



## 2022 ?? Glenbridge Avenue Bridge

### Description

#### Meta Fields





**Project Summary :** This bridge replacement used a hybrid lateral slide system that combined slide rails at the abutments and self-propelled modular transporters (SPMTs) at the pier. Multiple precast concrete elements were used to expedite construction of the substructure.

**Project Location :** Glenbridge Avenue over US Route 6 in the city of Providence, Rhode Island

**Mobility Impact Time :** ABC: Rte 6 â?? short-term closures during off-peak hrs for demolition; 8-hr closure for slide Glenbridge Ave â?? 7-day closure *Note: Conventional construction was not an option because of its unacceptable impact to residents along one of the detour routes.*

**Impact Category :** Tier 3 (within 2 weeks)

**Dimensions :** 42-ft wide, 153.5-ft long two-span continuous steel girder bridge (76.75 ft â?? 76.75 ft), 2Â° skew

**Average Daily Traffic At Time Of Construction :** 67800

**Traffic Management :** 2.3-mile extended detour with significant increase in truck traffic through residential streets due to 67,800 ADT on US Route 6

**Existing Bridge Description :** The existing 2-span steel beam bridge was 153.5-ft long and 42-ft wide. It had two 12-ft-wide traffic lanes, two 2-ft-wide shoulders, and two 6-ft-wide sidewalks. The bridge superstructure and substructure were deteriorated and required replacement.

**Replacement Or New Bridge :** The two-span replacement bridge is also 153.5-ft long and 42-ft wide. As with the original bridge, it has two 12-ft-wide traffic lanes, two 2-ft-wide shoulders, and two 6-ft-wide sidewalks. The new cross-section consists of seven W30x191 steel girders supporting a cast-in-place concrete deck. The girder ends were detailed with cast-in-place semi-integral abutment diaphragms. The existing abutment foundations (footings) were retained. The abutment stems were replaced with precast concrete abutment stems. The wall pier was made with cast-in-place concrete under the existing bridge, prior to the lateral slide. Precast bearing pedestals were used to establish the final bridge seat grades. Precast approach slabs were detailed to expedite the opening of the roadway after the lateral slide.

**Construction Method :** This replacement bridge was part of RIDOTâ??s RhodeWorks, a major infrastructure rebuilding program. The bridge was initially designed and bid with conventional construction details. During preliminary construction the project was changed to ABC due to issues with the proposed detours. The contractor hired a designer (CHA Consulting, Inc.) to execute the design change working with the heavy-lift engineer. The preliminary design was based on using slide rails at all substructures. The final design incorporated a hybrid lateral slide system that combined slide rails at the abutments and self-propelled modular transporters (SPMTs) at the pier to support the span at the pier and to move the new two-span continuous steel girder bridge. The new superstructure was built parallel and adjacent to the existing bridge over Route 6, which was surrounded with sloped ground and trees and had a limited width. Route 6 has a total of six lanes with three lanes on each side. During construction, only two of the lanes on each side were required to be open. The other two lanes in the median were used for placement of construction equipment, for placing the existing bridge on temporary interior supports, and for construction of the new cast-in-place wall pier underneath the existing bridge prior to closure. Before closure, the existing bridge was placed on temporary supports at the pier. The existing pier was removed and replaced prior to the bridge slide. Glenbridge Avenue was closed a total of 7 days. The existing bridge was demolished with a short-term closure of Route 6 during off-peak hours. The precast abutment stems, precast wingwalls, and precast pier cap pedestals were installed. Slide tracks were placed at both abutments, and a single SPMT line was positioned in the median. Route 6 was closed for 8 hours for the bridge move. The SPMTs lifted the center portion of the new two-span bridge from its temporary pier support. The abutments were jacked along with the SPMT lift-off. The SPMTs moved the bridge horizontally along the abutment slide tracks into its final position. The SPMTs lowered the bridge onto the permanent isolation bearings on the wall pier, and the abutment jacks were released to set the bridge on the abutments. Precast approach slabs were erected. There were no incentives on the project. The cost and time frames were negotiated between the state and the contractor due to this being a change order to ABC after the conventional

construction bid. **Lessons Learned:** Use a flexural / twist monitoring system during the move.  
**Stakeholder Feedback :** Overall, the project was a success. The superstructure was installed with minimal disruption to traffic on and under the bridge.

