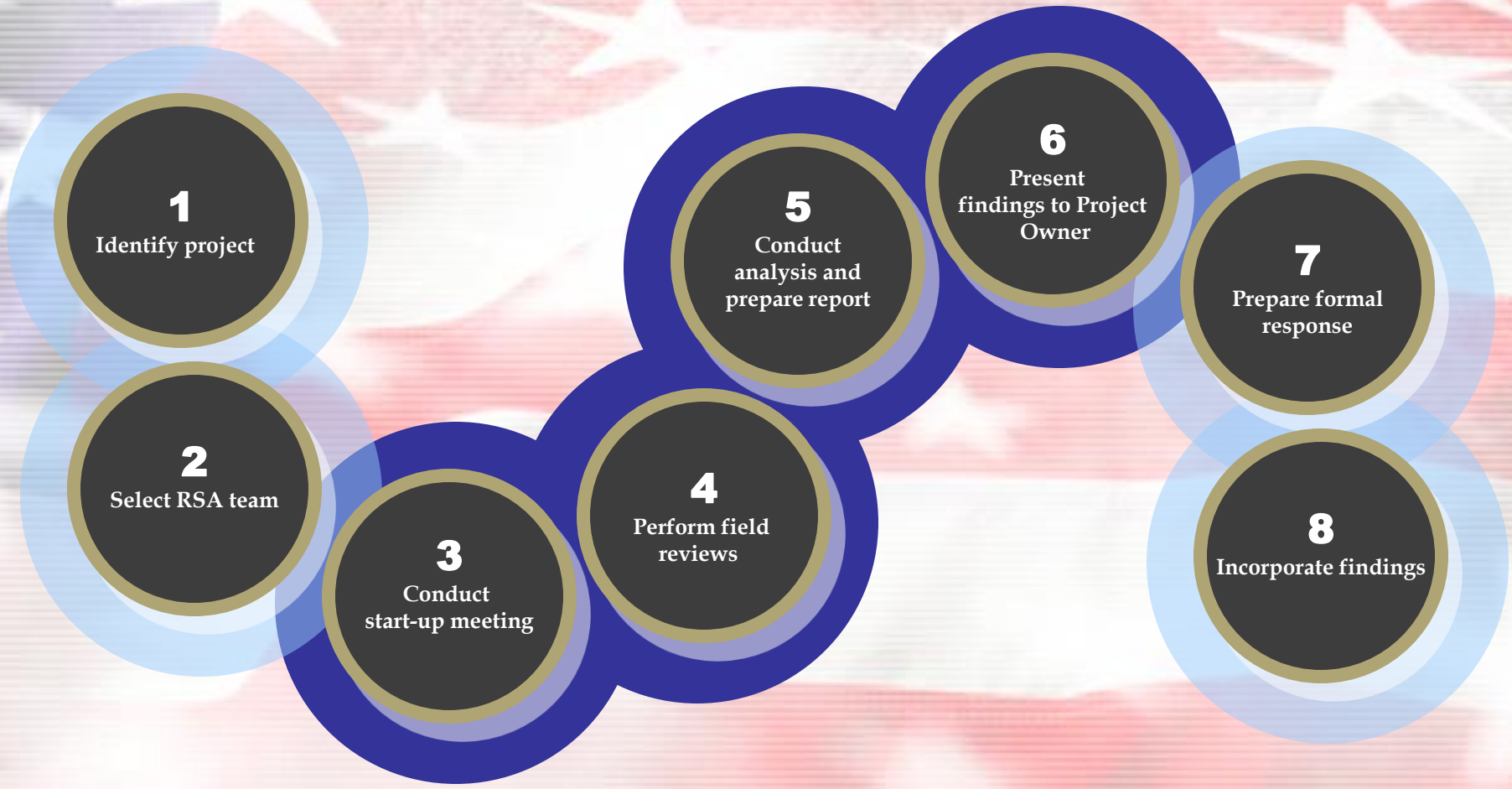
C Procedures

The Eight Step RSA Process

Responsibilities

RSA Team

Design Team / Project Owner

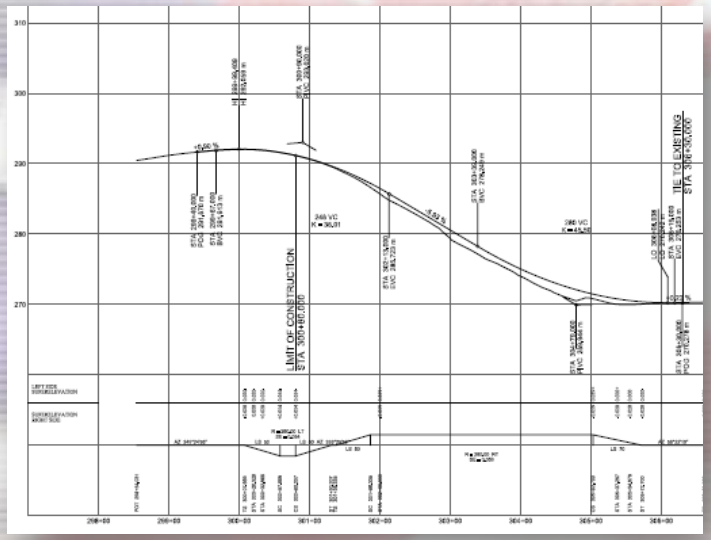


Responsibilities

RSA Team

Design Team / Project Owner

Step 1: Identify the Project



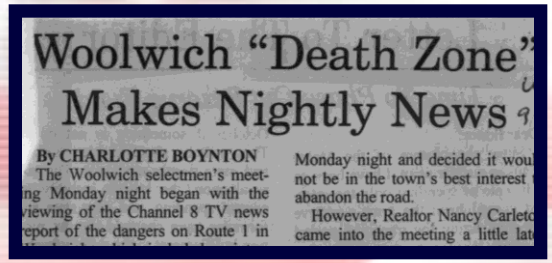
Design stage project

In-service project

Candidates for In-service RSAs

Step 1

High-crash sites



Woolwich "Death Zone" Makes Nightly News

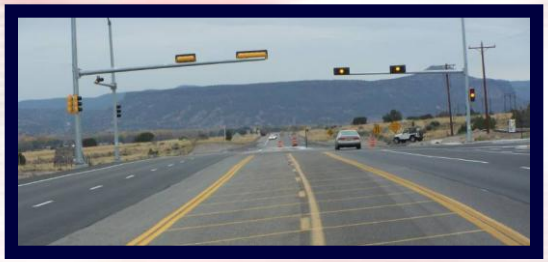
By CHARLOTTE BOYNTON

The Woolwich selectmen's meeting Monday night began with the viewing of the Channel 8 TV news report of the dangers on Route 1 in

Monday night and decided it would not be in the town's best interest abandon the road.

However, Realtor Nancy Carleto came into the meeting a little lat

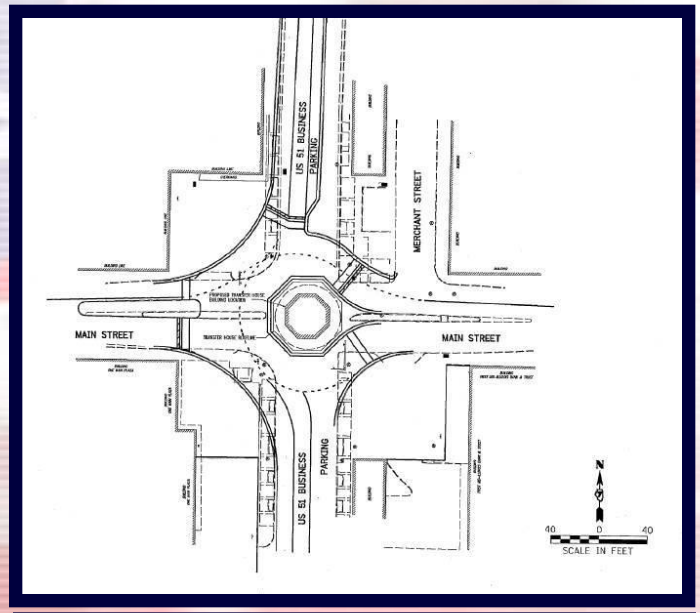
High-profile sites

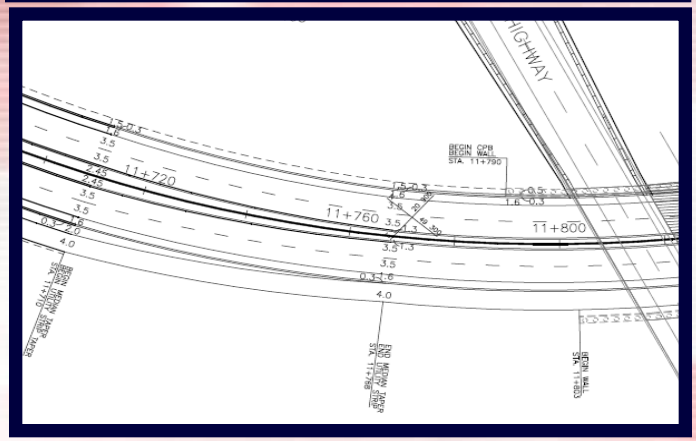


Changed traffic characteristics

Candidates for Design-stage RSAs

Step 1





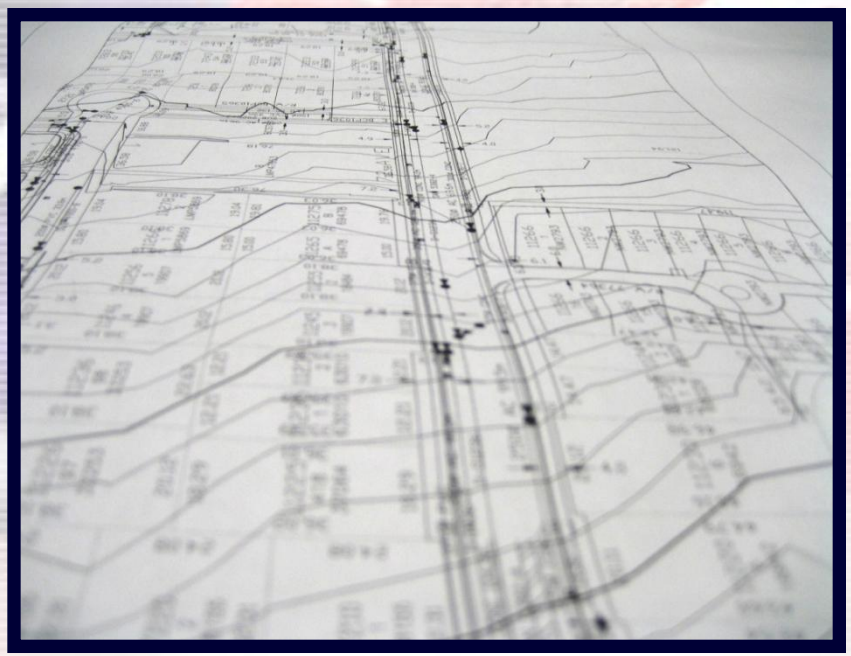
- Safety-oriented
- High-profile
- Complex design

RSAs: Design Stage

"I believe that [RSAs] are an excellent tool for evaluating and improving the safety of our highway system. In the projects we've done, we've seen the most benefit in doing an RSA during conceptual and preliminary design, when any improvements can be incorporated into our project estimates and final design."

Beth Wright
District Engineer
Missouri DOT

RSAs: Design Stage

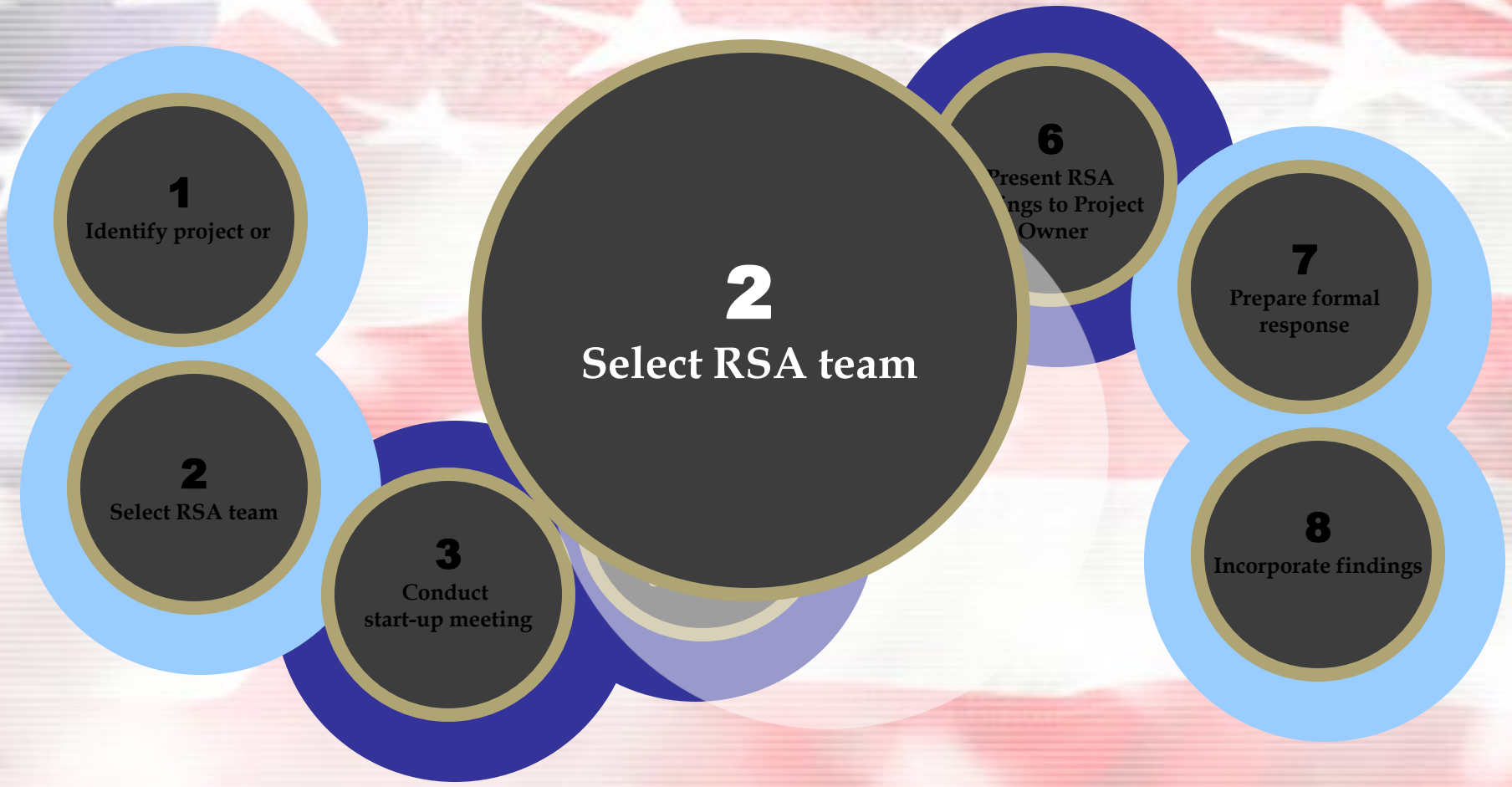


- Make structural changes on paper instead of in concrete.
- Optimize crash and conflict prevention.

Responsibilities

RSA Team

Design Team / Project Owner



Select RSA Team

Step 2

- Independent
- Experienced
- Multi-disciplinary

Select the RSA Team: Core Skills

Step 2

Operations

Geometric

Road users/human factors

Select RSA Team: Supplementary Skills

Step 2

- Human factors
- Specialists
- Enforcement
- Maintenance

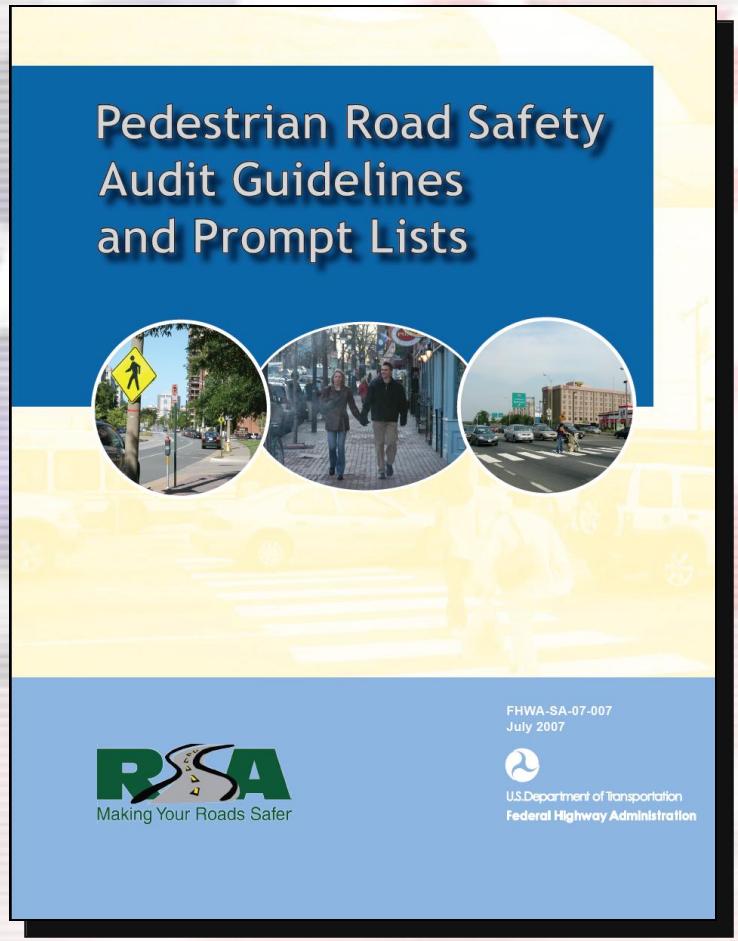
Interdisciplinary RSA Team: Composition and Size

3-member audit team

- local agency staff
- exchange staff from another local agency
- consultants
- combination of above

Focused RSAs

Step 2



- Pedestrians
- Cyclists
- Older/younger drivers
- Special situations

Select the RSA Team: Team Planning

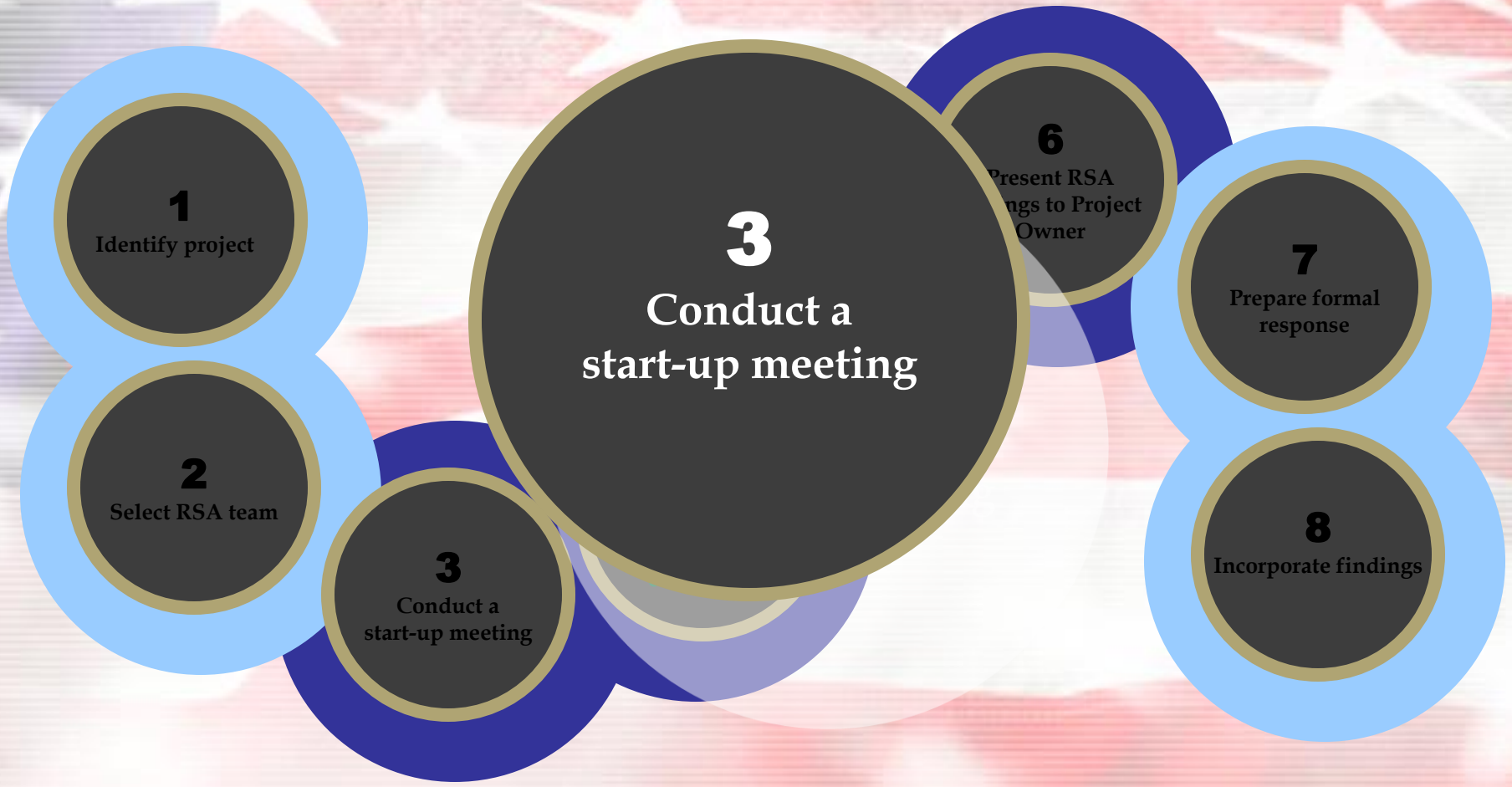
Step 2

- Meet informally or by phone
- Discuss RSA schedule
- Communicate schedule to project owner

Responsibilities

RSA Team

Design Team / Project Owner



The Start-up Meeting

Step 3

- Identify individual roles
- Communicate information
- Communicate RSA process
- Discuss constraints and limitations

The Start-up Meeting: Provide Project Information

Step 3

- Crash history
- Traffic volumes
- Aerial photographs
- Design drawings
- Background reports
- Design criteria

The Start-up Meeting

Step 3

- Communicate project concerns
- Review steps in RSA
- Review safety concerns with similar projects
- Discuss schedule
- Provide contact info

Responsibilities

RSA Team

Design Team / Project Owner

Step 4: Perform Field Reviews

- Design-stage
- In-Service

Team in One Vehicle

Perform Field Review: Preparation for the Field Review

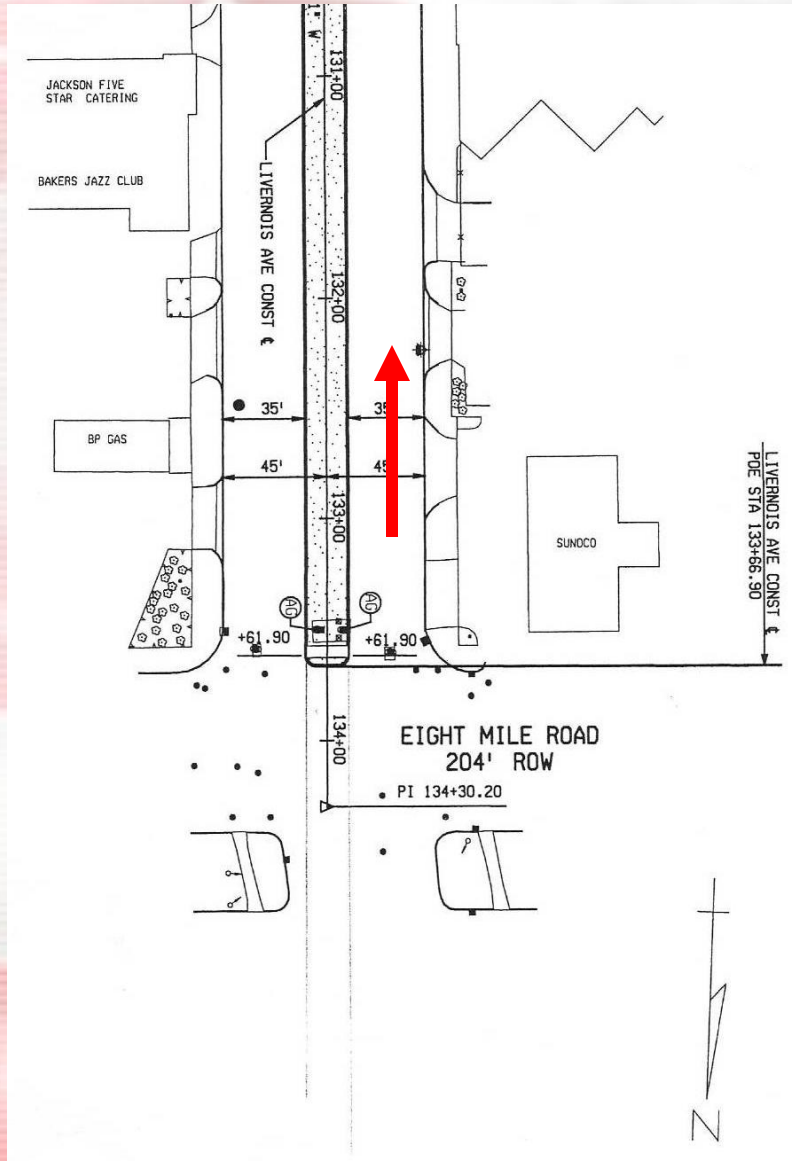
Step 4

- Review available crash data
- Arrange transportation
- Designate a secretary and photographer

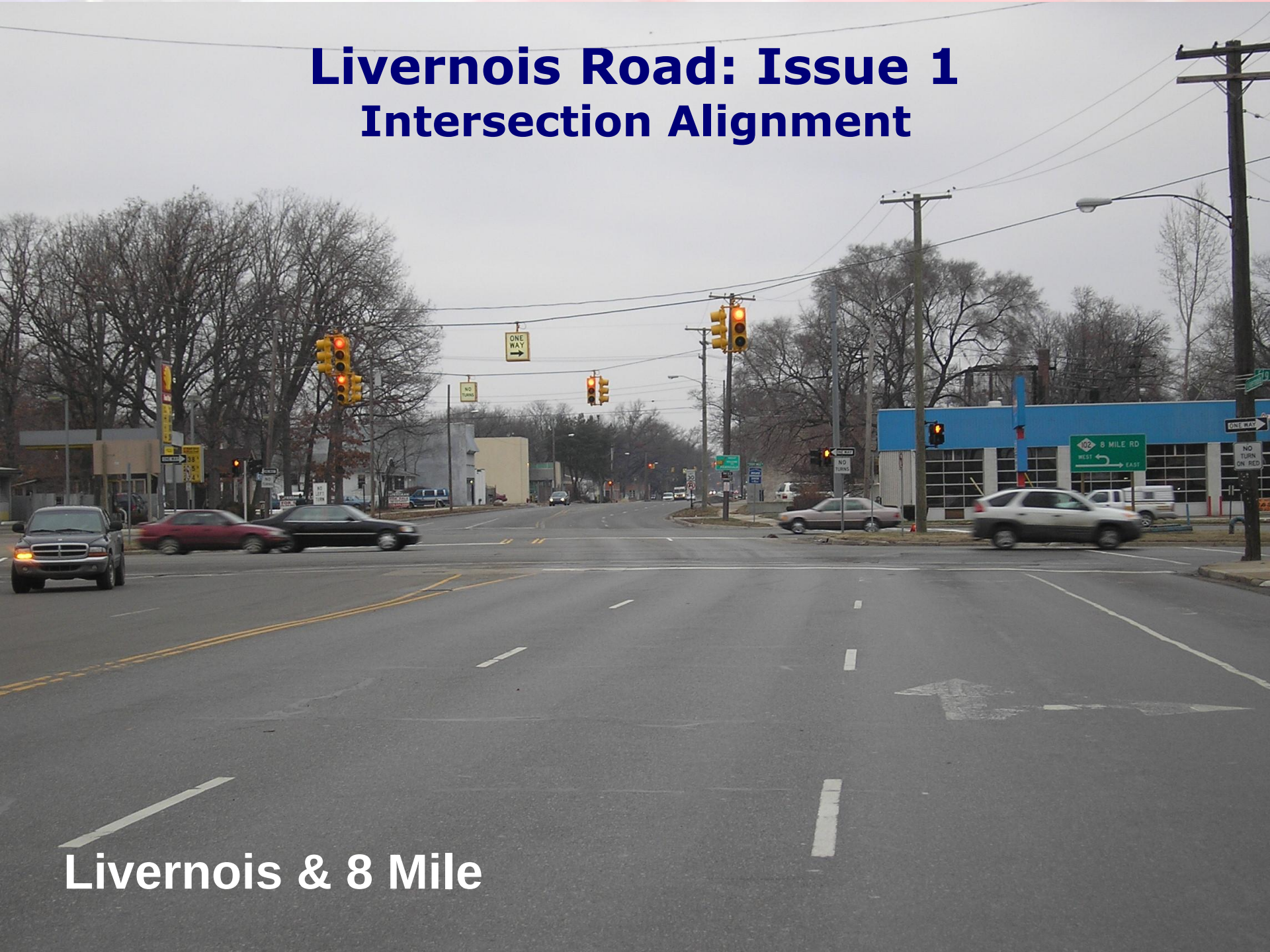
(2) Field Reviews

- Observe road user characteristics.
- Observe surrounding land uses.
- Observe link points to the adjacent transportation network.

Livernois Road: Issue 1
Intersection Alignment



Livernois Road: Issue 1
Intersection Alignment

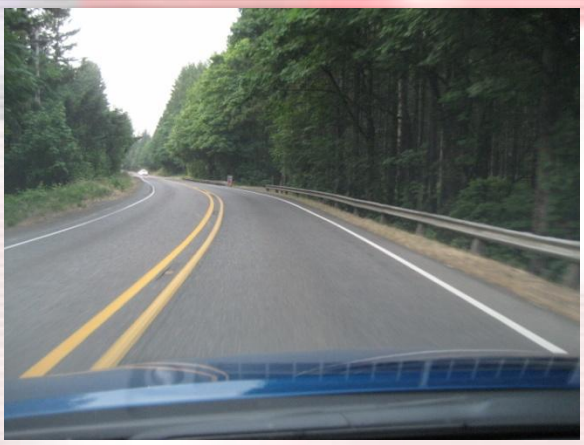


Livernois & 8 Mile

Perform Field Review: Common Items to Look For

Step 4

- Sight distance obstructions
- Pedestrian and cyclist conflicts
- Visual clutter




10S

Chester, Virginia


SUNOCO


Wawa
Market
15840
2.09 9/10
2.19 9/10
2.29 9/10
15840
Open 24 Hours
PEPSI


Woods Edge Rd
SUNOCO
SUNOCO
130


Wawa
SUNOCO
SUNOCO


Woods Edge Rd
SUNOCO
SUNOCO
1
301


Jefferson Davis
1135


COLONIAL CYCLESPORTS
Colonial Cyclesports
Milhorn St 2600
1135
SPEED LIMIT 45


STOP
Jefferson Davis


Jefferson Davis
Hwy
16000
STO


POLARIS
Colonial Cyclesports
520-6808
REBATES UP TO
$500 OR
2YR EXT SERVICE
ON ATVS
COLONIAL
CYCLESPORTS
Mithorn
END
ROAD WORK
FOR
SALE


Malhorn


ONLY


1135
ENTRANCE


STOP


SIDEWALK
CLOSED


STOP
4 WAY

BEFORE

AFTER


Wendy's
A SIGN OF OUR TIMES
BUTTERNUT BREAD
DOLLY MADISON CA
PIES ROLLS
BUTTERNUT BREAD
CAKE DONUTS
NO SIGNS ON LOT
kmart

(2) Field Review

- Drawing, aerial photographs
- camera still/video
- measuring wheel, stopwatch
- high-visibility vests

(2) Field Review

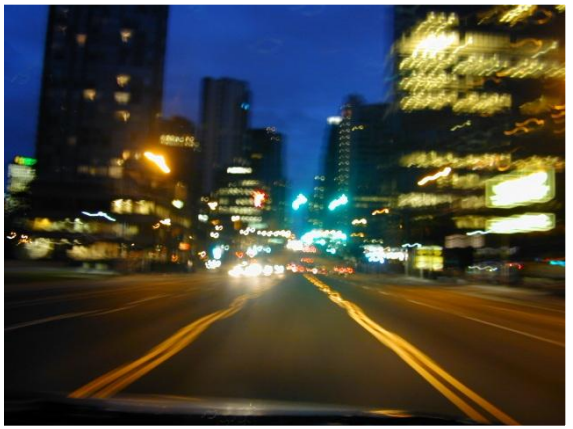
Look for:

- **sight distance obstructions**
- **roadside hazards**
- **driveway issues**

Perform Field Review: Variable Conditions to Observe

Step 4

- Peak and off-peak traffic periods
- Dry and wet weather conditions
- Day and night conditions




STOP


STOP

Perform Field Review: Up Close and Personal

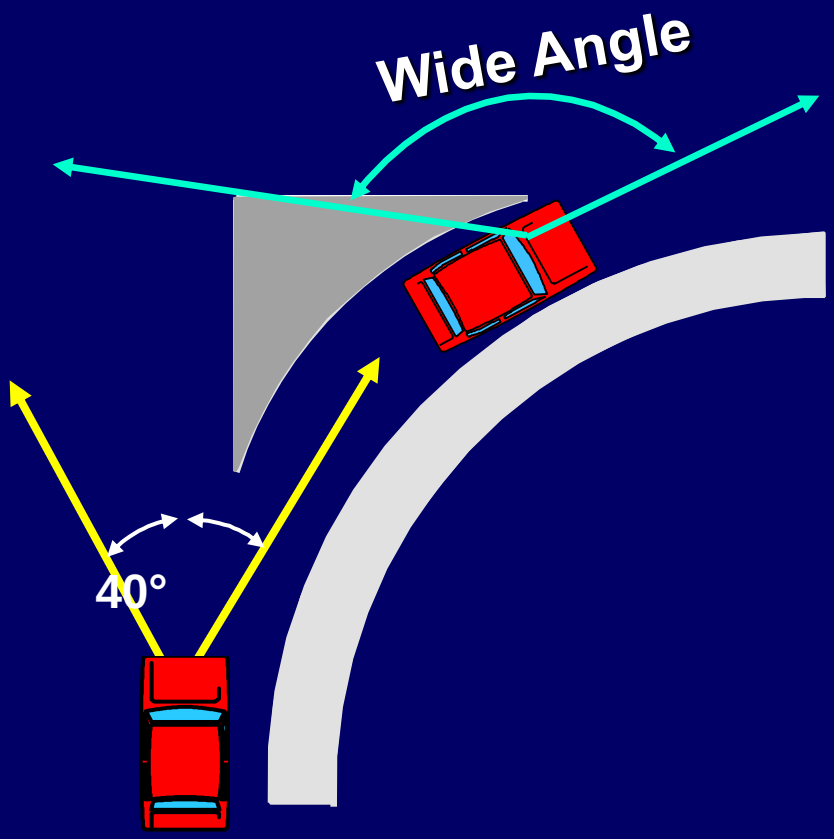
Step 4

Walk the site!

(2) Field Review

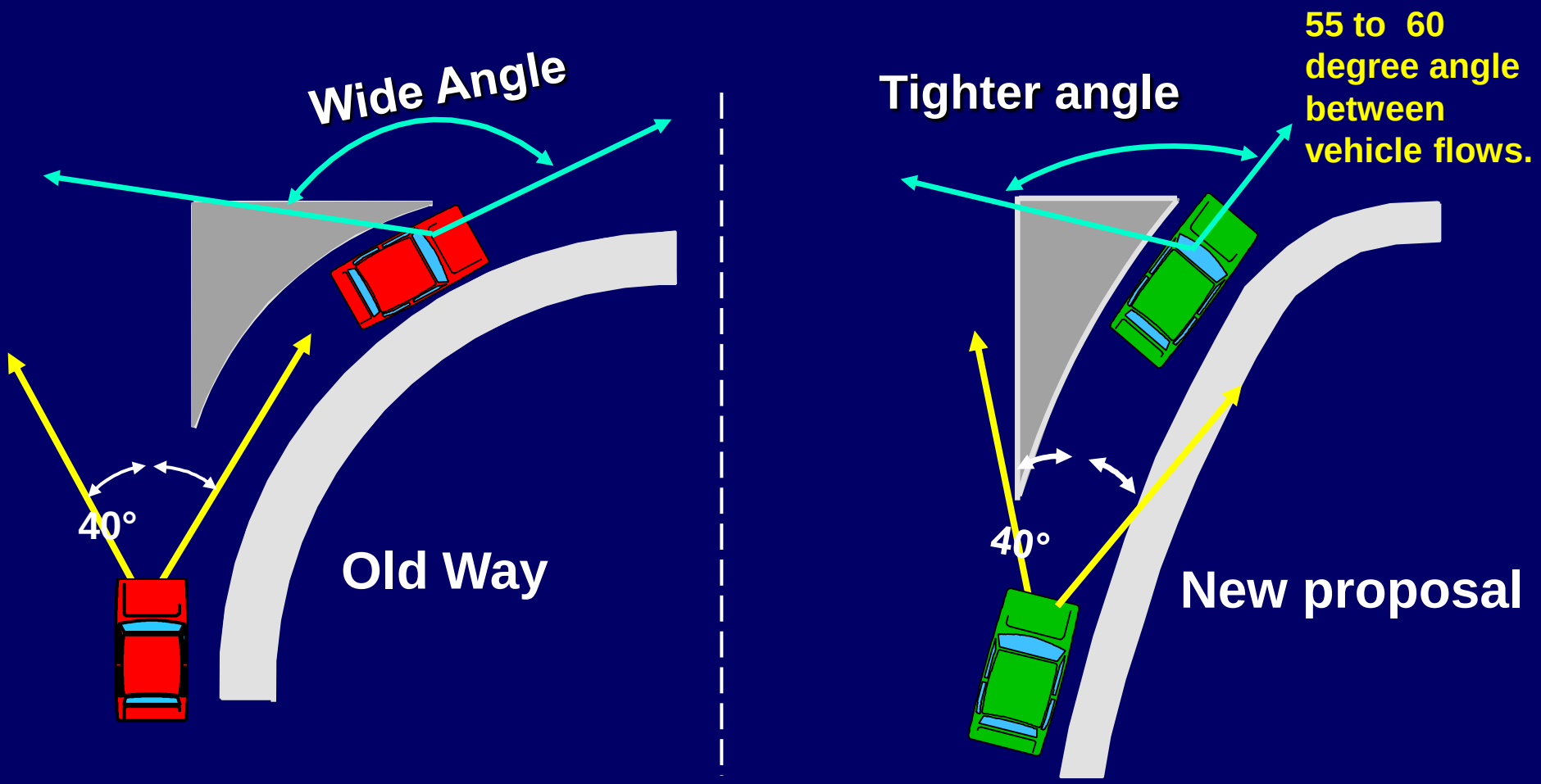
Walk the audit site.

Right-Turn Slip Lane: Design for pedestrians



High speed, head turner =
low visibility of pedestrians

Right-Turn Slip Lane: Design for pedestrians



High speed, head turner = low visibility of pedestrians

Slow speed, good angle = good visibility of pedestrians

Perform Field Review: Note the Positive

- ***Good safety design features***
- ***Safety mitigation features already in place***

(2) Field Review

Prompt list:

- **may provide structure to the site visit**

- **remind the team what to look for, and help ensure that nothing is overlooked**

Examples

Five KPH per Hour Difference

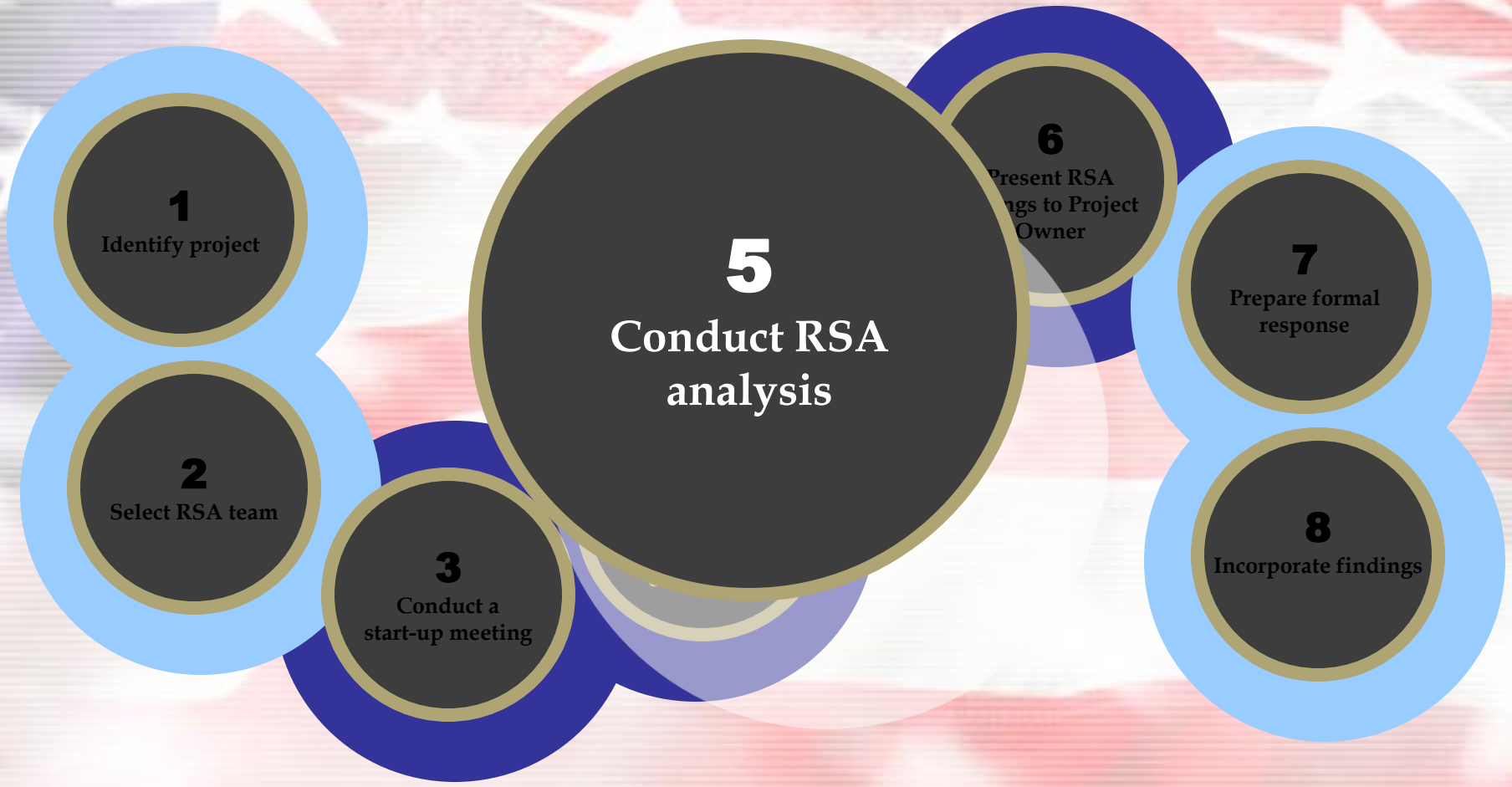

BOULDER
CREEK


CAYOOSH
CREEK

Responsibilities

RSA Team

Design Team / Project Owner



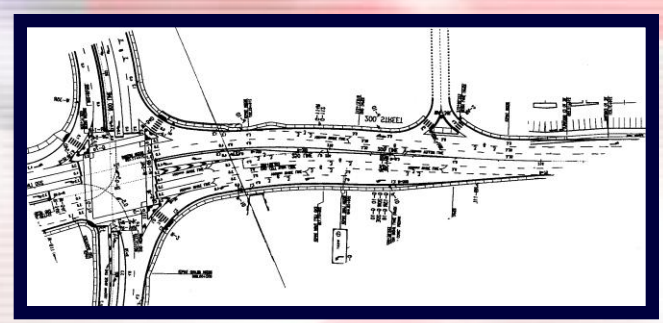
Step 5: Conduct RSA Analysis

Step 5

- Identify and prioritize safety concerns
- Develop suggestions for reducing the degree of risk
- Compose presentation of early findings

RSA Analysis:

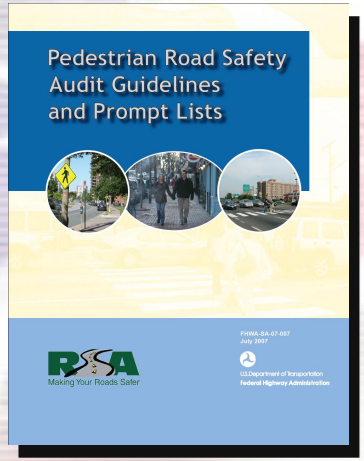
Step 5

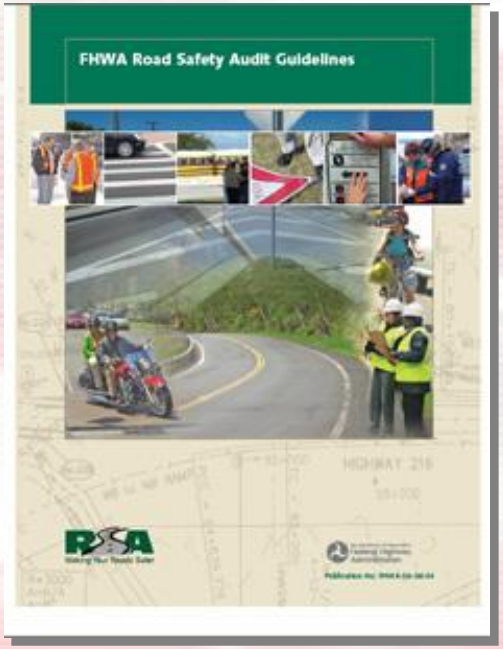


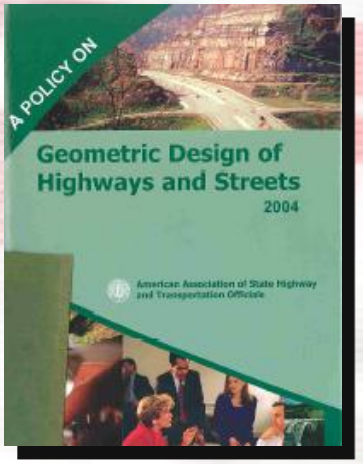
- Schedule work sessions
- Assemble RSA information
- Gather references
- Appoint a coordinator and secretary

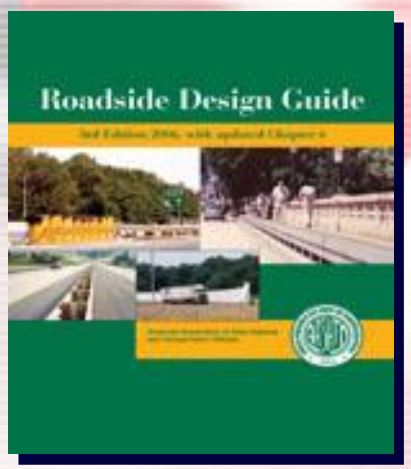
Resources and References

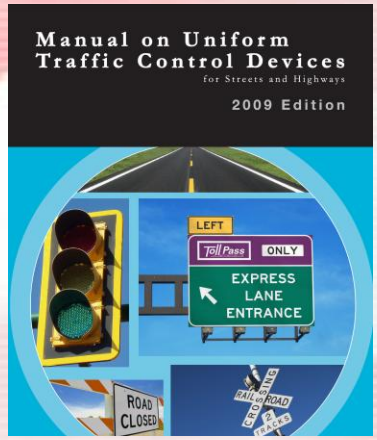
Step 5

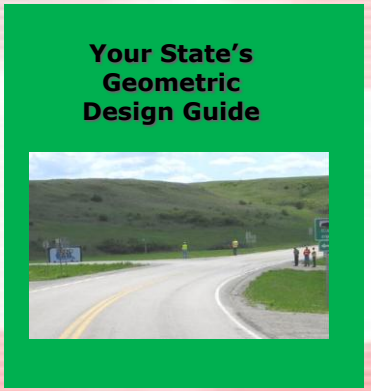


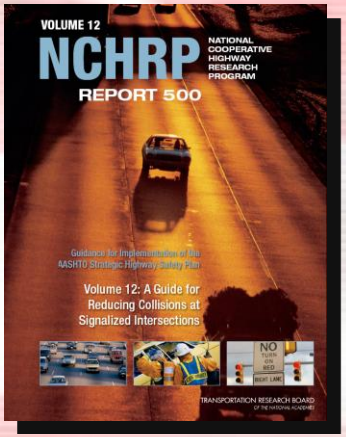












Analysis: The Process

Step 5

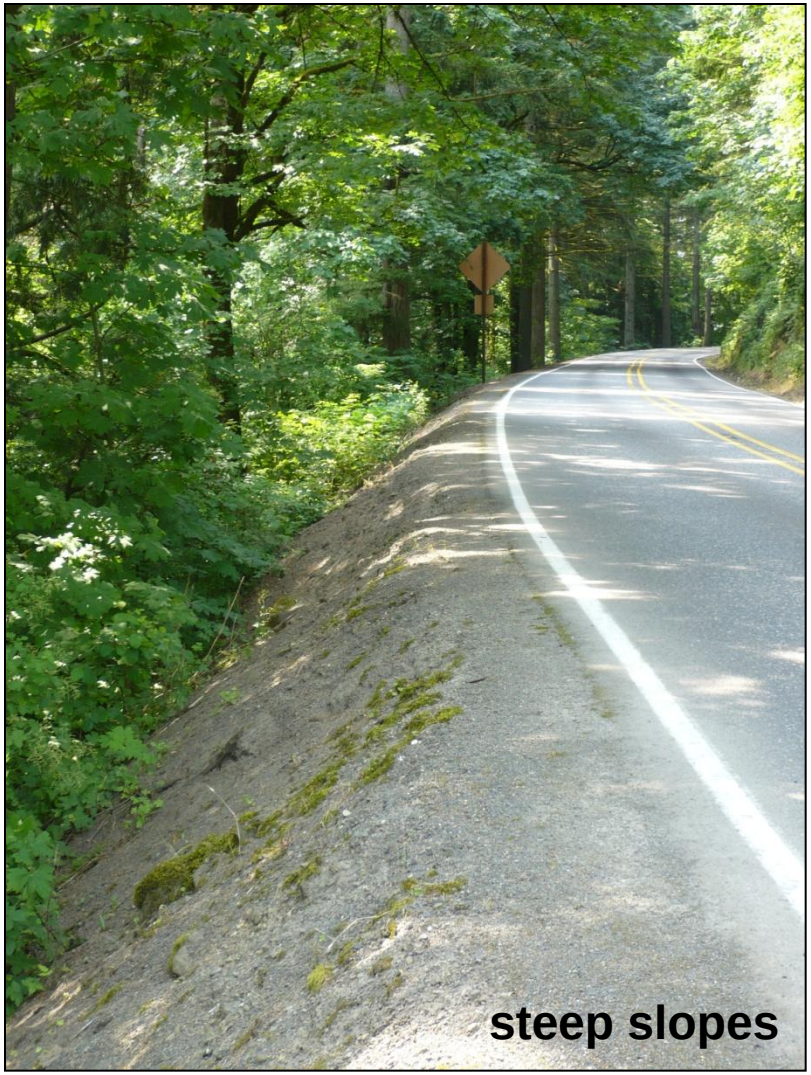
1. Inventory information
2. Review information
3. Identify safety concerns
4. Prioritize safety concerns
5. Mitigate safety concerns
6. Compose preliminary findings

Analysis: Phase 2
Systematically Review Information

Step 5

- Thoroughly review all data
- Think in terms of GORE

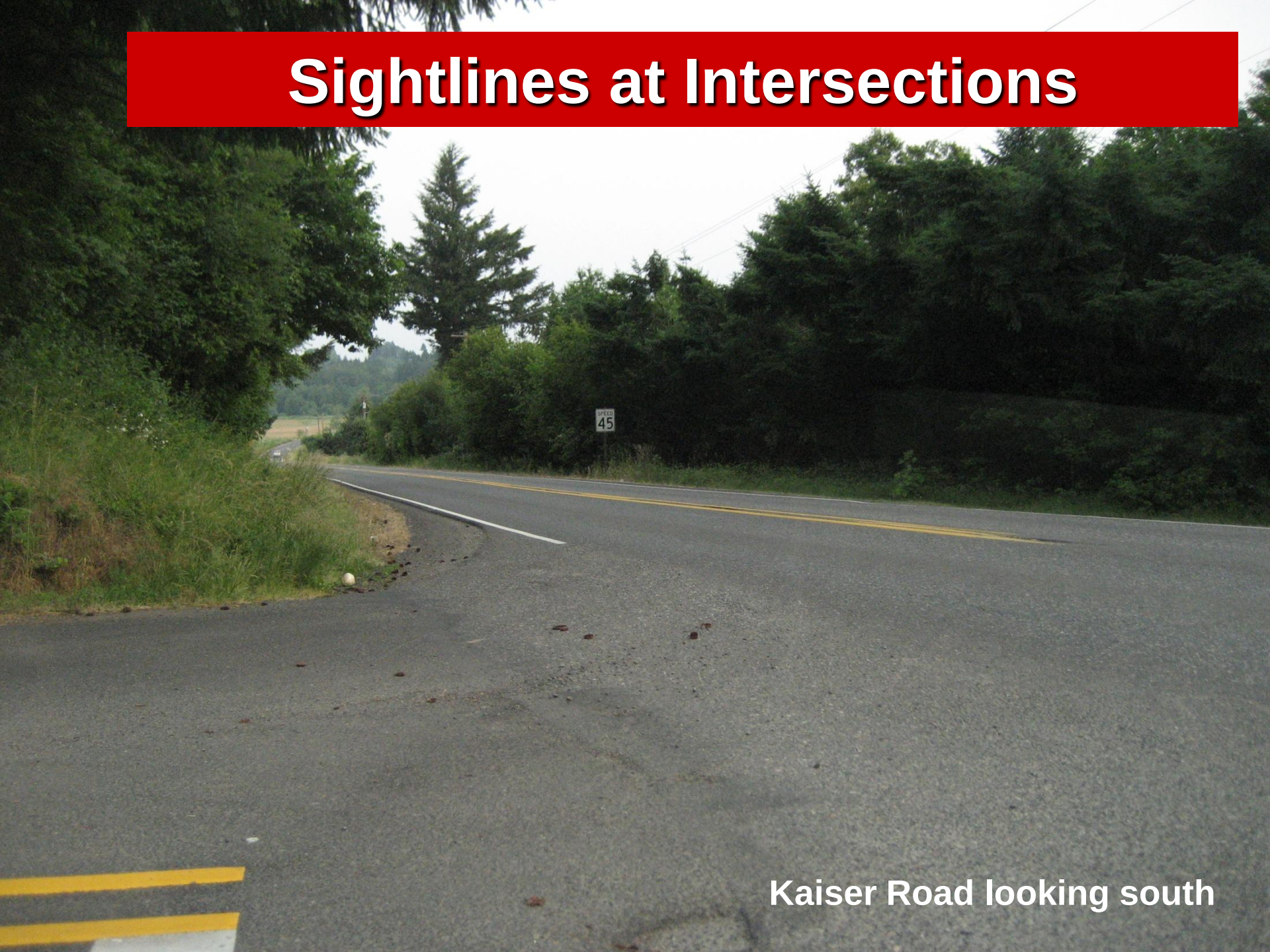
Hazards in Clear Zone



Sightlines at Intersections

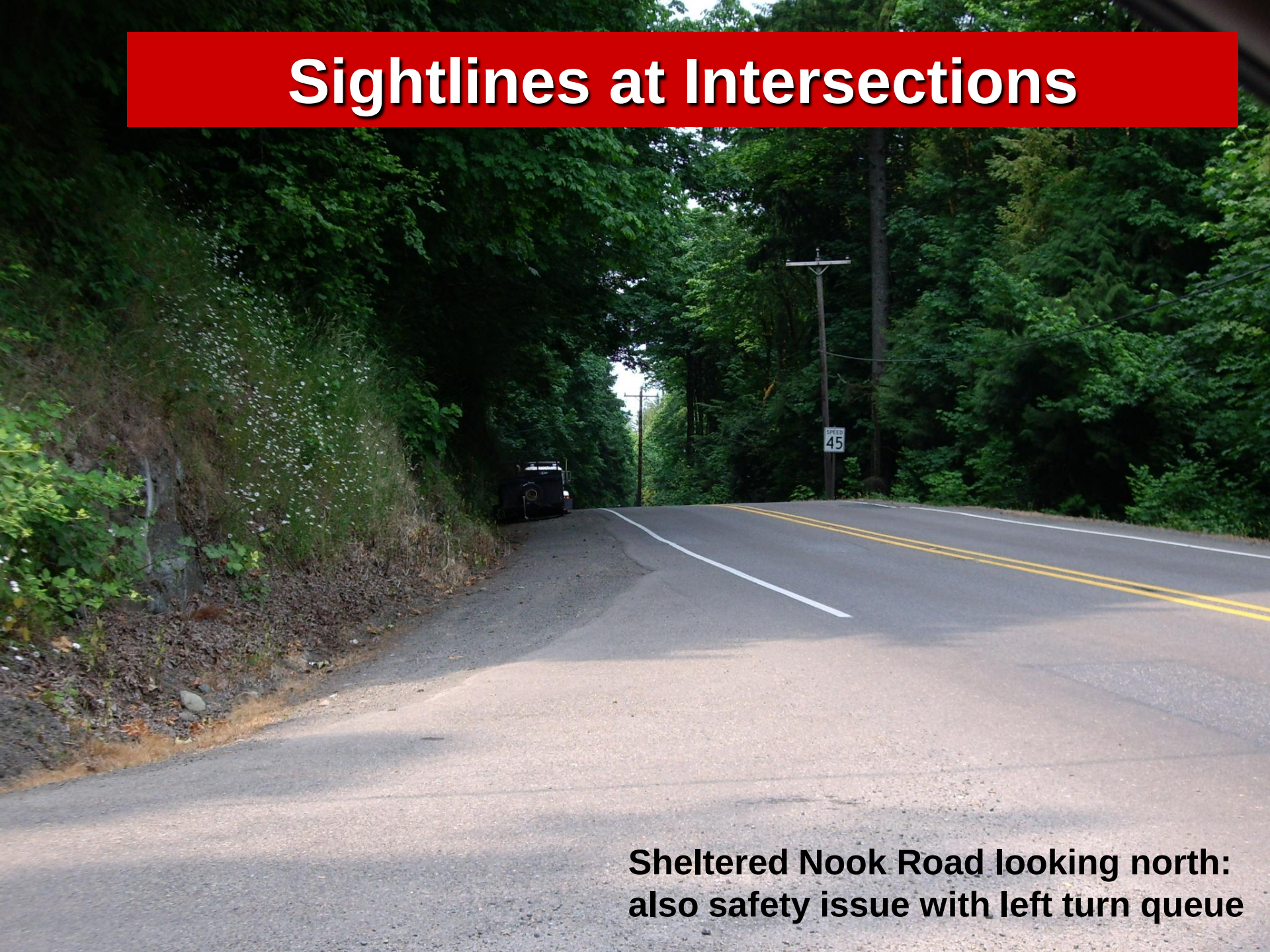
Skyline Blvd looking north

Sightlines at Intersections



Kaiser Road looking south

Sightlines at Intersections



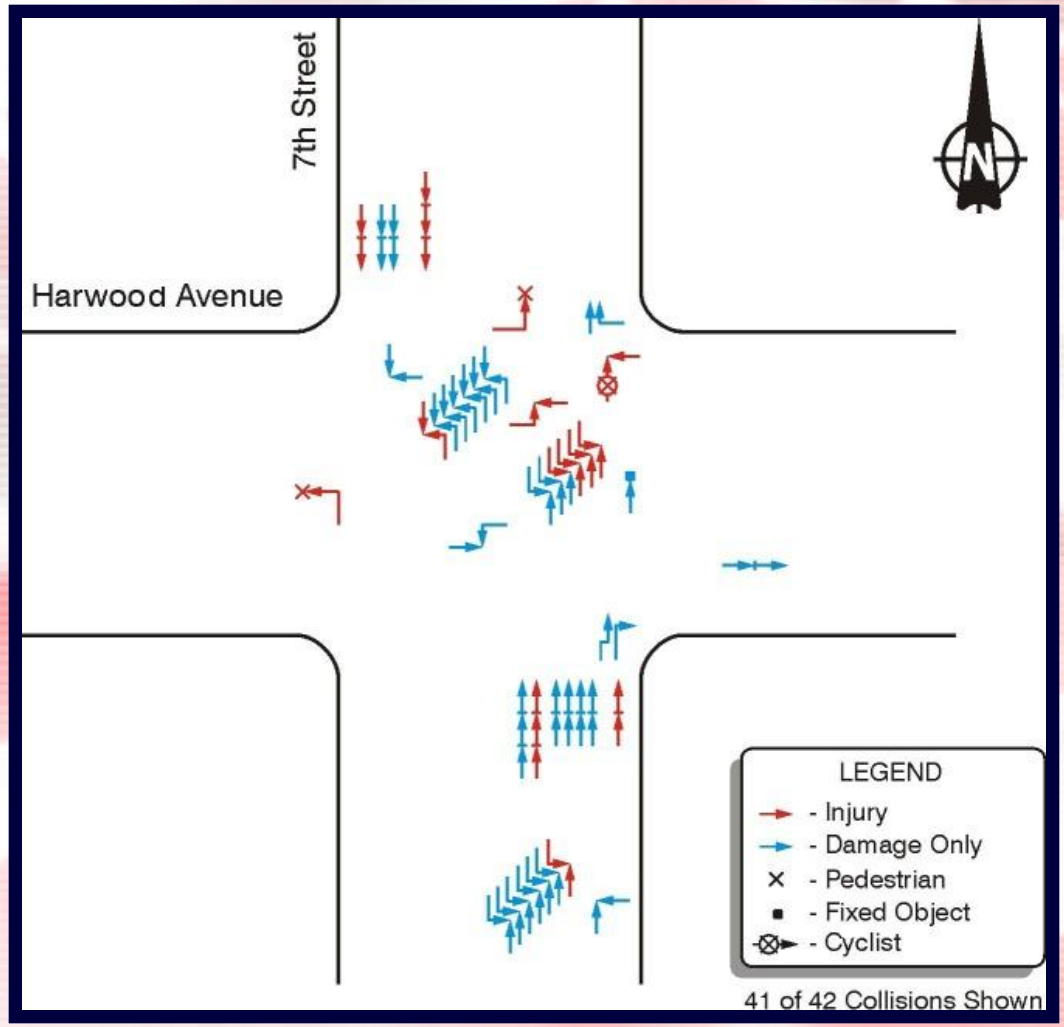
Sheltered Nook Road looking north:
also safety issue with left turn queue

Step 5

- Crash history (existing roads)
- Expected crashes (design-stage)

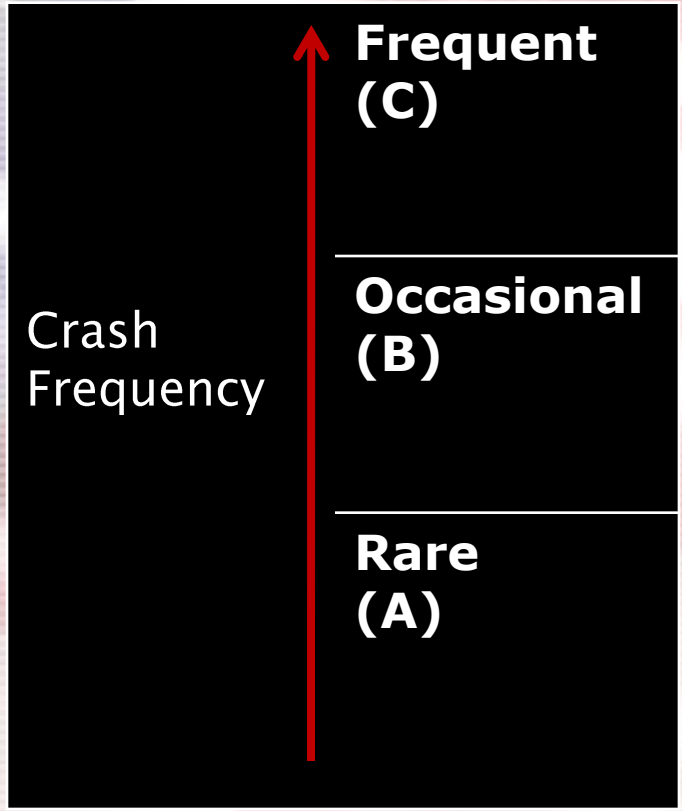
Analysis: Crash History

Step 5



Prioritize Safety Issues: Crash Frequency

Step 5



The RSA team must ask how often each safety issue may contribute to a crash.

RISK CATEGORY

A = Lowest priority

F = Highest priority

Prioritize Safety Issues: Crash Severity

Step 5

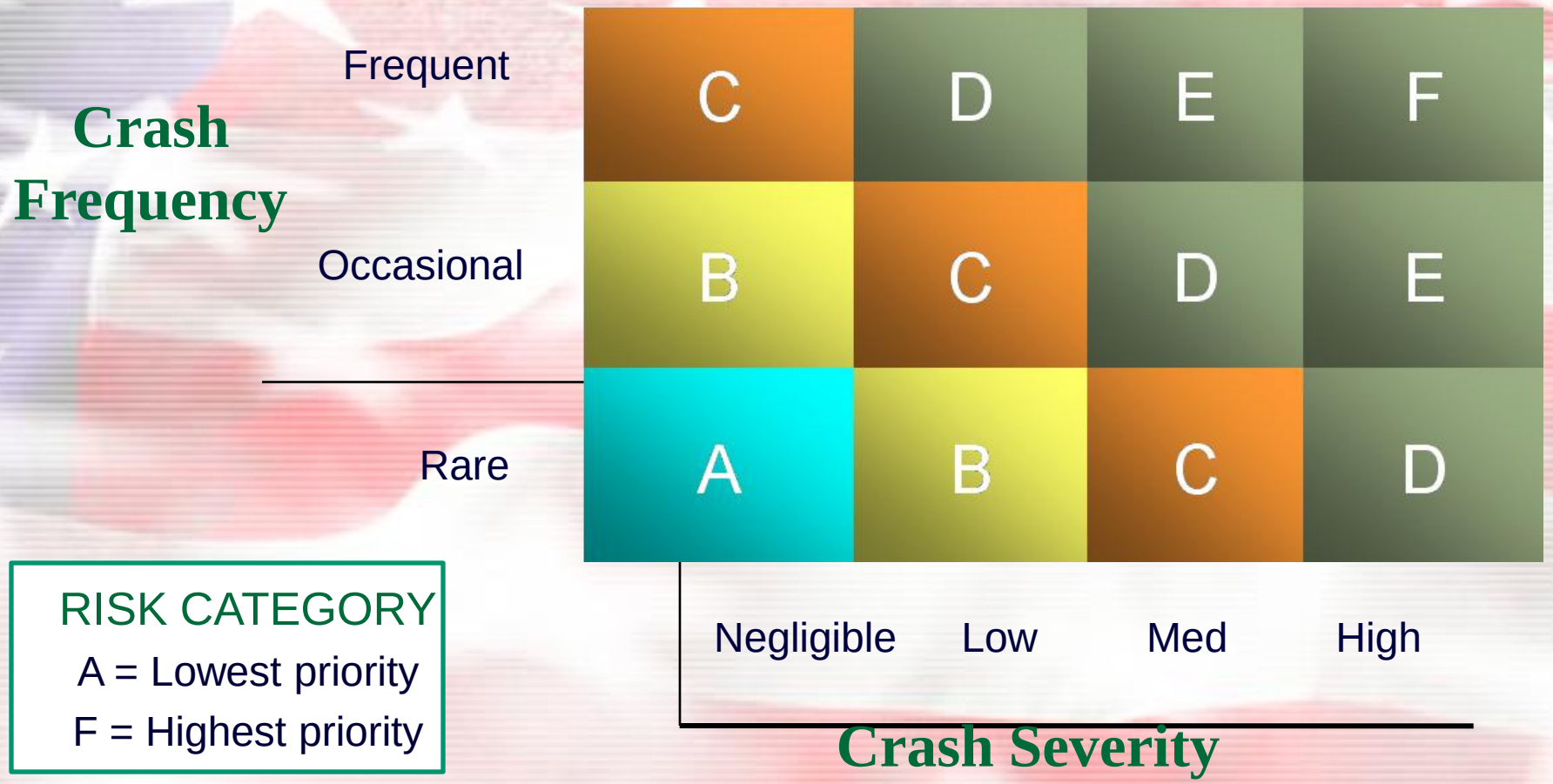
The RSA team must ask how severe the crashes related to the safety issue may be.

Negligible (A)	Low (A)	Medium (B)	High (C)

Crash Severity

Prioritize Safety Issues: Risk Matrix

Step 5



RISK CATEGORY
A = Lowest priority
F = Highest priority

Step 5

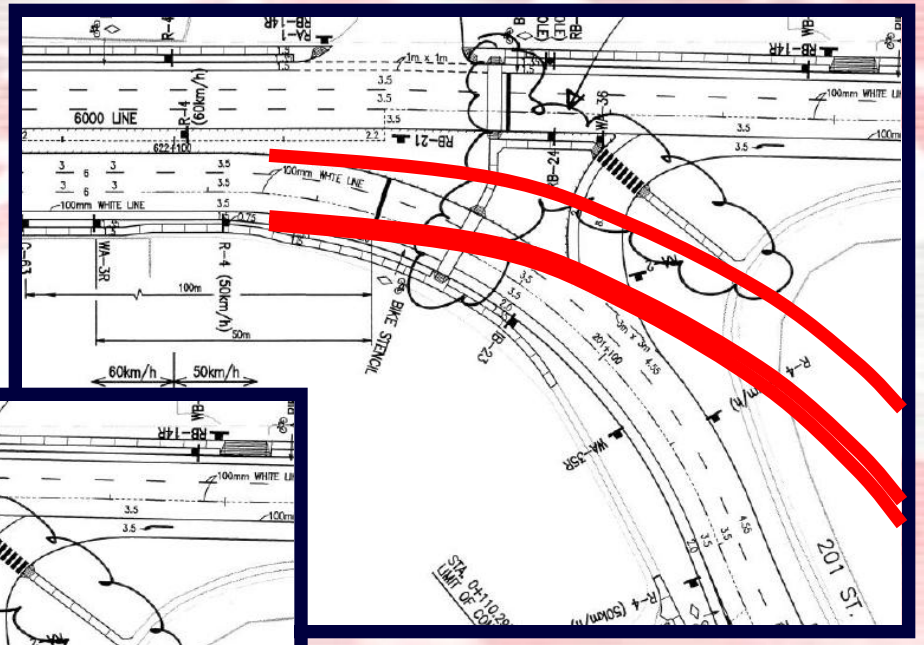
Mitigate Safety Concerns: Suggestions Appropriate to Project Stage

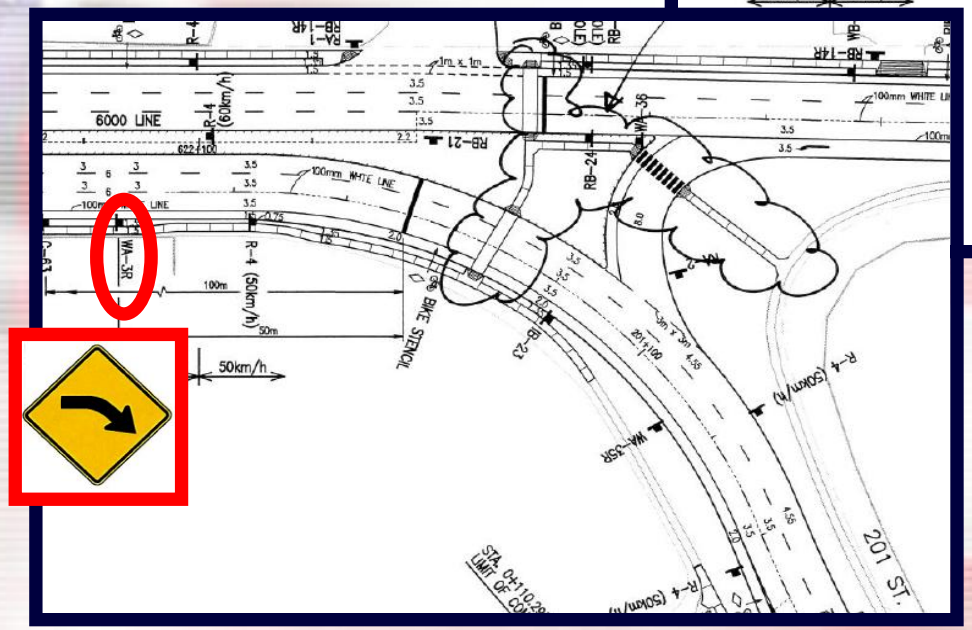
- *Short term* solutions include: maintenance, vegetation, changing signage or pavement markings, **Enforcement & Education**
- *Long term* solutions include: flattening a curve or modifying a roadway's vertical alignment, **Enforcement & Education**

Mitigate Safety Concerns: Design-Stage

Step 5

Early design stage: alignment changes





Later design stage: signing improvements

Prepare Preliminary Findings Presentation

Step 5

- Identify safety successes
- Briefly describe safety concerns
- Identify potential conflicts
- Suggest mitigation

Compose Preliminary Findings Presentation: Example 1

Step 5

Responsibilities

RSA Team

Design Team / Project Owner

The RSA Findings Presentation

Step 6

- Discuss safety concerns
- Discussion of safety concerns
- Clarify findings and suggestions
- Assist project owner in making best choices

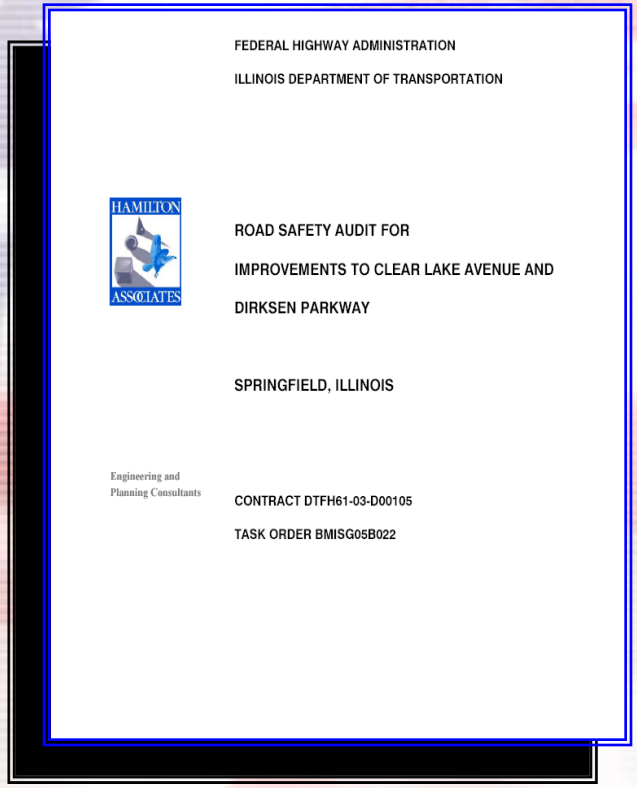
The RSA Findings Presentation: Factor in the Feedback

Step 6

- Review and revise findings where appropriate
- Initiate formal report

The RSA Findings: Formal Report

Step 6



FEDERAL HIGHWAY ADMINISTRATION

ILLINOIS DEPARTMENT OF TRANSPORTATION

HAMILTON ASSOCIATES

ROAD SAFETY AUDIT FOR

IMPROVEMENTS TO CLEAR LAKE AVENUE AND

DIRKSEN PARKWAY

SPRINGFIELD, ILLINOIS

Engineering and Planning Consultants

CONTRACT DTFH61-03-D00105

TASK ORDER BMISG05B022

- Summarizes the project
- Identifies team
- Documents site visits
- Documents results
- Identifies and prioritizes safety concerns
- May include suggestions for improvements

The RSA Findings Presentation: Formal Report

Step 6

Design-stage Report Layout Sample

Sample Road Safety Audit
Issue 1: Closely-spaced Sample Street Intersections

Safety Issues: During peak periods, left-turn queues may extend into or past adjacent closely-spaced intersections on Sample Street.

Safety Issue Description: Opposing through and right-turn traffic volumes can be expected to cause peak-period delays to traffic turning left at two intersections:

- Sample Street and the northbound entrance to I-XX, which has limited (70-foot) left-turn storage lane;
- Sample Street and Example Street, which has no left-turn lane.

If left-turn movements experience a long delay, queued left-turn traffic may obstruct through traffic on Sample Street. Queued or obstructed traffic may queue back and affect operations at upstream intersections, increasing the risk of all types of intersection collisions.

Expected Crash Types: intersection (left-turn, rear-end, and crossing)
Expected Frequency: occasional
Expected Severity: medium
Risk Rating: D (moderate-high risk level)

Suggestions: If micro-simulation modelling or post-construction observations show congestion related to left-turn queues, the following measures may be considered:

- Signalize the ramp intersection, and coordinate the ramp signal with those at Sample Street and Example Street to clear traffic when queues approach the adjacent upstream intersection.

Safety concern

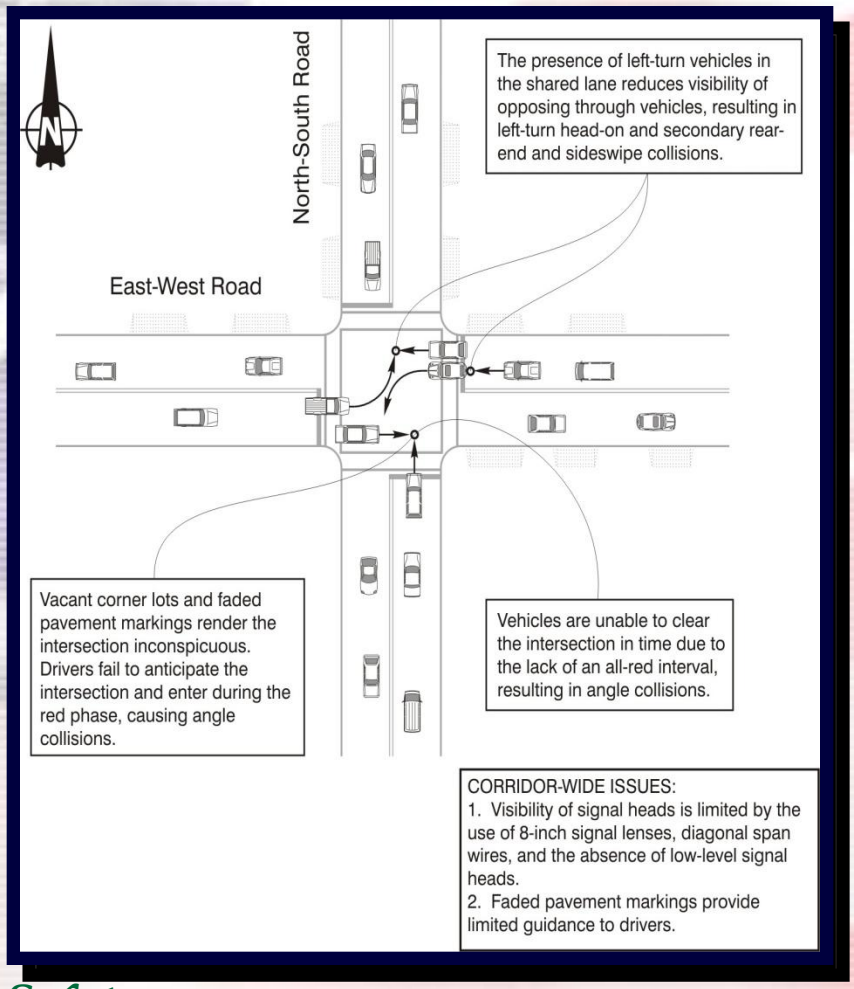
Description

Prioritization (optional)

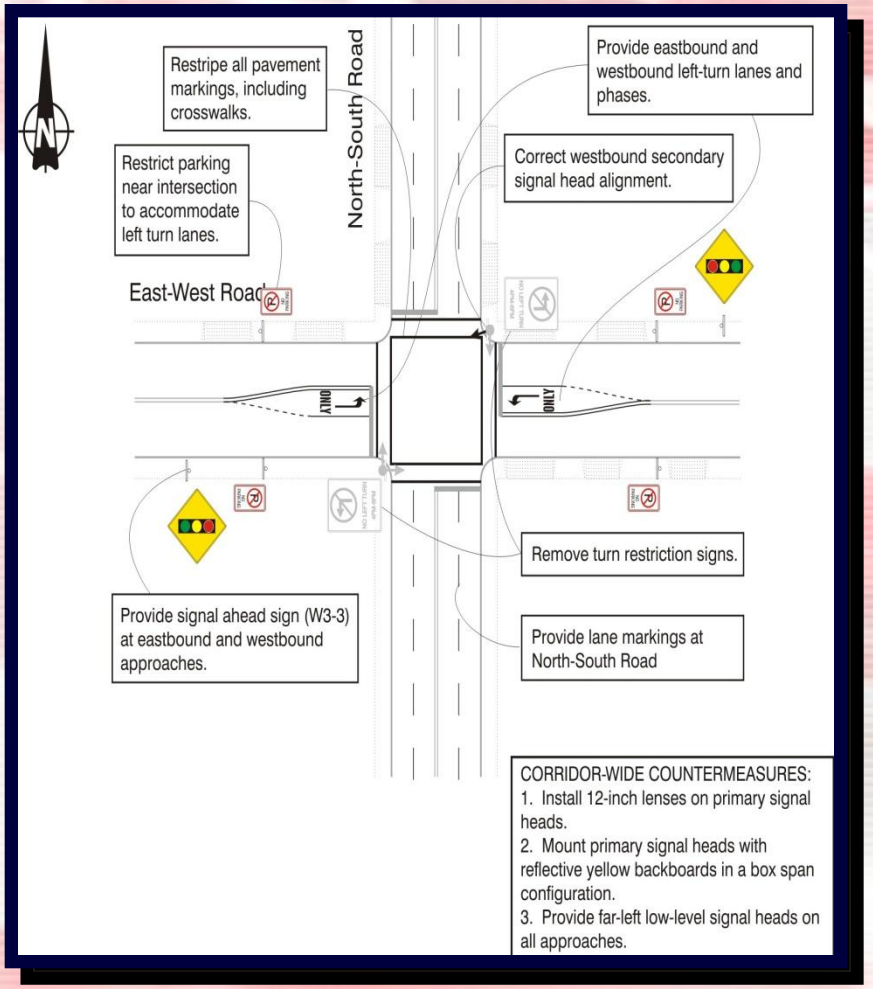
Suggestions (optional)

The RSA Findings Presentation: Formal Report

Step 6



Safety concerns

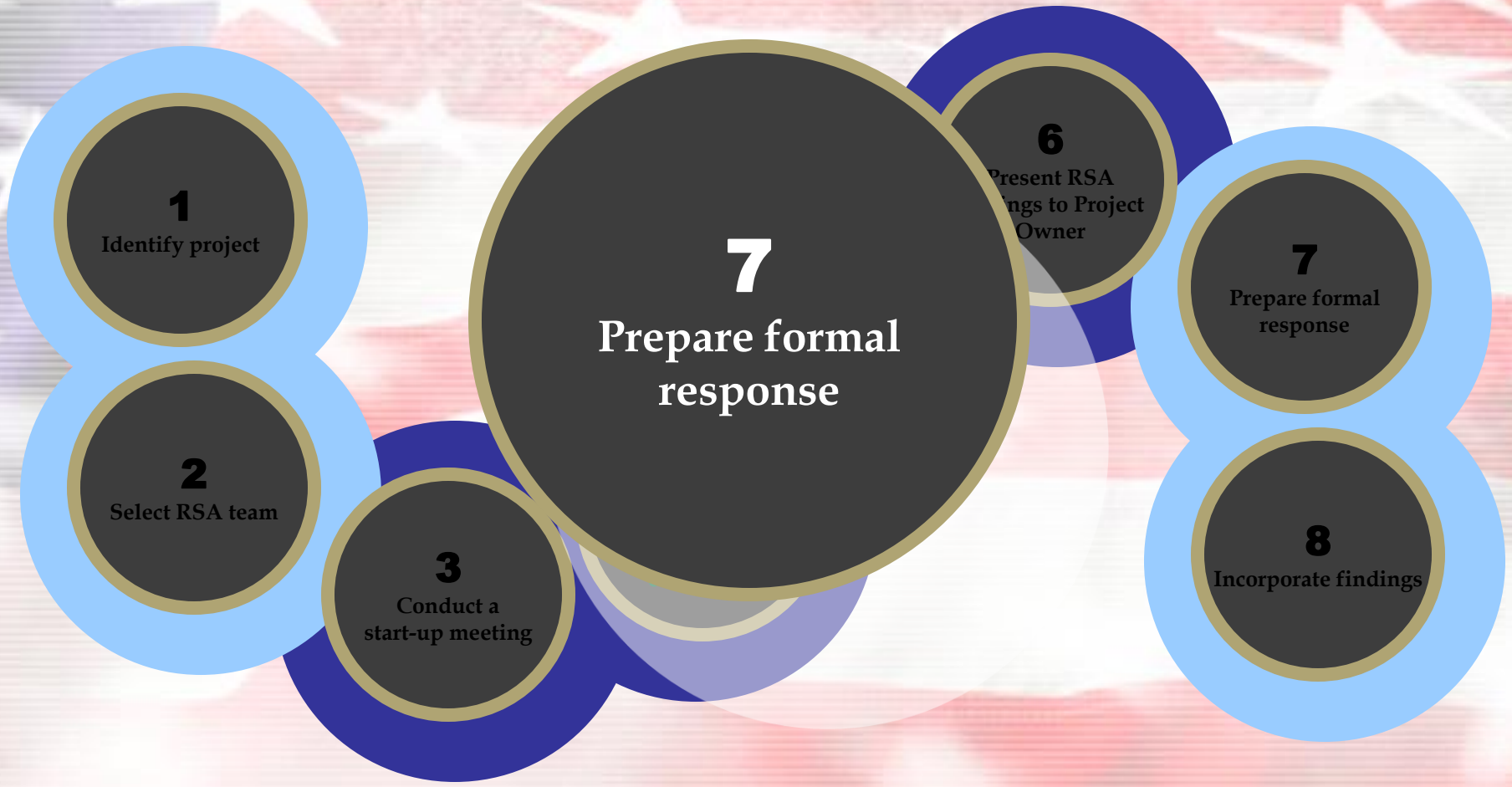


Suggestions

Responsibilities

RSA Team

Design Team / Project Owner



Responses

Step 7

- Short Range
  - Paint, Signage
- Mid-Range
  - Contour Bank
- Long-Range
  - Realign Skewed Intersection

Responses

Step 7

Inadequate Response

"We will not realign the intersection at Jefferson Road. We do not feel that it is needed."

Responses

Step 7

Adequate Response

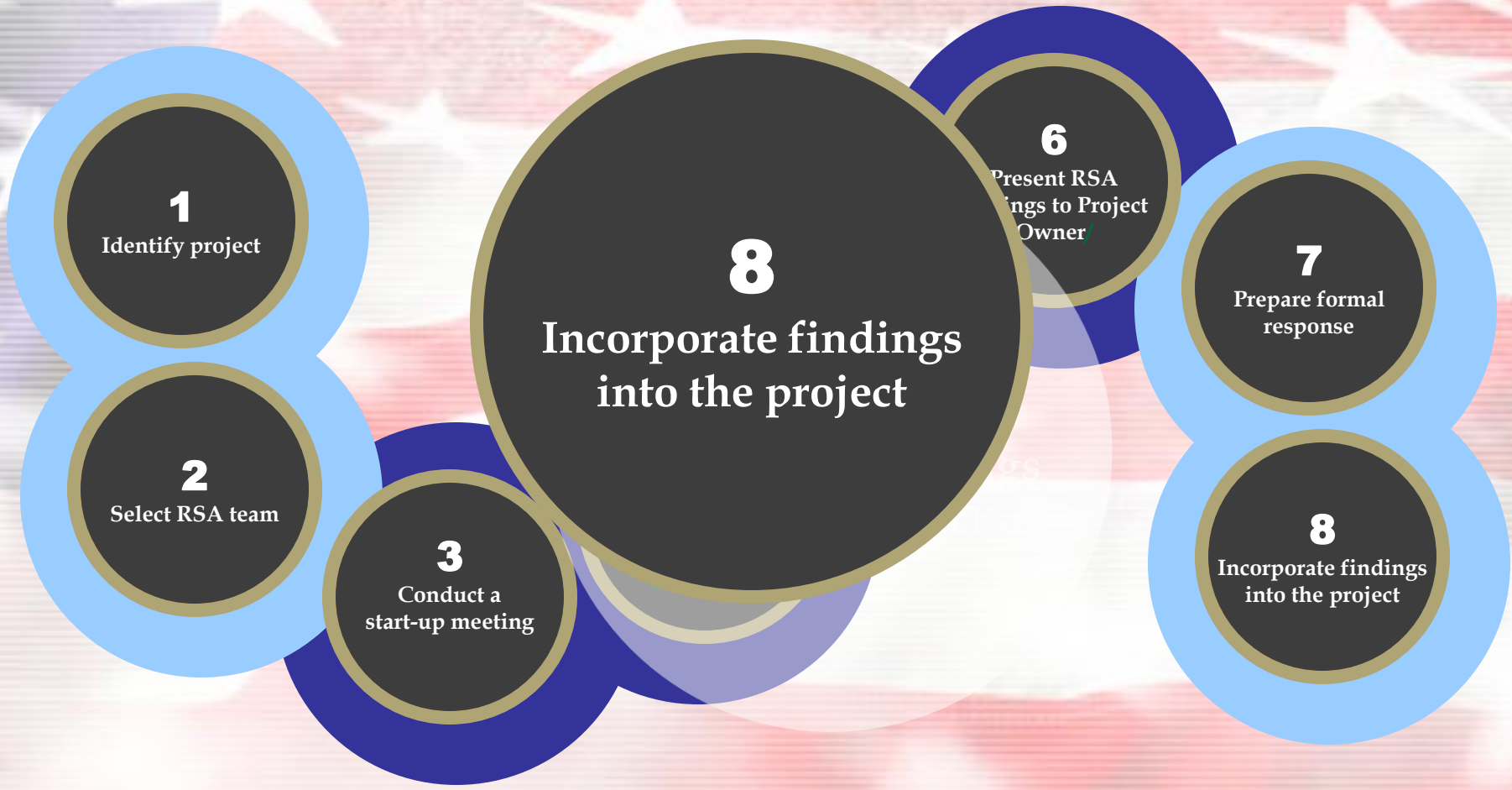
"While we agree with the need to realign the skewed intersection, the realignment cannot be achieved within the existing right-of-way. Realignment will require the purchase of property at a cost of about $500,000, representing about 15 percent of the total annual transportation budget. The acquisition of the required property may be considered in future budgets."

Response Letter

- prepared by the local road agency (with possible input from designer)
- for each audit issue, identifies what action will (or will not) be taken with a brief explanation
- part of the project record

Responsibilities

RSA Team
Design Team / Project Owner



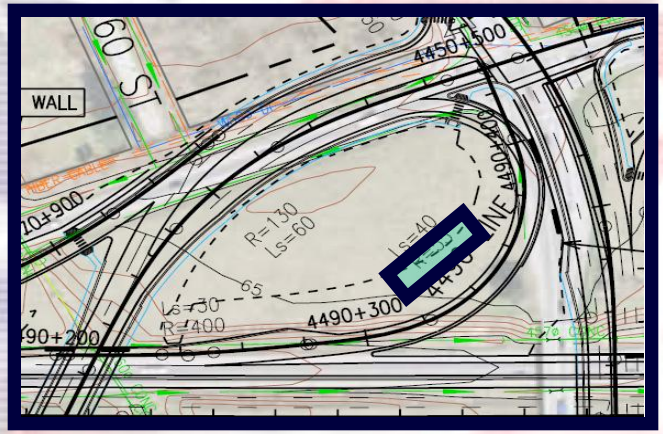
Step 8: Implementation of Improvements

Implementation - may depend on policy, manpower, and/or funding.

Implementation of Improvements

Step 8

Pre-construction



Changes to design drawings

Post-construction RSAs:

Incorporate improvements in operating budgets or maintenance programs

RSAs: Conclusions

RSA

Making Your Roads Safer