

STEEL AFFORDS UNIQUE SOLUTION



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for Temporary FDR Roadway



IT'S NEVER A SURPRISE WHEN THE DEPARTMENT OF TRANSPORTATION (DOT) ANNOUNCES YET ANOTHER PLANNED ROAD OR HIGHWAY rehabilitation project, but it is a surprise when one of these projects gets underway with minimal disruption to traffic. Yet that's precisely what's happening now on the FDR drive between 53rd and 63rd Streets, thanks to the construction of the innovative Outdoor Detour Roadway and to steel.

In July 2002, Slattery Skanska in joint venture with Weeks Marine Inc., was awarded the \$136 million NYSDOT contract to rehabilitate the 1.28-mile stretch of the FDR, a 56-month-long project that is expected to be completed by April 2007. Instead of opting for the usual lane closure strategy in handling vehicular traffic during the rehabilitation project however, DOT decided on a unique solution to diverting traffic and reducing noise by calling for construction of a temporary roadway to divert traffic from the primary construction site.

Unique Solution to Diverting Traffic The use of the Outdoor Detour Roadway, which is being hailed as a critical civil engineering and urban planning accomplishment, not only reduces the impact on traffic patterns and lessens noise levels for nearby residences, but it will also save years in construction time. "Leave it to New York City to do something so complicated and challenging," said Tom Bowers, the chief engineer for the State Department of Transportation. "But then again what do you expect? This strip of real estate is hemmed in on one side by a city that never sleeps and on the other side, by Mother Nature."

Temporary Roadway to be Recycled

The scope of overall project includes replacing the bridge and viaduct superstructures, rehabilitating the roof structure and barrier and retaining walls, seismic retrofitting, lighting, signs, and drainage. But by far, according to Slattery Skanska, the most challenging aspect of the assignment was the construction of the outboard detour roadway. And what is perhaps most amazing about the structure, which represents a full 50% of the cost of the entire project at \$68 million, is that it is temporary. After the work on the FDR drive is complete, the temporary structure will be disassembled and removed. It will become the property of the contractors and is expected to be recycled – another obvious benefit to using steel in its construction.

The 1,035-meter-long water structure, designed to accommodate two lanes of detoured northbound traffic, consists of 22 pier bents supported on a total of 64 (1.37 m diameter) steel pipe caissons socketed into the rock bottom of the East River. The superstructure of the temporary roadway consists of transverse steel-cap beams and longitudinal steel girders. The roadway surface consists of pre-cast concrete panel slabs overlain with asphalt. In an effort to reduce road noise, the temporary roadway utilizes wall panels on one side and a corrugated metal panel roof.

As part of the outboard detour roadway, the project team also constructed a parallel, elevated road structure to be used as a temporary exit ramp for E. 61st Street. The construction of the outboard detour roadway, the exit ramp and the fender system took approximately 16 months to complete.

Concrete Would Have Crumbled The roadway extends approximately 25 feet over the river and functions like a coronary bypass, allowing the northbound traffic to flow continuously while



reconstruction of the lower and middle levels occur. When considering which materials to use to create this temporary roadway, engineers realized that heavy concrete would have crumbled and steel was the superior choice, being readily available, cost effective, sturdy and durable.

A true engineering feat, the roadway was constructed using floating vessels in the East River carrying massive cranes, steel pipes, and other building material. Engineers attached a total of sixty-four 90 foot steel pipe caissons into the rock below the water surface. This risky procedure involved the use of seismographs to insure that no damage was caused to the nearby subway tunnels or to the support structures of the Queensboro Bridge up above. The floating barges rocked back and forth in wakes up to six feet caused by passing vessels, forcing workers to perform their jobs in unpredictable conditions. Divers faced an additional challenge of welding into 11-inch thick rock walls that were barely visible in the silty river while swimming steadily in a fast moving current. This, according to Bowers, was perhaps the most difficult aspect of the work. "Working with the unknown at the bottom of the river – that was the ultimate challenge," he said.

In addition to the roadway, engineers attached steel pipes measuring 11 feet in diameter and 1 inch thick to the roadway's waterside edge to act as a "fender" for errant ships. These fenders are anchored to the bottom of the river by an immense chain. Designed by the Stephen's Institute in Hoboken, NJ, this is the first time a fender of this kind has been used. Each link of the chain measures 2-feet-long and 1-1/2-feet wide and weighs 150lbs. This steel "dolphin" structure protects the roadway and guides wayward vessels back into the river.

As one of the most challenging and expensive roadways ever built in New York, the Outboard Detour Roadway has thus far proved to be a time saving and efficient solution to a potentially dangerous and costly renovation. This unprecedented approach to roadway reconstruction, with its time saving advantages for motorists and minimal impact on the local community and city economy will likely serve as an example for future road reconstruction projects in this and other cities for many years to come. ■



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FDR DRIVE PROJECT
 Steel Fabricator ??????????
 Steel Erector Slattery Skanska Weeks Marine
 Structural Engineering Consultants Earth Tech, Inc.
 Engineer in Charge Tom Bowers
 New York State Department of Transportation