The Driscoll Bridge

The creation of the New Jersey Highway Authority in 1952 included a mandate to construct the Garden State Parkway as quickly as possible to relieve the increasing traffic congestion in New Jersey. A centerpiece of the project was the bridge carrying the Parkway over the Raritan River at Perth Amboy. Named for Alfred E. Driscoll, New Jersey Governor from 1947 to 1954, it is the largest of the Parkway's nearly 300 bridges, and one of the state's busiest, carrying an average of over 200,000 vehicles per day.

The Driscoll Bridge was designed as a nearly identical twin of the Edison Bridge because of the channel clearance requirements set forth by the U.S. Department of the Army. With jurisdiction to determine the minimum height and width of bridges over navigable waterways, the U.S. Army Corps of Engineers required that the 135' height and 250' channel span specified for the Edison Bridge fourteen years earlier would also apply to the Driscoll Bridge. A further condition, that the channel piers of both bridges share a common fender system, resulted in the new bridge being located just 175 feet west of the Edison Bridge. This ensured that navigation and river currents would not be impeded by an excessively long fendered channel or by a second restricted channel a short distance away.

Whatever difficulties these requirements posed for the Parkway's planners were offset by benefits to the bridge engineers. With the bridges so close together, it was logical for both aesthetic and practical reasons that they be twins with essentially the same engineering and architectural features. The highly successful and record-setting Edison Bridge provided a full-scale model with plans and records from which the details of design, fabrication, erection, and cost of the new bridge could all be extrapolated.

The design and construction oversight of the Driscoll Bridge was the result of a collaboration between three groups of engineers: the New Jersey Highway Authority staff, the consultants to the Authority for the overall Garden State Parkway project, and the bridge design firm of D.B. Steinman of New York City.

Harold W. Griffin, chief engineer of the New Jersey Highway Authority, carried overall responsibility for the Driscoll Bridge project and was assisted by Harry A. Hartman, supervisor of construction. The firm of Parsons, Brinkerhoff, Hall & McDonald served as general consultants for the Parkway project, and Morris Goodkind served as consulting bridge engineer for the Parkway's bridges. Goodkind was chief bridge engineer at the New Jersey State Highway Department at the time and had been responsible for the design of the Edison Bridge fourteen years earlier.

David B. Steinman was one of the world's leading bridge engineers at the time and was chosen for his particular experience with long-span *plate-girder* bridges. Steinman and his partner, Holton D. Robinson, pushed the limits of bridge materials and engineering, and designed many of the early record-setting suspension bridges during the 1920s and 1930s. The firm of Robinson and Steinman had designed the Charter Oak Bridge at Hartford, Connecticut, completed in 1942, which held the title as longest plate-girder bridge in the United States until 1951, when the twin New Jersey turnpike bridges over the Passaic and Hackensack rivers were completed.

The Garden State Parkway

Construction of the Garden State Parkway (GSP) began in 1946 after passage of New Jersey's Parkway and Freeway Act. The GSP was started as part of the state highway system and was initially funded with annual highway appropriations. By 1950, with only ten miles of the parkway's 165-mile route opened, it became apparent that with only annual appropriations, the project might take 40 years to complete.

In April 1952, the legislature created the New Jersey Highway Authority to build, maintain, and administer the GSP using state-backed bonds to be paid back with tolls. When voters overwhelmingly approved the project referendum in the November election, the Authority began construction on a large scale. By the end of 1953, $140 million in construction contracts had been awarded, and the construction of 177 of the GSP's 282 bridges was proceeding rapidly along.

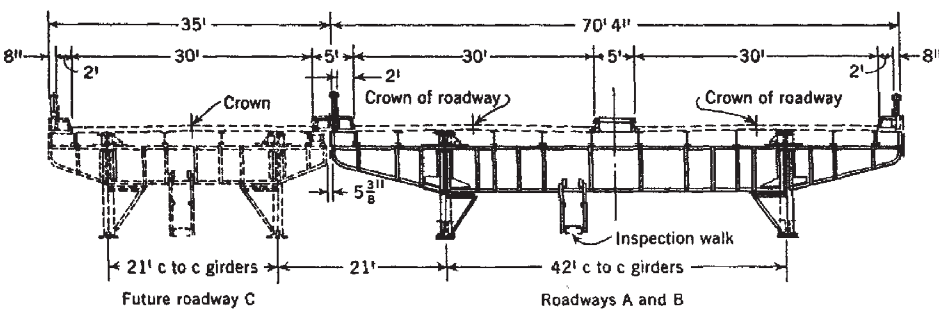
The 165-mile-long parkway was designed to connect the northern metropolitan areas and southern coastal areas. With more than 200 entrance and exit ramps, it would lessen congestion on local roads along the way. The GSP was built to move New Jersey drivers around their state, in contrast to the Turnpike, which was built with very few exits, and channeled interstate traffic in one end and out the other.

In addition to the 13 engineers on staff, the Highway Authority assembled a team of 24 of New Jersey's leading engineering consultants and firms. The engineers employed state-of-the-art highway and bridge planning and design technology. Features to accommodate future traffic needs were "built-in," such as banked curves to safely handle speeds up to 70 miles per hour, and wide medians and shoulders for additional travel lanes. Extra concrete foundations were even added to allow for bridges to be widened. This feature saved taxpayers several million dollars when the bridge was widened in 1972.

The Raritan River Bridge was finished three months ahead of schedule in July 1954, and the GSP, being largely completed, was officially opened on October 23, 1954, by Governor Meyner. In May 1956, with the opening of the Great Egg Harbor Bridge, the parkway was complete. The nine-mile extension joining the GSP to the New York State Thruway was added in 1957. The Raritan River Bridge has since been renamed after Alfred E. Driscoll, governor of New Jersey from 1947 to 1953.

The robust economy and suburban housing boom that followed World War II resulted in not just one car in every garage, but two, and a multitude of new trucks for every commercial purpose.

Nowhere was the impact of all these vehicles felt more than on New Jersey's highways. But New Jersey's drivers were long acquainted with traffic jams, dating from the early days of the automobile when beach traffic backed up in legendary proportions. Geographically positioned as New England's gateway, the Garden State also suffered from large and ever-increasing numbers of interstate travelers and commerce just passing through. To many it seemed that traffic could only get worse. And so, in the early 1950s, with the good times rolling, taxpayers embraced heavy investment in highways that would carry them far into the future. New Jersey was ready to lead the way, and the Garden State Parkway would be a standard bearer.



Driscoll Bridge Evolution. *The bridge was originally built with two 30' concrete roadways, a 5' center mall, and two 2' emergency walkways to accommodate four 15' wide lanes of traffic. In 1957, the deck was re-striped to accommodate six 10' lanes. Between 1970 and 1972, a third set of columns was added, resting on the foundations built for them in 1955, and the superstructure was widened from six lanes to ten lanes. In 1984, the timber median barrier was replaced with a concrete barrier to provide six lanes of traffic in each direction. Source: Gronquist 1955.*

With no opportunity for record setting, the Driscoll Bridge project was essentially a "bread-and-butter job" for Dr. Steinman. As part of a major new high-capacity highway system, it did, however, call for the best practice in design, materials, and construction to ensure long, efficient service. Notable in this regard were special structural features to allow economical widening of the bridge to meet future traffic demands, and a state-of-the-art concrete deck. Building bridges has always been one of the most expensive public undertakings. Although the great initial cost justifies some additional expenses to ensure long life, the public generally cannot accept expensive over-designing for estimated future traffic loads. Bridges are normally bottlenecks because they cannot be economically equipped with wide shoulders and breakdown lanes needed for maximum traffic flow. It was therefore considered significant at the time that not only was the Driscoll Bridge designed with unusually wide travel lanes and broad shoulders, but that a major investment was made in building extra foundations for a third roadway to be built sometime in the future.

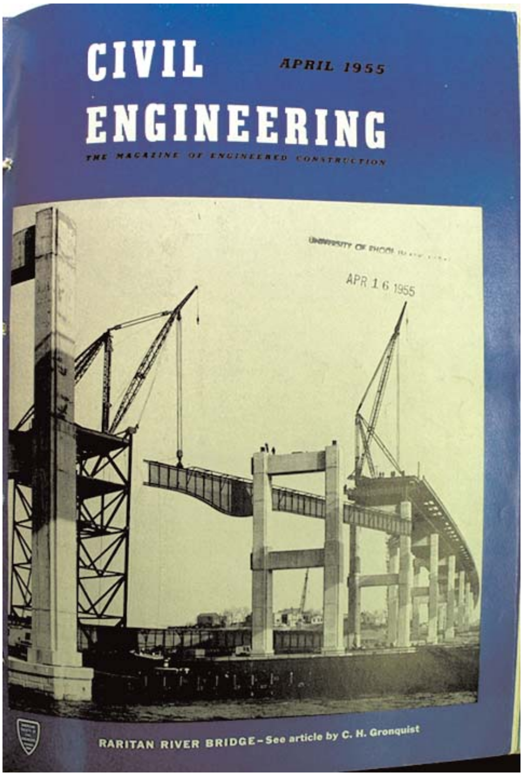
The second special feature of the Driscoll Bridge was the design of the concrete deck, which provided for the latest advances in construction methods and equipment. Efficient techniques developed three years earlier for building the decks of the huge New Jersey Turnpike bridges over the Passaic and Hackensack rivers were studied and incorporated into the design of the Driscoll Bridge. The attributes of good engineering– great speed, high quality, and economy–had all been achieved.

In designing the 7" thick concrete deck for the Driscoll Bridge, the engineers started with the specifications used by the New Jersey State Highway Department and then turned their efforts to achieving the smoothest possible riding surface. The use of structural-steel continuous-drain curbs, and steel grating for the sidewalks and center mall, simplified the concrete work. The walks provided workers easy access for construction of the bridge deck. The curbs served as a fixed support and guide on which to slide the deck *screed* and personnel bridges that were used in spreading and smoothing the wet concrete.

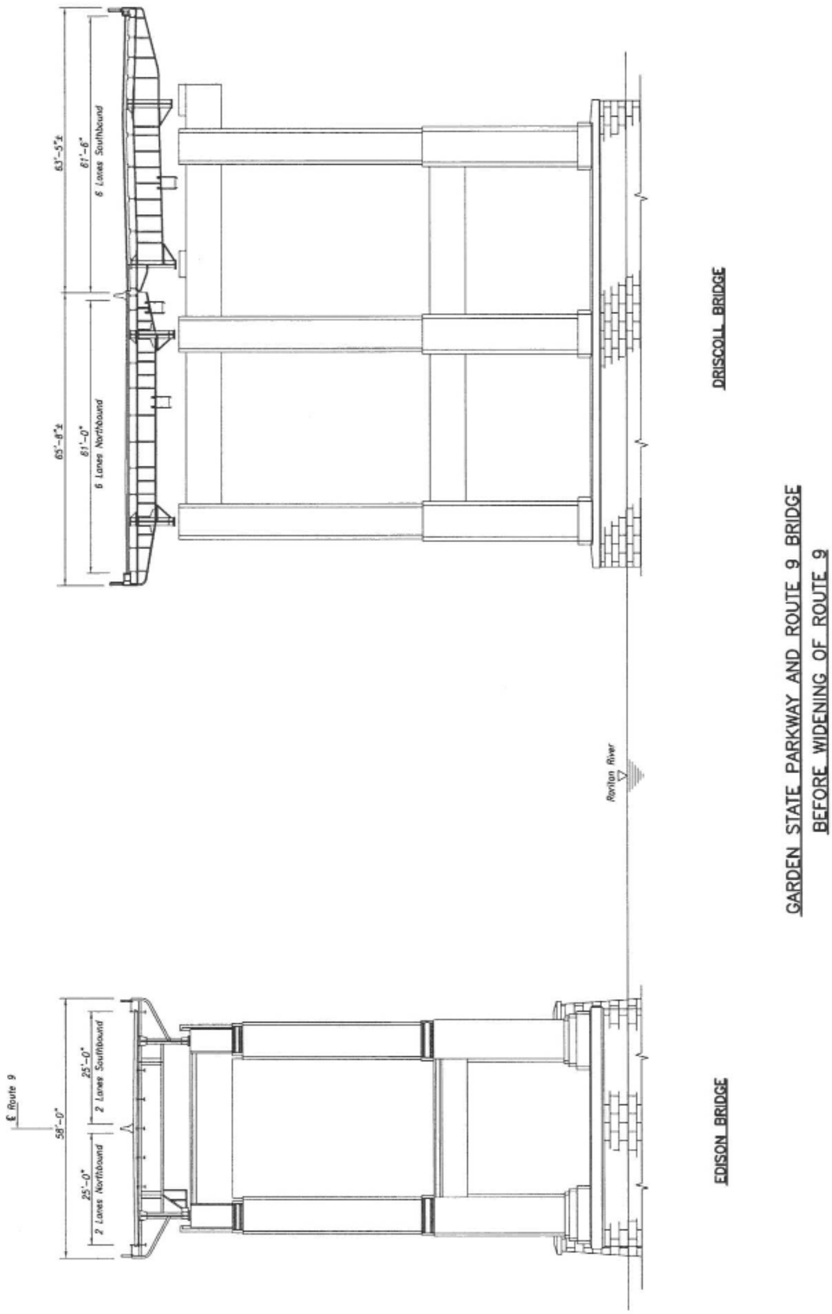
The steel curbs were set in place with precision and closely inspected by the field engineers for uniformity. The finishing of the concrete deck required several steps: a vibrating screed, mounted on wheels that rode on the curbing, was pulled over the fresh concrete. This was followed by a wood float and then a straight-edge scraper, operated by two men from a pair of rolling bridges spanning the fresh pavement. Wet burlap cloth was then pulled across the surface, and the final finish was produced with a stiff bristle broom. The result was a nearly mile-long concrete surface that was considered as perfect as could be constructed.

The superstructure of the Driscoll Bridge was fabricated and erected by the Bethlehem Steel Company, the same contractor that built the Edison Bridge. As the Driscoll Bridge was a structural copy of the Edison Bridge, Bethlehem Steel had the necessary patterns for duplicating the girders and the equipment and experience for efficiently erecting the bridge. The construction process was essentially the same: the girders were assembled in the company's Pottstown, Pennsylvania, plant, transported by special railcars and barges to the site, and lifted with enormous cranes into place.

One improvement in the construction process was in the temporary stiffening truss attached to the girders to prevent lateral buckling during lifting and setting. During the lifting of the main girder for the Edison Bridge, the heaviest lift in the world at the time, the girder buckled slightly. The improved stiffening truss used high-strength bolts, torqued to a minimum tension of 25,600 lbs. The Driscoll Bridge was completed in July 1954, three months ahead of schedule.



Specially built to be easily widened to meet future traffic demands, the Driscoll Bridge was cited for its progressive design and was featured on the cover of the April 1955 Civil Engineering *magazine. Shown is the lifting of the massive 263' main girder, weighing over 200 tons, fabricated and erected by the Bethlehem Steel Company.*


63'-5"±
61'-6"
6 Lanes Southbound
65'-8"±
61'-0"
6 Lanes Northbound
DRISCOLL BRIDGE
Raritan River
℄ Route 9
58'-0"
25'-0"
2 Lanes Southbound
25'-0"
2 Lanes Northbound
EDISON BRIDGE
GARDEN STATE PARKWAY AND ROUTE 9 BRIDGE
BEFORE WIDENING OF ROUTE 9

Historic Photos of Edison Bridge and Driscoll Bridge.