
The Need for Traffic Incident Management

With traffic incidents responsible for approximately 50-60% of the congestion delays motorists encounter on the nation's roadways every day, increased roadway capacity through construction only addresses half of the problem.

It is no longer acceptable to only construct and maintain roads; they must also be actively managed. Traffic incidents (crashes, breakdowns, and weather and construction work) need to be addressed by efficient operation of the roadway system.

The economic impact, increase in air pollution, increase in motorist frustration, and the general quality of life impacts of traffic incidents are substantial.

Traffic incidents are hazardous to emergency workers and motorists alike. More responders are killed responding to or working at the scene of traffic incidents than by any other means. Too often, both responders and motorists are injured or killed in secondary incidents, which are often more severe than the original.

Clearly, the mitigation of traffic incidents is an important function of highway operation. The implementation of Accident Investigation Sites (AIS) is one of a number of means of reducing incident delays and improving safety on our roadways.

ACCIDENT INVESTIGATION SITES (AIS)

PURPOSE AND NEED

Traffic incidents can greatly reduce the capacity of a roadway; even incidents on the shoulder of a freeway system can reduce roadway capacity on the order of 25%. As part of a comprehensive program for Freeway Traffic Incident Management, accident investigation sites (AIS) are being installed along freeway systems to assist with the timely removal of incidents, the safety of motorists and responders, and the reduction of secondary crashes.

Accident investigation sites, also referred to as emergency stopping sites or crash investigation sites, are improved areas off the freeway mainline, specifically designated and signed, that provide a safe area where motorists with partially disabled vehicles, law enforcement, fire-rescue and other public service vehicles can be temporarily relocated. Generally, these sites are identified by signs and sometimes pavement markings, have sufficient space to park multiple vehicles and lighting to ensure personal safety, and often have access to phone service.

Motorists approaching a traffic incident on an interstate facility, even from the opposite direction, are often distracted by the emergency-vehicle lights and slow or brake abruptly to look (rubberneck) as they pass the incident. The lingering effect of this distraction significantly contributes to increased congestion and delay on freeway systems. By removing disabled and wrecked vehicles from the roadway and shoulders, safety is improved for responders, the motorists involved in the incident, and other motorists coming upon the incident. In addition, delay experienced by other motorists is reduced and by quickly restoring freeway capacity after an incident, the potential for secondary crashes is also reduced.

Accident investigation sites provide:

- A safe area for stranded motorists experiencing mechanical problems or involved in a minor incident to relocate their operable vehicles away from a travel lane or roadway shoulder, as required by Florida law, in order to exchange information and to receive assistance,
- A safe area for law enforcement to conduct and complete crash investigations,
- A safe area to conduct commercial vehicle and other enforcement activities,
- A safe area and easier access for Road Rangers to provide motorist vehicle assistance,
- A relocation site for tow truck operators to move wrecked vehicles for final rigging and securing of loads, and
- A staging area for other activities unrelated to incident management.

LOCATION

Accident investigation sites can be flexible in location and design. The location and type of an accident investigation site is dependent on several factors, including the availability of space, width of right of way, existing infrastructure, accessibility to/from the proposed site, natural features to conceal the site from the view of mainline traffic, and planned improvements. The first step is to perform a site review and analysis to evaluate and determine feasible sites. Sites may be located downstream of areas with a high probability of incidents, or at regular intervals along a corridor. Three mile spacing in an urban area is a starting point.

AIS are generally placed at one of the following areas:

- On freeway exit ramps
- In freeway medians that are exceptionally wide
- On freeway entrance ramps at diamond interchanges
- Outside freeway shoulder (utilizing berms or landscaping to conceal from view of freeway traffic)
- Under a structure
- On a frontage road
- On a local roadway network

The tradeoffs between locating a site away from mainline traffic lanes and still providing accessibility to all users will need to be weighed to determine placement and location of an accident investigation site.

Figures 1 and 2 illustrate investigation sites located on an exit ramp and in the median of a freeway system, respectively. Appendix A contains additional photos of accident investigation sites deployed in many of the areas identified above.

DESIGN

Design of accident investigation sites is dependent on the site location characteristics, and can range from minor modifications to existing infrastructure to a design of a completely new site. Because sites vary and no standard configuration will apply to all sites, general guidelines for the layout of an investigation site have been provided to identify certain design components and to offer general guidance. The design should be based on good engineering decisions.

General guidelines include the following:

- Size of site should be at least 1,000 square feet, in order to provide adequate space for five vehicles, including passenger vehicles, patrol vehicles, and a tow or Road Ranger truck
- Sites of 3,000 square feet can accommodate two large commercial vehicles, a Class C tow truck, and two public safety vehicles
- Paved surface; gravel sites may be considered if location is off the freeway
- Tapers of 5:1 or less to guide motorists into and out of site
- Minimum width of 12 feet
- Set back from travel lane, 4-foot minimum (8 feet desirable)
- Pavement markings and signs to clearly delineate the limits of the site
- Advance signing on the freeway, 1 mile, ½ mile minimum
- Signing at the site to identify site location
- Lighting, if power is available
- Phone service at site or nearby

Typical design of an accident investigation site will include geometrics, signing, pavement markings and sufficient lighting to provide site access, adequate capacity, security, concealment from general traffic view, and communication. Figure 3 shows a typical layout plan and sign and pavement marking plan for a proposed AIS on State Road 924 (Gratigny Parkway) in Miami, Florida operated by the Miami-Dade Expressway Authority (MDX). The Insert A image in Figure 3 illustrates the existing conditions of the site and Insert B shows a typical sign for the AIS. Construction of the proposed site requires minor modifications, including minimal widening with additional signs and pavement markings as shown in the plans.

Information and training materials explaining the use of AIS should be provided to law enforcement and public service providers to support the understanding and use of these sites. In addition, public information campaigns are needed to provide public awareness and education on the use of the sites.

BENEFITS AND COSTS

The first accident investigation site was installed in Houston, Texas in the 1970's and was based on the concept developed by the Texas Transportation Institute and Texas Highway Department. Today, the following states have deployed AIS on freeway systems: Texas, Illinois, Georgia, Florida, California, Wisconsin, Minnesota, Indiana, Washington, New York, and Pennsylvania.

From a benefit-cost ratio perspective, experiences in Houston, Texas indicated a benefit-cost ratio of 28:1 during the first year of operation. Data indicated that the potential benefit-cost ratio for accident investigation sites could be as high as 35:1, that is, \$35 return for every \$1 invested. (FHWA Freeway Incident Management Handbook).

The expected benefits to be derived from the use of accident investigation sites include:

- Increased safety to motorists, law enforcement and public service responders
- Reduced congestion caused by stopped vehicle(s) along the freeway shoulder or in a travel lane
- Improvement in travel times, gas consumption, and vehicle emissions due to reduction in congestion
- Removal of potential hazards and distractions to freeway mainline traffic

- Reduced potential for secondary incidents
- Quicker restoration of roadway capacity back to normal traffic conditions after initial impact of an incident

The value of these benefits is difficult to quantify in trying to equate or calculate the risk of the human exposure and potential of secondary crashes and injuries to highway users and public agency responders.

Typically, accident investigation sites have low construction costs. Due to the flexibility in design and location, construction activities range from minor improvements on existing infrastructure to construction of a completely new site. Therefore, construction cost estimates range from \$3000 to \$36,000 per site. Sites utilizing existing areas are generally more cost effective to construct than new sites.

For example, accident investigation sites deployed by MDX along State Road 874 (Don Shula Expressway) in Miami, Florida utilized existing ramps originally designated as Car Pool and Bus Ramps that were not being utilized. Because these ramps were accessible from the mainline and did not require any additional modifications/construction, deployment of the sites required minimal cost for only AIS signs. At the higher end of the scale, MDX programmed a total of \$71,000 for construction of two (2) accident investigation sites along State Road 924.

Construction cost estimates for completely new accident investigation sites within the right of way, off the shoulder of the freeway mainline that require construction for extension of the pavement, tapers, signs and pavement markings, etc. may range higher. However, for accident investigation sites incorporated in the overall design of new or reconstructed facilities, the incremental cost for constructing the AIS is negligible compared to the overall construction cost of the project.

EXAMPLES



Figure 1. AIS located off freeway exit ramp

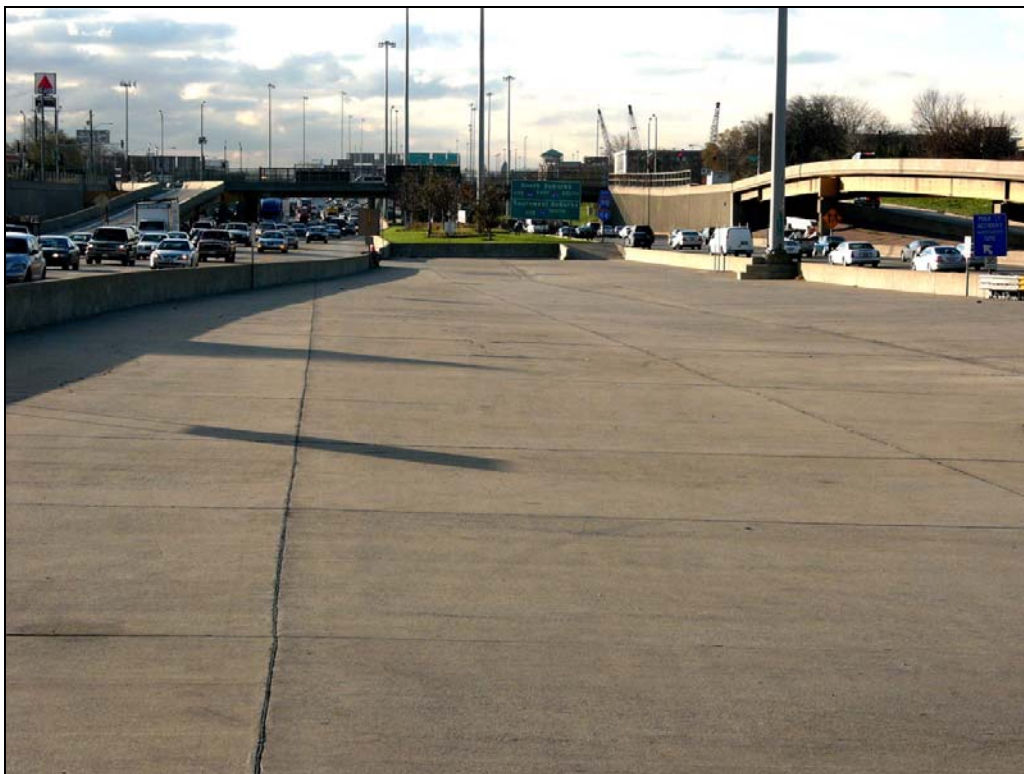


Figure 2. AIS located in median of freeway

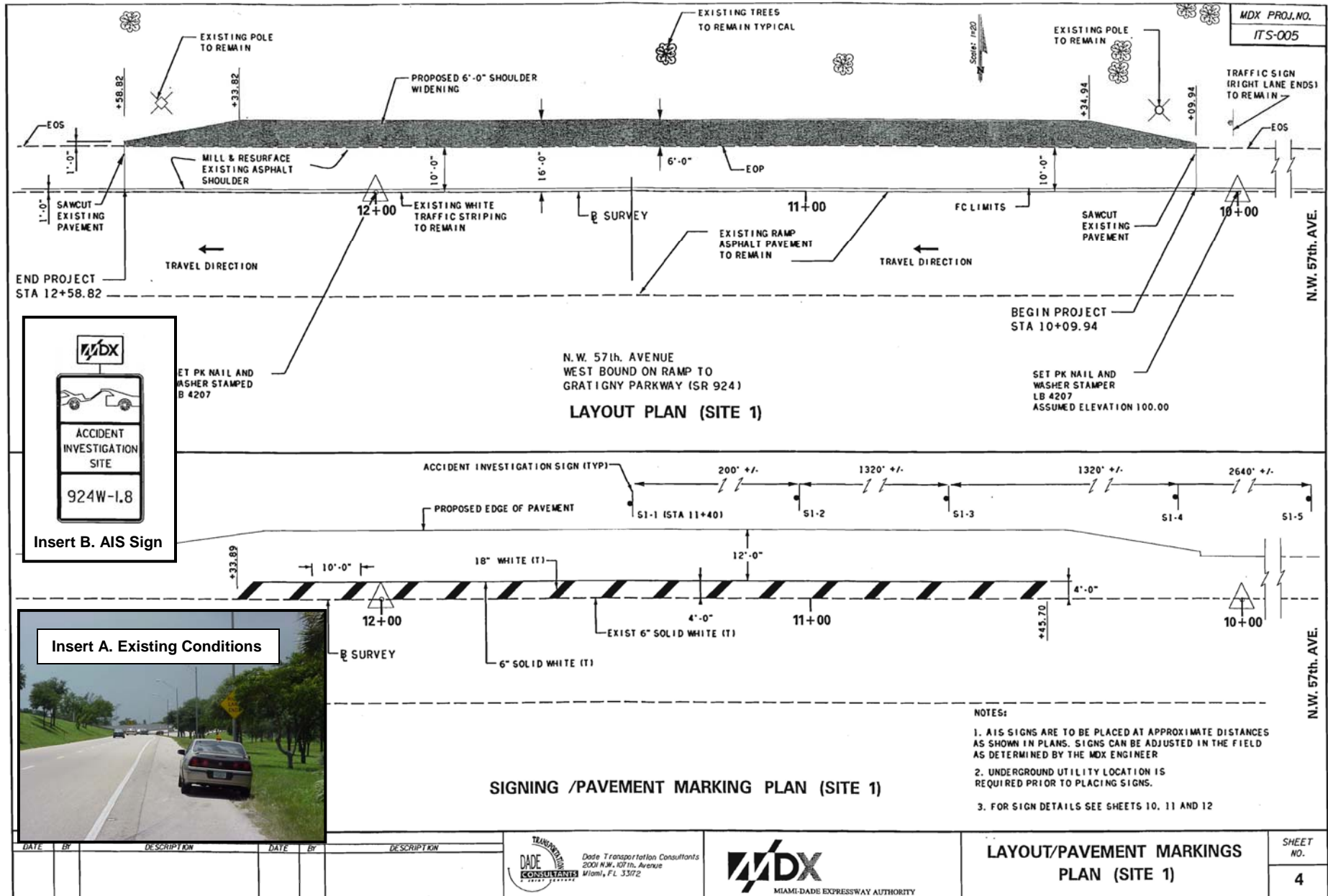


Figure 3. Typical design of AIS

APPENDIX A: ACCIDENT INVESTIGATION SITE EXAMPLES



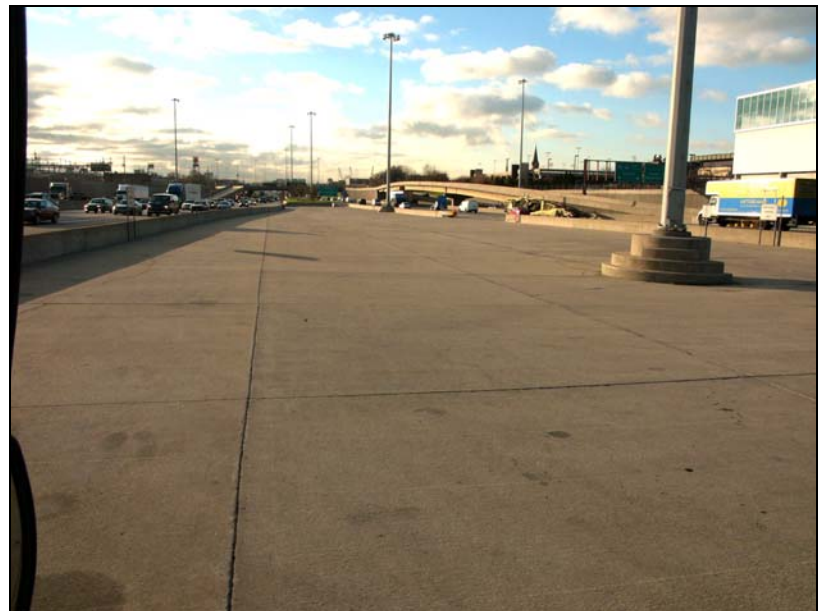
**Hallandale AIS, Interstate 95
Broward County, Florida
AIS located on NB Exit Ramp**



**Addison Street AIS, Kennedy Expressway
Chicago, Illinois
AIS located on SB Exit Ramp**



**Foster Avenue AIS, Edens Expressway (I-94)
Chicago, Illinois
AIS located on NB Exit Ramp**



**Polk Street AIS, Dan Ryan Expressway
Chicago, Illinois
AIS located in Median (access from NB and SB Mainline)**



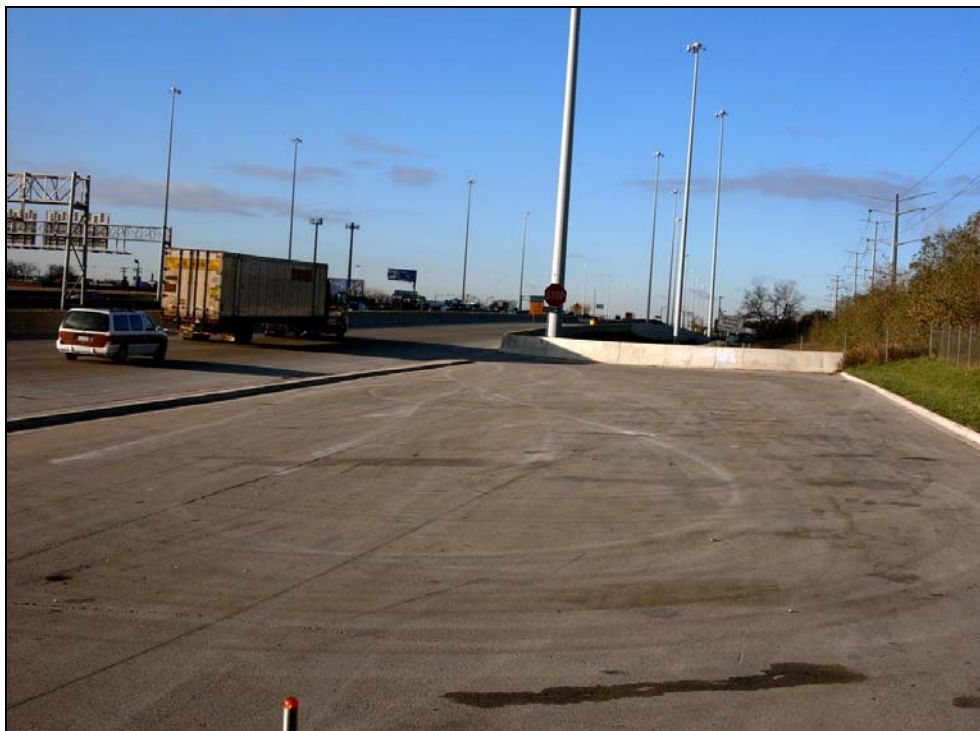
**Throop Street AIS, Stevenson Expressway
Chicago, Illinois
AIS located off Mainline**



**Ohio Street AIS, Kennedy Expressway
Chicago, Illinois
AIS located off Mainline**



**Halsted Street AIS, Stevenson Expressway
Chicago, Illinois
AIS located off Mainline (access from wide shoulder)**



**Kedzie Street AIS, Stevenson Expressway
Chicago, Illinois**
AIS located on freeway auxiliary lane (separated from mainline) between on- and off-ramps



**Wood Street AIS, Stevenson Expressway
Chicago, Illinois
AIS located on local road under Stevenson Expressway (access from exit ramp)**



**Armitage Avenue AIS, Kennedy Expressway
Chicago, Illinois
AIS located off Mainline**



Minnesota AIS Sign