

NATIONAL STEEL BRIDGE ALLIANCE

2001 Prize Bridge Award

WINNER:
MEDIUM SPAN

Industriplex Interchange Flyovers

Woburn, MA



The I-93 Industriplex interchange project was the first fully directional T-interchange in Massachusetts. Based on type studies, VHB chose curved twin steel trapezoidal boxes to meet tight curvature and minimize structure depths. VHB partnered with the contractor for development of erection procedures. Erection over the Interstate (vpd = 120,000) incorporated southbound closure and northbound crossover. Erection of the girders was completed in less than 36 hours over the weekend.

The interchange directly connects I-93 with a 245-acre area once containing the majority of industry in the city of Woburn, MA, which has been significantly reconfigured to incorporate a 30-acre intermodal center including a MassHighway carpool parking/congregating area, Massachusetts Bay Transportation Authority (MBTA) commuter rail station with parking, and Massachusetts Port Authority (Massport)-Logan International Airport off-airport parking/express bus service, over 1 million square feet planned of "corporate center" space, a 200,000 sq. ft. retail center and hotel/conference space.

I-93 is a major commuter route between Boston and New Hampshire, with substantial buildup along the entire corridor. Additionally, it interchanges with two equally highly traveled routes (I-95/Route 128 and I-495) within one mile and 8 miles, respectively, of the Industriplex interchange. It is also a primary route to vacation and recreational destinations. Maintaining traffic flow during construction was paramount. Construction was scheduled such that erection of the girders occurred in 36 hours over one weekend, during which time the northbound barrel was closed and traffic was diverted to the southbound barrel.

Some design highlights are:

- Both multiple long spans (8 spans = 1,157' and 11 spans = 1,574') are jointless, all expansion is allowed at the abutments.
- VHB design eliminated use of intermediate diaphragms and cross frames between girders and used only pier diaphragms, which sped the erection process.
- VHB used complex three-dimensional finite element modeling for analysis of gravity, centrifugal, thermal, seismic and wind load combinations.

Steel was an important element in the design enabling short depths to twin steel trapezoidal box girders of 5' 6" for clearance over the Interstate.

The area development enhances the City's economic base and construction of the interchange. It also results in significant improvement to congestion on I-93 and at the interchange with I-95/Route 128 one mile southeast of I-93. For maintenance freedom, ramps were designed of Grade 50 weathering steel with full depth silica fume concrete (high performance concrete) for decks and parapet. They were designed for a 50-year life.



Owner

Massachusetts Highway Department, Boston, MA

Structural Engineer

Vanasse Hangen Brustlin, Inc., Watertown, MA

Steel Fabricator

High Steel Structures, Lancaster, PA (AISC member)

Steel Detailer

ABS Structural Corporation, Melbourne, FL (AISC & NISD members)

General Contractor

SPS New England, Inc., Salisbury, MA

Software

BSTI, STAAD

