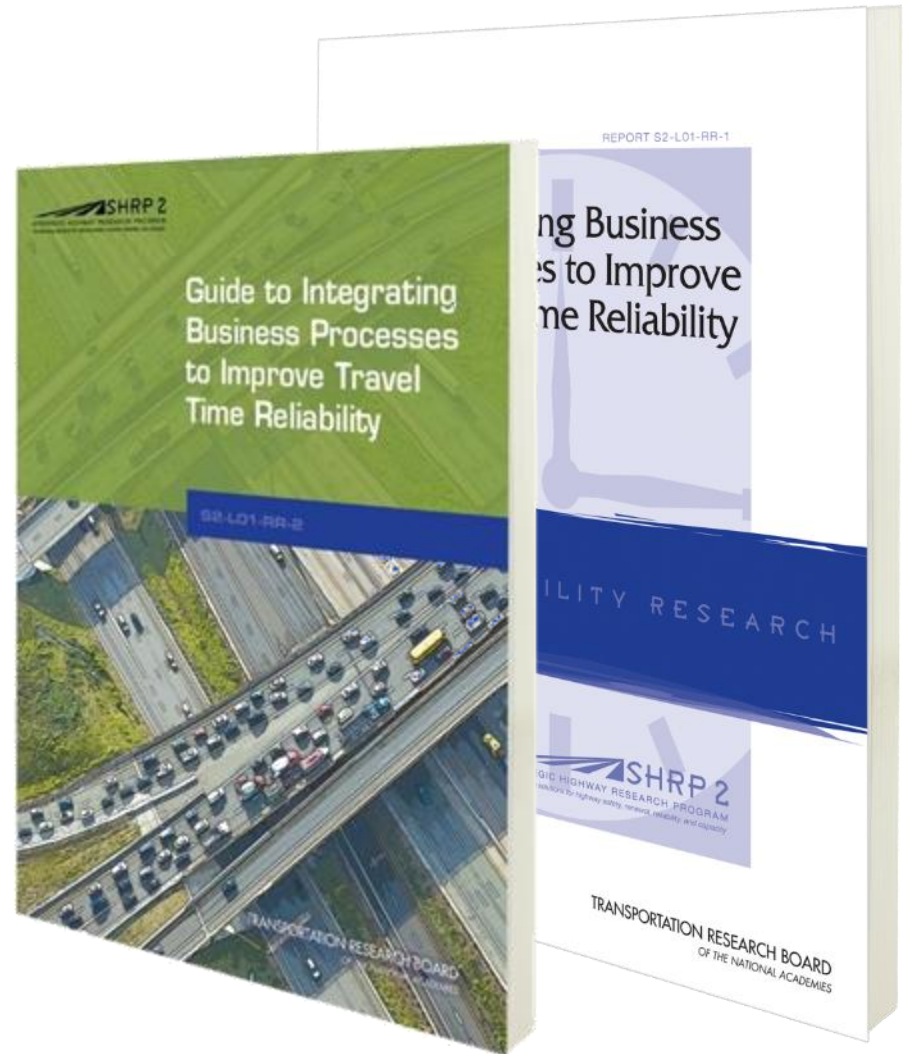
# Step 1 - Identify Influences

What made it apparent that there is a need to improve a business process in order to improve travel time reliability?

**TOP DOWN**

**EVENT DRIVEN**

**NEEDS BASED**



# Top Down Influences

- Also known as “big directive”
  - Legislative requirements
  - Directives from agency management
  - New venues or expansions driven by elected officials
    - Need for coordinated special event management with new event facilities
    - Need for signal retiming with new development



# Event Driven Influences

- Caused by a specific event
  - Fatality in a construction work zone
  - Weather event causing significant impacts to travelers
  - Major incident with significant closure times and traffic disruption
  - May be accompanied by media and public perception impacts



# Needs Based Influences

- Also known as “opportunity based”
  - Initiated at grass-roots level
  - Evolves over time according to recurring needs
  - Influences day-to-day operations
  - E.g. Florida DOT Road Rangers Highway Assistance Program
    - Initially implemented for work zones
    - Later expanded to assist stranded motorists



## 2 – Define Goals

- Used to measure success
- Focuses your efforts
- Assists in developing benchmarks
  - Reduce incident clearance time
  - Provide 24/7 operations
  - Improve resource efficiency
  - Reduce congestion/delays
  - Implement more effective plans for managing incidents



# 2 – Define Goals

## Examples:

- Provide incident clearance within 60 minutes for major freeway incidents
- Reduce traffic impacts to arterials during freeway incidents
- Achieve actual travel times through work zones within 10% of anticipated travel times



# 3 - Identify and Document Current Business Processes

- As previously discussed, a **business process**:
  - Defines a series of actions or activities that result in a specific or desired outcome to accomplish a goal
  - Is likely something your agency does on a daily basis
- This step documents the existing business process



# 3 – Identify and Document Current Business Processes

## Why?

- Better understand your current process
- Identify appropriate stakeholders
- Identify gaps in communications or data flows
- Identifies roles and responsibilities to:
  - Ensure continuity
  - Retain institutional knowledge

# 4a – Develop/Change Process

## **Change or develop new business process to reflect:**

- Influences, goals, policy, procedures
- Input from stakeholders
- How could the process be improved?

# 4a – Develop/Change Process

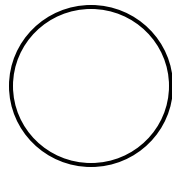
- Document the process
  - Critical inputs and outputs
  - Data flows
  - Decision points
  - Responsible entities
- Create a visual representation of the process



**Business Process Mapping**

# 4a – Develop/Change Process

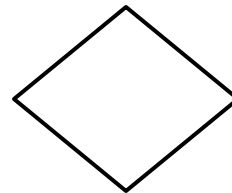
## Business Process Mapping – Symbols



Start or  
End Point



Steps in  
a Process



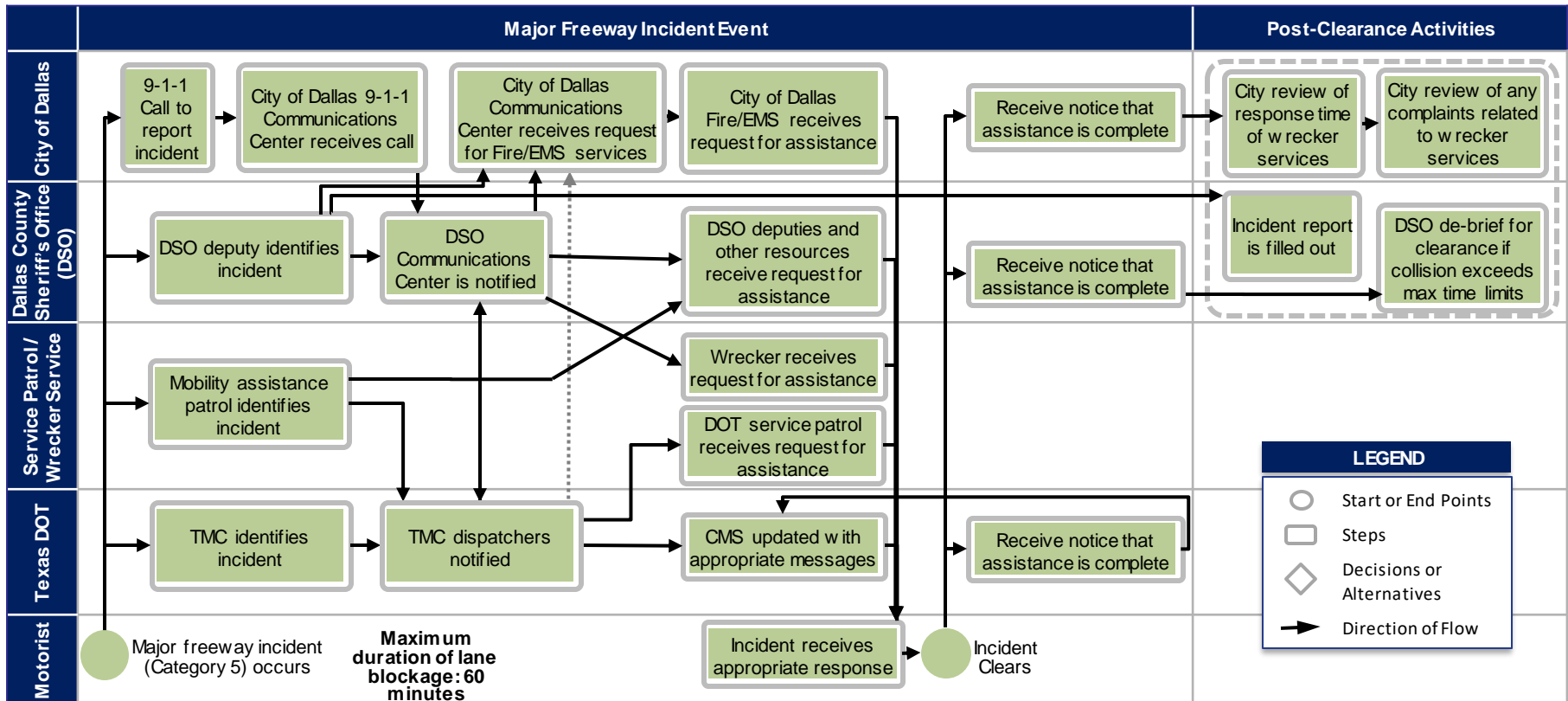
Decisions or  
Alternatives



Direction of  
Flow

# 4a – Develop/Change Process

## NCTCOG Dallas Major Freeway Incident Clearance



# 4b - Implement Process

- **The approach to this step varies**
  - Number of agencies involved
  - Depth or complexity of process
- **Involve all stakeholders**
- **Timeframe for implementation**
  - Needs to be sufficient to allow stabilization of new process
  - May include more than one iteration to implement/assess



# 5 – Assessing the Process

**Important to determine the effectiveness of the newly developed process**



# 5 – Assessing the Process

## **Assessment:**

- Identify measures of success
- Outline methods of continuous evaluation
- Identify data needed
- Review results against the defined goals

# 6 – Documenting the Process

- Formal documentation occurs once the process has been implemented and proven effective
- Includes:
  - Details of the business process
  - Assessment procedures
  - Benefits
  - Lessons learned
  - Roles and responsibilities

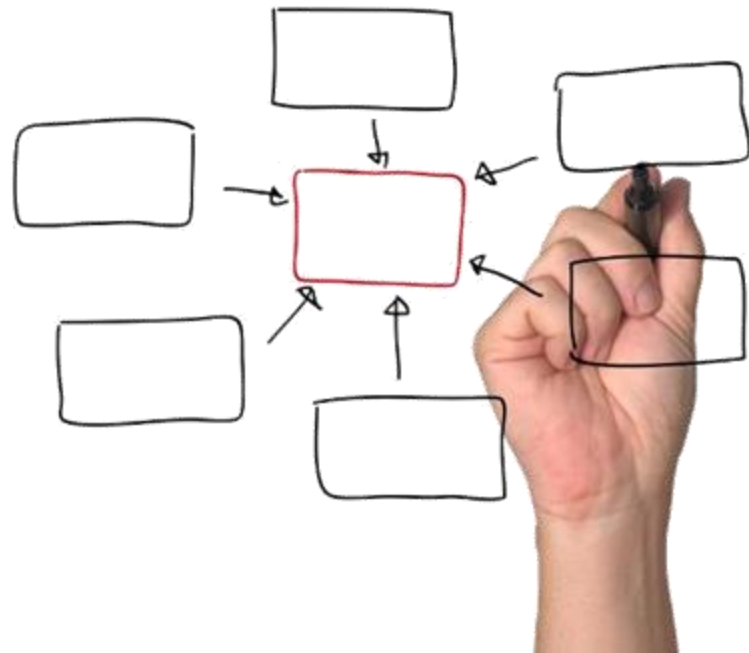


# 6 – Documenting the Process

- Facilitates updates to processes as conditions change
- Examples of documentation:
  - Internal memoranda
  - Memoranda of understanding
  - Agreements between stakeholders
  - User guides
  - Reports
  - Flowcharts

# 7 - Institutionalizing the Process

- Process is embedded into existing policies or programs
- Starts at higher levels and survives changes in management
- Linked to established agency goals
- Documentation is key!



# 7 - Institutionalizing the Process



## Strategies for Institutionalizing Process

- Obtain buy-in and ongoing support
- Link to agency goals
- Make documentation accessible and available
- Maintain documentation – keep it current
- Communicate performance to inform management and decision-making



***NOACA Region Business Process:  
Arterial Management During Freeway  
Incidents***



# ***Background and Goals for Process Improvement***

*Brian Blayney, NOACA*

*Tony Toth, Ohio DOT*

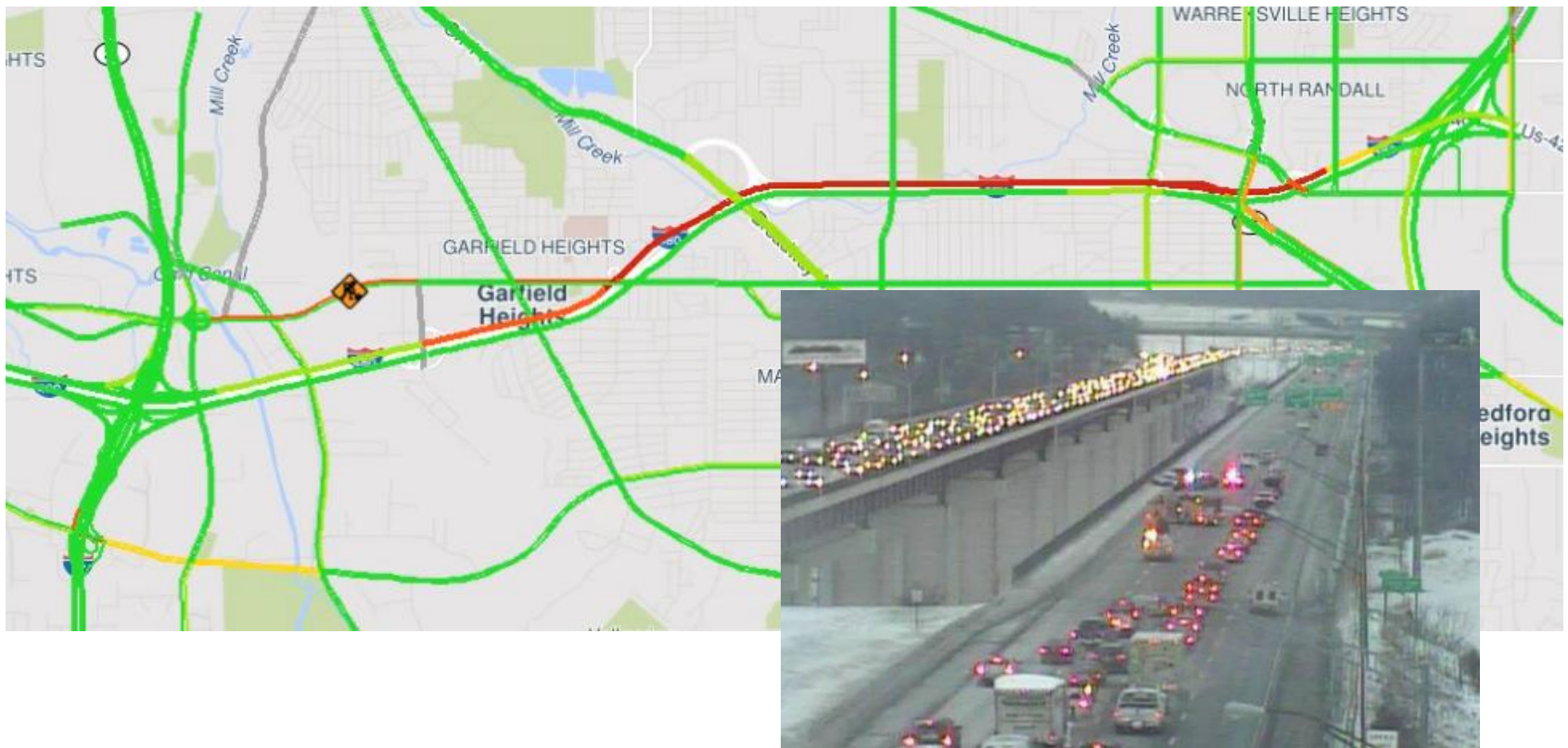
*Scott Ockunzzi, Ohio DOT*



# Background

## Pre-Planning for Traffic Incident Management

- “Arterial Management” during major freeway incidents



# Workshop Goals

## Goals

- Have a plan to manage traffic impacts
  - Anticipate primary diversion routes
  - Plan for diverted traffic
  - Identify critical locations
  - Minimize impacts on local communities
- Develop relationships
  - Collaborate
  - Share experiences
  - Learn from one another



# Expected Outcomes

## Expected Outcomes

- Develop a mapped-out process for managing traffic
  - Steps, roles, responsibilities
  - Share with other jurisdictions through Safety and Operations Council, other agencies to help in similar planning



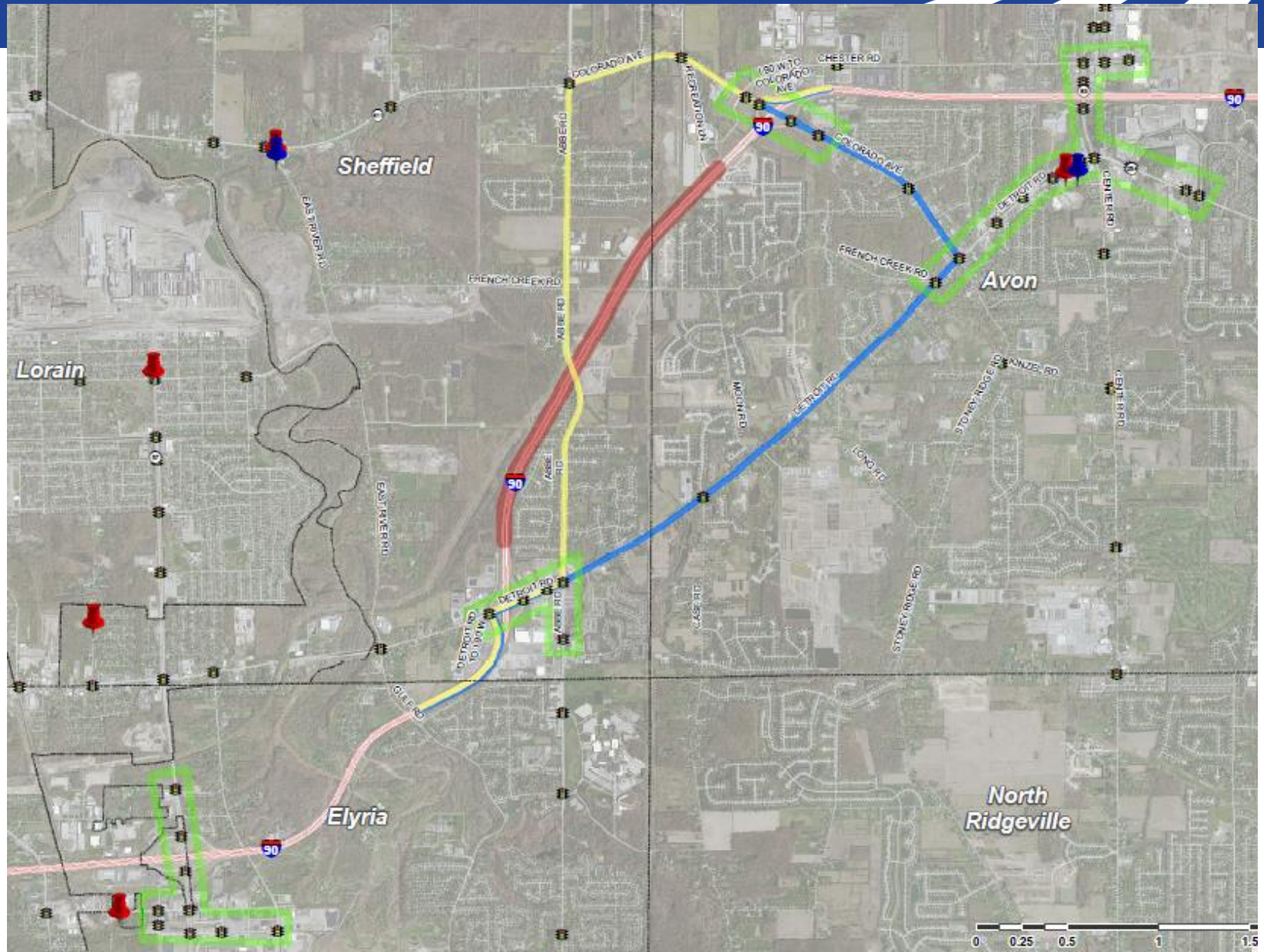
# Expected Outcomes

## Expected Outcomes

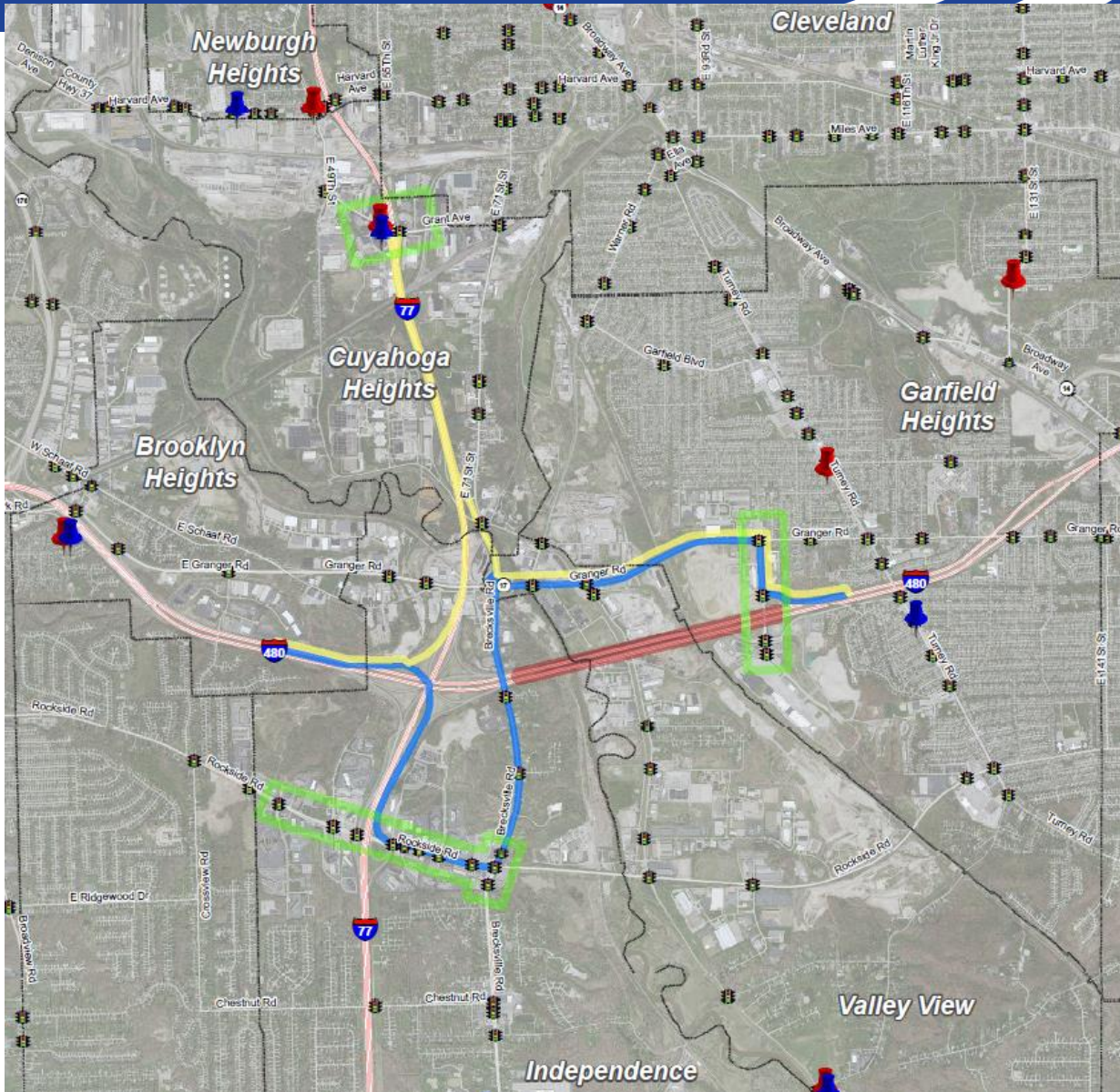


- Identify resources that may be needed in the future
  - Training
  - Equipment and materials
  - Planning
  - Agreements

# Scenario #1: I-90 WB, PM



# Scenario #2: I-480 WB, AM



# Current Processes: Challenges

## Challenges faced in current processes

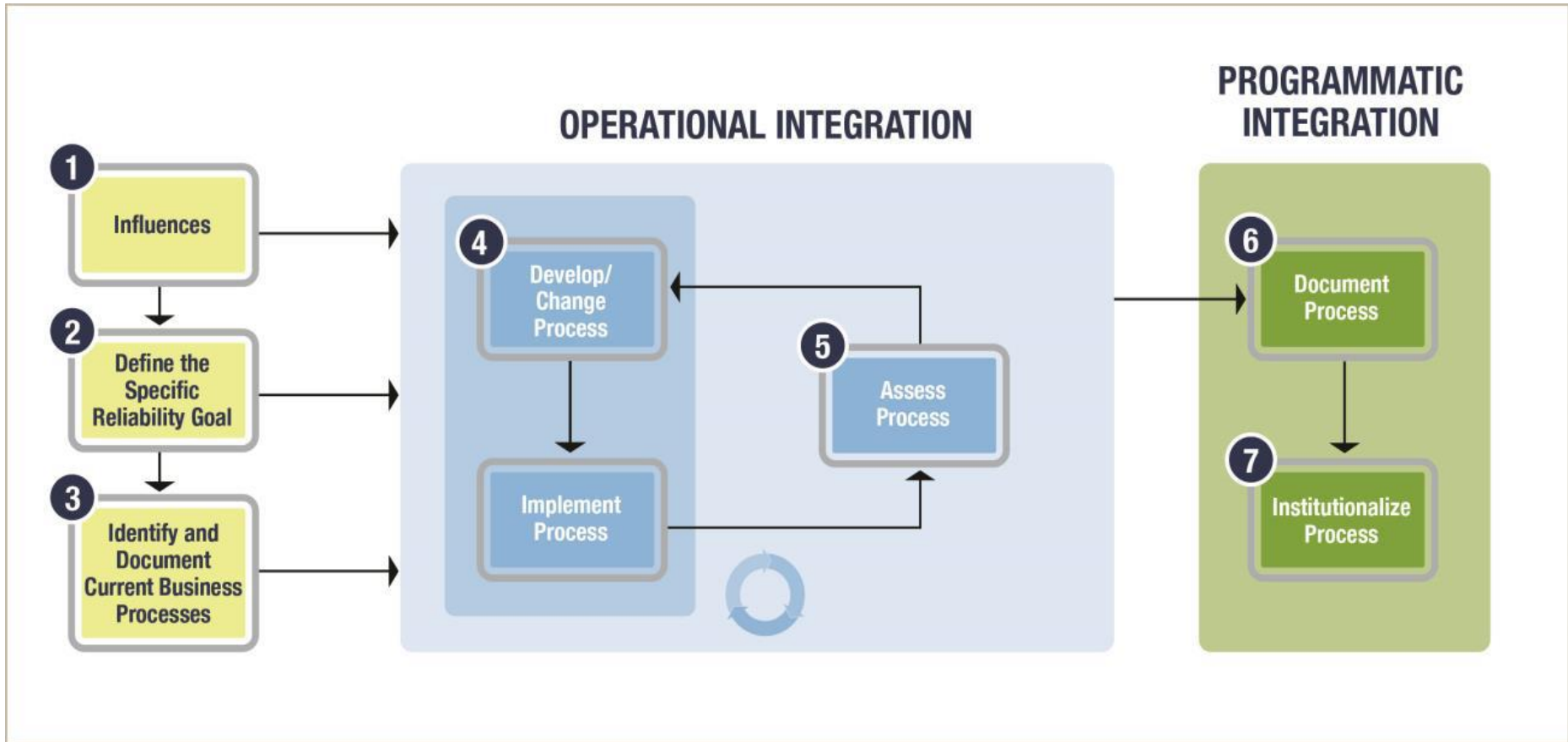
- Notifying ODOT, media, adjacent communities
- Coordinating inter-agency efforts via radio communication (state/county/multiple local jurisdictions)
- Knowing what resources are available (staff, equipment, material)
- Managing of traffic at ramps entering and exiting the freeway
- Managing of traffic along arterials once traffic signals are overwhelmed with diverted traffic
- Having too few emergency responders to perform critical tasks



***Applying the 7-Step Approach***  
***“Managing Arterials during Freeway Incidents”***



# Applying the 7-Step Approach



# Applying the 7-Step Approach

## Overview of Steps:

**Step 1: Identify Influences**

**Step 2: Define Goals**

**Step 3: Discuss Current Processes**

- What works well? What needs improvement?
- What have been some challenges?

Large  
Group

**Step 4a: Develop/Change Process**

– **Breakout groups:**

– Group 1: Incident on I-90 WB in Lorain County

– Group 2: Incident on I-480 WB in Bridge Construction Zone

– **Large group** - reconvene for reports from small groups

**Steps 5-7: Assess, Document, Institutionalize the Process**

Large Group

# Steps 1-2: Influences and Goals

## **Influences and Goals:**

- Step 1 - Influences
- Step 2 – Define Goals


# Step 3: Current Process

## Step 3 - Current Processes

- What are your current processes for managing traffic during major incidents?
- What works well? What needs improvement?
- What have been some challenges?



***Lunch Break (On-site)***



***Business Process Mapping Exercise***  
*Scenarios and Instructions for Small  
Group Breakouts*



## ***Scenarios / Breakout Groups***

*Group 1: Incident on I-90 WB in Lorain County*

*Group 2: Incident on I-480 WB in Bridge Construction Zone*



***Scenario 1:  
Incident on I-90 WB in Lorain County***



# Scenario 1:

## I-90 WB in Lorain County

- An incident has occurred on I-90 WB, between the SR 254 and SR 611 interchanges.
- It is 5:00 PM on a weekday.
- The incident has blocked all lanes of traffic on I-90 WB. Therefore a full closure of I-90 WB is required.
- This incident will require a lengthy cleanup with the closure in place for 12-18 hours.
- Traffic is expected to divert to the following arterials:
  - SR 254
  - SR 301

(See maps on the following slides)

# Scenario 1: I-90 WB in Lorain County

## DETOUR 1:

Detroit Road/Colorado Avenue

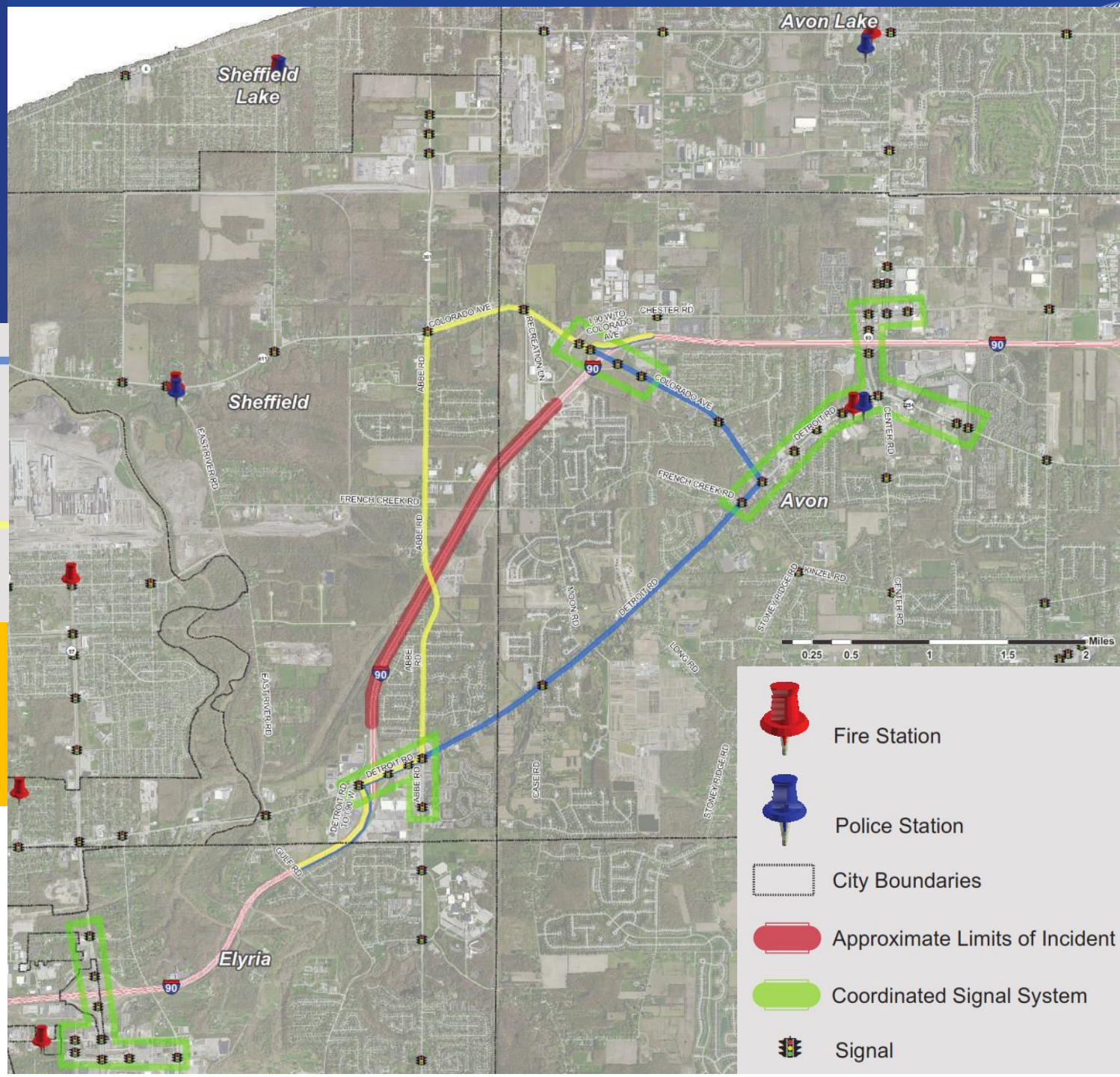
5.9 miles

## DETOUR 2:

Abbe Road/Colorado Avenue

5.5 miles

**SEE HANDOUT**





***Scenario 2:  
Major Incident on I-480 WB in the Bridge  
Construction Zone***

# Scenario 2:

## I-480 WB Bridge Construction Zone

- A major incident has occurred on I-480 WB near the major bridge construction work zone.
  - It is 5 AM on a weekday.
  - It is expected to take 3-4 hours to clear the incident, well into the morning rush hour.
  - The crash has blocked 2 lanes; 2 lanes remain open.
  - Traffic is expected to divert to the following arterials:
    - Trans Blvd / Granger / Brecksville / Rockside, to I-480
    - Trans Blvd / Granger / Brecksville, to I-77
- (See map on the next slide)

# Scenario 2: I-480 WB Bridge Construction Zone

## DETOUR 1:

Trans Boulevard/Granger/Brecksville/Rockside

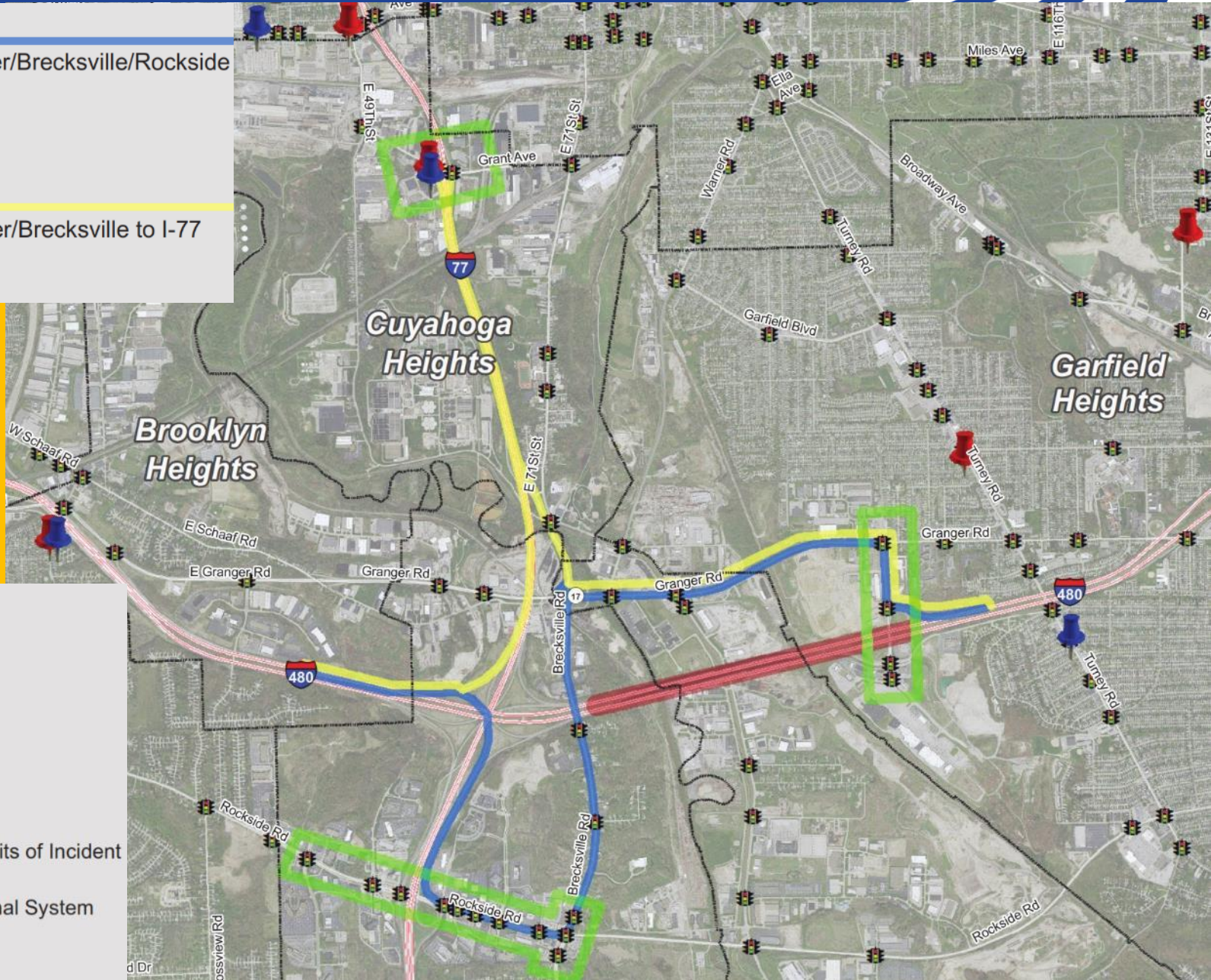
5.5 miles

## DETOUR 2:

Trans Boulevard/Granger/Brecksville to I-77

7.3 miles

SEE  
HANDOUT



Fire Station



Police Station



City Boundaries



Approximate Limits of Incident



Coordinated Signal System



Signal

# Process Mapping Exercise

Split into 2 groups:

- I-90 WB in Lorain County
- I-480 WB major bridge construction zone

**Your agencies will work together map out a process for managing traffic during the incident.**

Consider previous experiences:

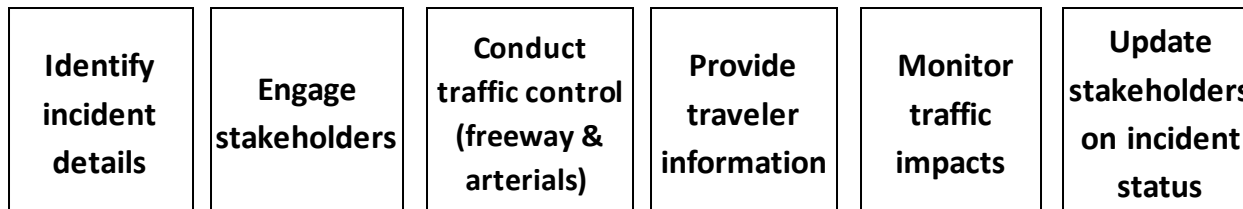
- How can traffic management be improved?
- What are the expected impacts to arterials, and how can these traffic impacts be better managed?

# Process Mapping Exercise

## ***Use Flip Chart Paper or White Board***

- Identify key stakeholders and points of contact
- Identify start and end points
- Show key inputs, outputs, steps, and decision points
- Indicate who is responsible for each step

### ***Reference your handout during process mapping:***



- ***Assign a reporter – who will provide an overview of your process map during report-outs***

# Step 4a – Develop Process Business Process Mapping Exercise

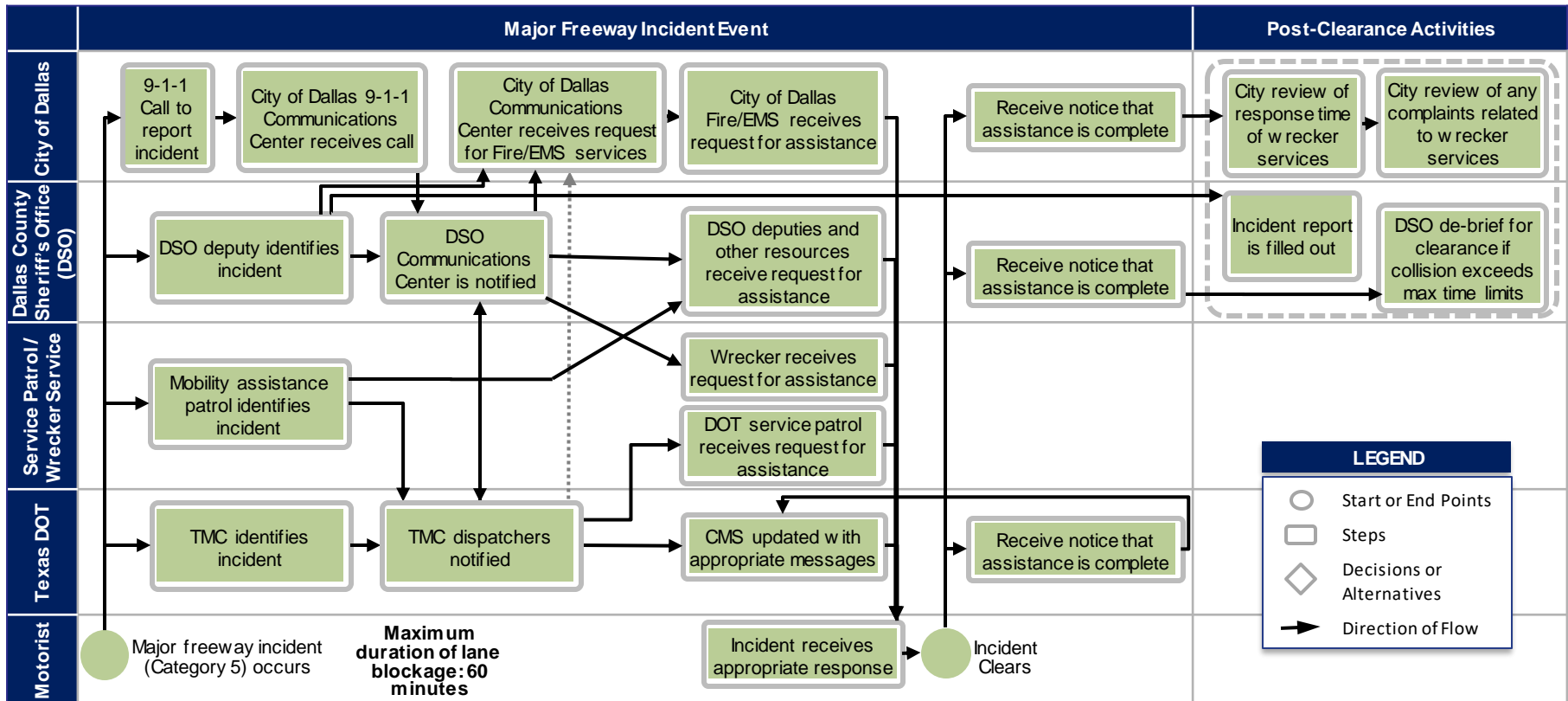


## REMINDERS:

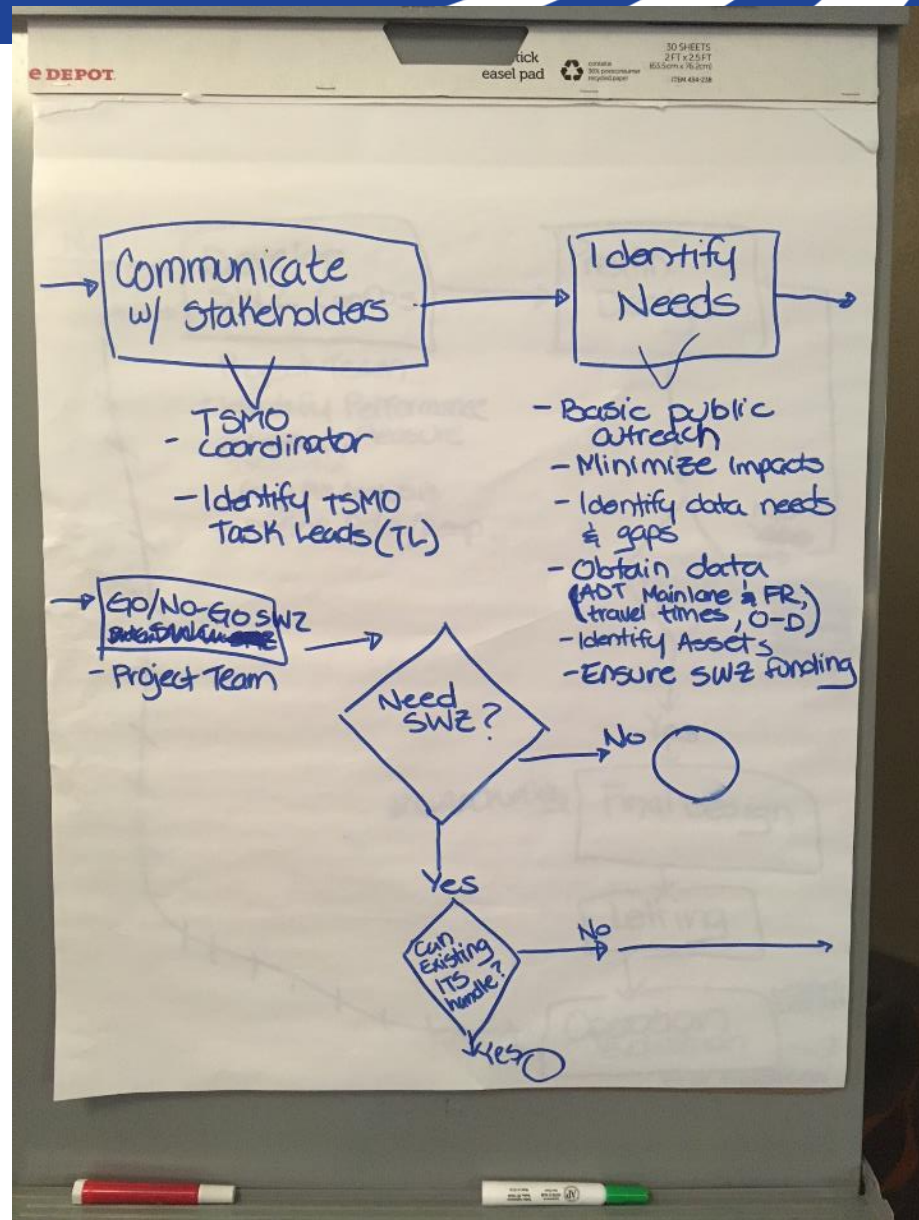
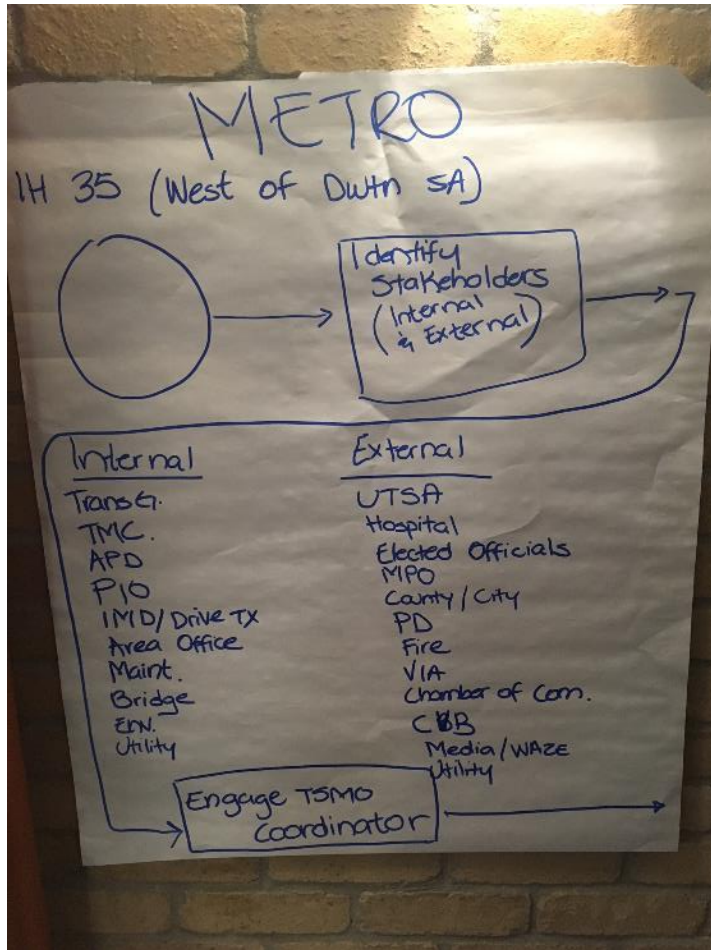
- Visual representation of steps & connections
- Concise picture of sequence of tasks
  - Identify when each step takes place and who is responsible
  - Call out decision points
- A good business process map should:
  - Show where improvements can be made
  - Where smooth handoffs are not taking place
  - What steps may be eliminated



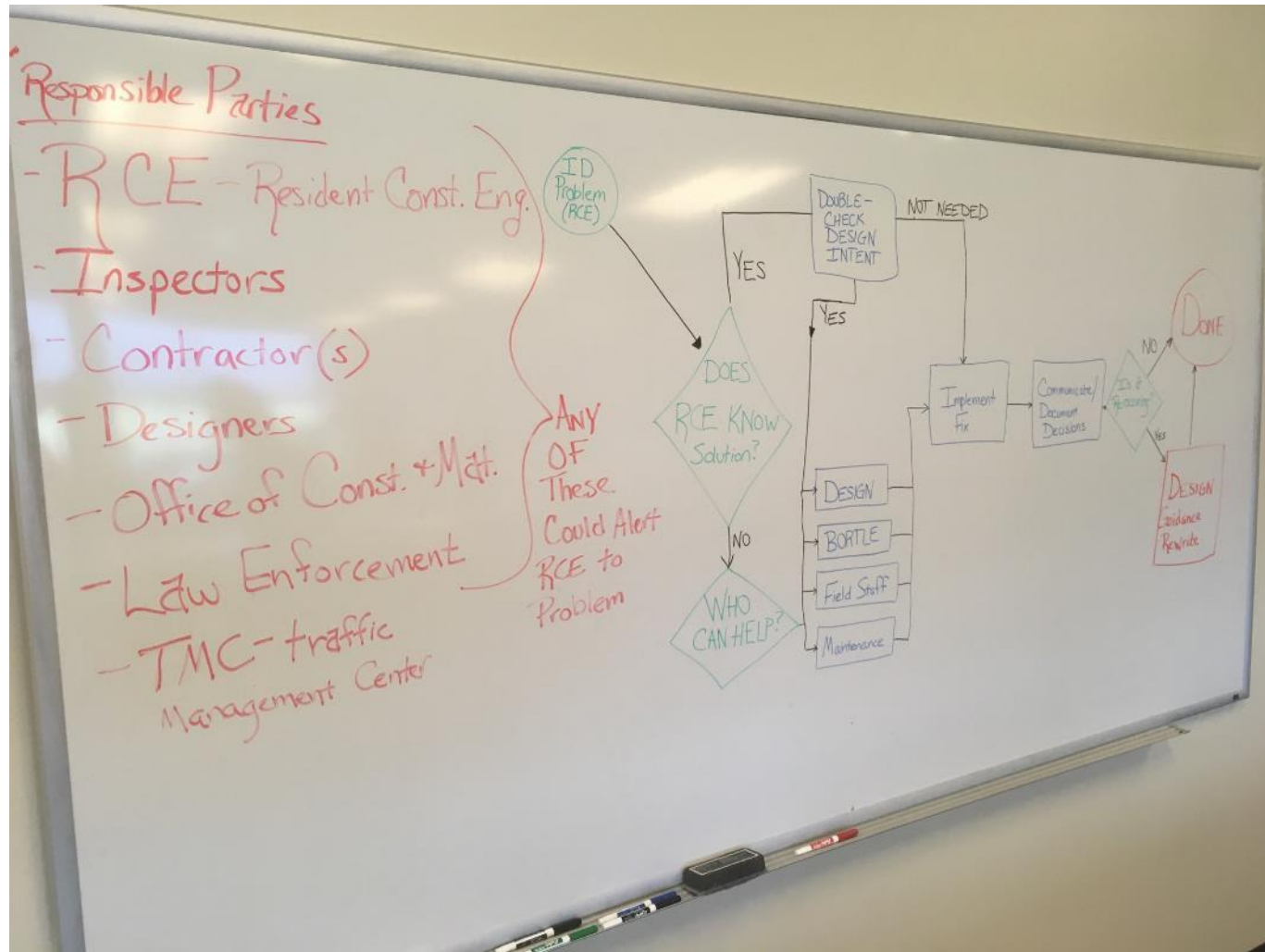
# Example Business Process Map: Dallas Major Freeway Incident Clearance



# Process Mapping Exercise - TxDOT



# Process Mapping Exercise – Iowa DOT



# Crashes (Near/Misses in WZ)

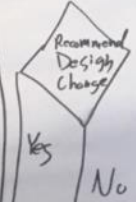
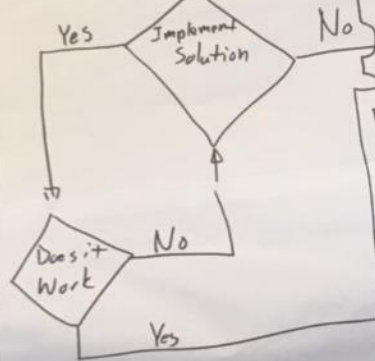
Problem with Crashes in WZ  
RCE/Project Staff Observe

Contact  
Dist, Design & Central Const (Bottle)  
Dist → RCE, DCE, DE  
ADE, Traffic Eng, Traffic Tech  
Design → Designer/Method  
Traffic Staff → Bottle coordinate

Who?  
Situational  
- Design  
- Operations  
- Bridge  
- Central Const  
- Dist  
- RCE  
- Other

Mark Coordinates  
Safety Review & Possible Solutions Developed  
1)  
2)  
3)

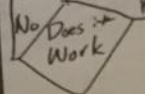
Safety Review Group  
Who? →



Traffic (Who?)  
Team meets with Design/Methods  
New TC/Design Manual  
Const Manual  
Sheet Guidance?

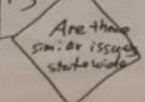
Training

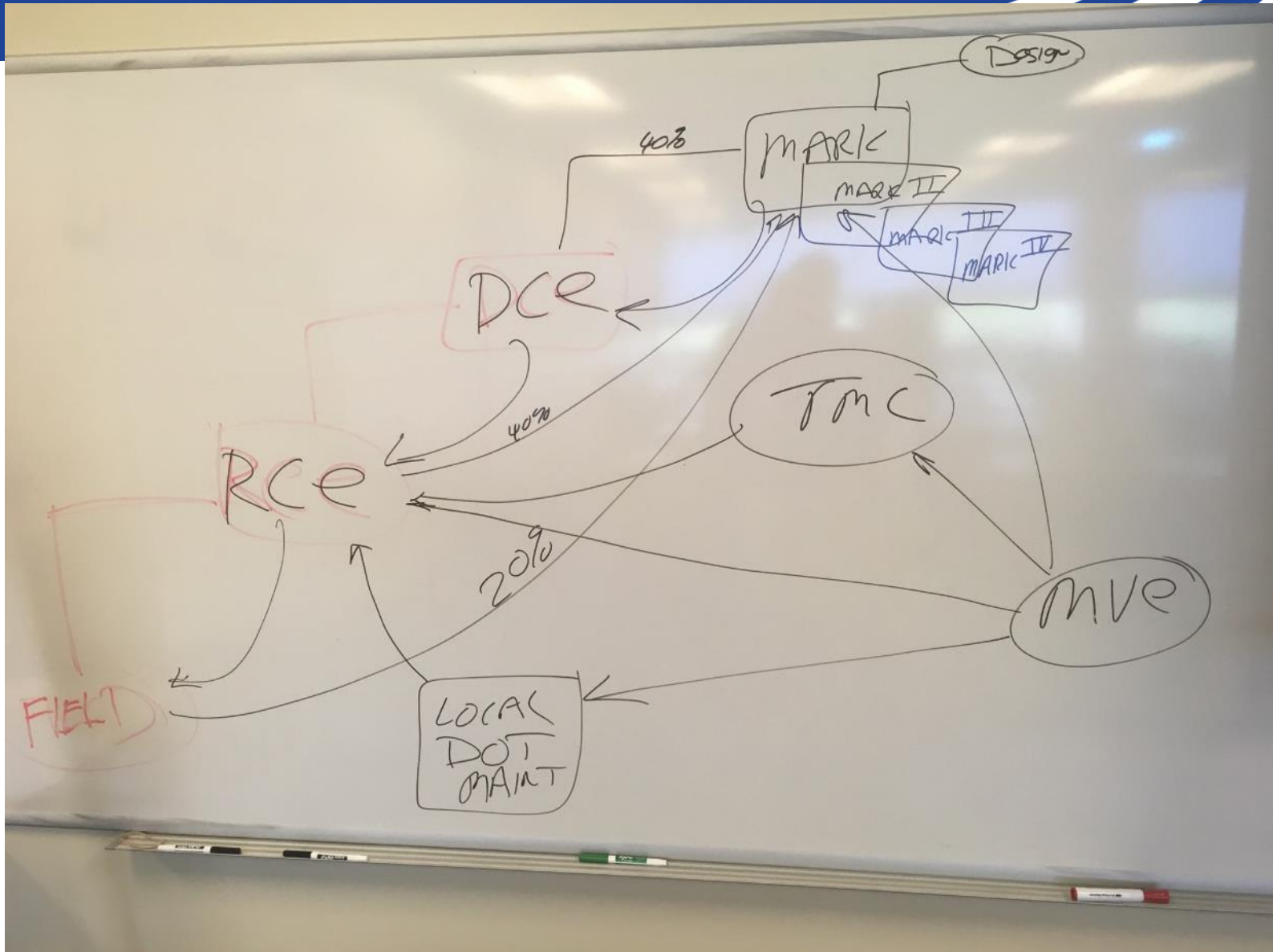
Plans



Not a Problem

Monitor for Similar Issues







## ***Small Group Breakouts (60 minutes)***

*Group 1: Incident on I-90 WB in Lorain County*

*Group 2: Incident on I-480 WB in Bridge Construction Zone*



***Re-Convene in Large Group  
to Report Out and Review Mapping***

# Step 4a - Re-convene to Review Mapping

## **Re-Convene in Large Group:**

- Report-out from Small Groups
  - Share process maps: key steps, responsibilities, decision points
- Discussion
  - Similarities and differences among process maps?
  - What do you like about each map?
  - Can maps be merged?





***Looking Ahead***

# Looking Ahead

## **Continue Documenting 7-Step Approach:**

- Step 4b – Implement the Process
- Step 5 – Assess the Process
- Step 6 – Document the Process
- Step 7 – Institutionalize the Process



# ***Action Planning***

# Action Planning

- **Develop Actions**
  - Small groups or all work together?
  - Develop action items
  - Identify top 3 actions
- **If Small Groups - Report Out**
  - Report on your group's top 3 actions
- **Large group discussion**
  - Prioritize and document highest priority actions



***Applying What You've Learned  
and Next Steps***

# Applying What you Learned



## **Additional TIM Business Process Improvements**

- Are TIM needs collectively assessed, reviewed, and acted upon on a routine basis?
- Is TIM integrated into formal state or regional planning process(es)?
- Do standardized TIM response systems (protocols) exist?
- Is TIM performance used to influence and/or improve operations?
- Is TIM understood and integrated into agency leadership?
- Is agency leadership actively involved in TIM decisions?
- Is the TIM program supported by a succession plan?

# Next Steps and Wrap-Up

- PDH Tracking Form
- Workshop Evaluation

## Next Steps:

- Workshop Summary Report – to be distributed to agency champion
  - Business process map
  - Action items

# Closing Comments



**THANK YOU for your participation!**