Intelligent Transportation Systems (ITS) technology is now being used to enhance traffic safety and operations during construction of the Interstate I-295/Route 42/Interstate I-76 (Interchange) Direct Connection project in southern New Jersey. A gateway for travel to and from Philadelphia, PA, and Camden, NJ, this interchange has had a poor crash history, due in part to an outdated design that is no longer capable of safely accommodating more than 250,000 vehicles per day. The New Jersey Department of Transportation (NJDOT) is committed to keeping interchange traffic flowing in a safe and efficient manner. The ITS component of the Direct Connection project expands these traffic mitigation capabilities, giving NJDOT the resources to keep regional networks operating at an acceptable level of service during and after project construction.

The Advance ITS Contract, awarded to Diehl Electric for $6.8 million dollars, was fast-tracked so that ITS elements could be used to mitigate construction traffic impacts. Working closely with NJDOT and the Federal Highway Administration (FHWA), Dewberry prepared contract-ready plans that were designed, advertised and bid before any of the major roadway construction commenced.

Redirecting Communications
Construction occurred in several stages. Each stage required protecting and relocating existing communications conduit and fiber optic cable multiple times. To avoid this, the team developed a proactive scheme to “redirect” communications. Temporary communication hubs were established to redirect ITS data from existing fiber optic lines in the construction area to leased communications services at locations outside of the construction areas. Contractors could then perform roadway work without concerns about damaging or disrupting existing fiber optic communication systems and ITS devices.

This approach protected the functional integrity of the existing ITS devices along the three major routes entering the interchange. By supplementing the existing ITS devices with additional traffic monitoring, information and control strategies, the system now supports a higher level of operational reliability, serving traffic approaching and passing through the project area.

Additional ITS systems were selected based on possible incident scenarios in and around the construction area. This included parallel arterials of US 130 and NJ 168 that will be forced to accommodate traffic surges if freeway diversions occur. The latest in Adaptive Traffic Signal Control systems were used to manage spikes in arterial traffic flow when diversions from freeways occur. These Adaptive Signal systems do not require operator intervention to work, and traffic signal timing adjustments are taken care of automatically, based on actual, real-time demand.

Alerting Travelers
New Dynamic Message Signs (DMS) help expand agency capabilities to disseminate traveler information, including travel time information along segments of freeways. Travel time detectors, placed on the four roadway approaches entering the interchange, monitor travel on those roads and provide more accurate travel times to destinations beyond the interchange.

The additional DMS signage (continued on page 35)
Technology Increases Safety, Aids Traffic Flow on Congested NJ Interchange

(continued from page 32)

and travel time sensors installed under the Advance ITS Direct Connection project provide more timely and relevant information to drivers and allow them to make better driving decisions, whether they are within one mile of the construction project or 20 to 30 miles away. The travel time detectors also monitor and collect traffic data on the signalized parallel arterials as a means of system verification and validation of the Adaptive Traffic Signal Control system.

Each of these ongoing additions helps alert drivers of major incidents—and a potential alternate route—as far ahead of the interchange area as possible. By choosing those alternate routes, drivers help to reduce congestion at interchange work areas and improve the safety of those areas for everyone involved.

In addition to these ITS efforts, the subsequent Direct Connection project (Contract 1) established an interim ramp and constructed a concrete island that eliminated a difficult merge area by separating Route 42 northbound and I-295 northbound. The interim ramp will remain in use for several years and allow traffic to exit Route 42 northbound and directly connect with I-295 northbound. The island will separate Route 42/1-76 traffic from I-295 northbound traffic and eliminate the need for motorists to move across lanes.