

SOUTH CAPITOL STREET CORRIDOR, FREDERICK DOUGLASS MEMORIAL BRIDGE

WASHINGTON, DC



Rendering/Photo credit: DDOT - District Department of Transportation



South Capitol Street Corridor Segment 1 main structure is the Frederick Douglass Memorial Bridge, a three-span arch bridge over the Anacostia River. The total length is 1445' (440.6m), with a main span of 540' (164.6m) and side spans of 452'-6" (138m). The deck carries eight lanes (three lanes with one future additional lane in each direction) with a footpath on each side of the deck. The typical deck width is 122'-6" (37.3m) and reached 166' (50.6m) at pier location where there is a pedestrian overlook. The arches are longitudinally stiffened steel box shapes and are laterally unsupported (no transverse bracing between arches). The steel arches are supported on post-tensioned concrete substructures and steel pipe pile foundations. Interior piers have a V-shape. The composite deck comprises precast panels on built-up I-shaped edge girders and floor beams. The deck is suspended from the steel arches with vertical hangers.

SYSTRA IBT's role was that of Independent Checking Engineer or ICE. In that role, SYSTRA IBT performed a completely independent analysis of the arch bridge structure based on the design plans and reports provided by the designers. This included independent modeling of the structure, structural verification of all elements from the foundations to the arches, and compliance reviews to ensure that the elements conformed with contractual requirements.

Structural checks were performed on a pass/fail basis in order to maintain complete independence from the designer's calculations and assumptions. Specialized analyses included deep foundations, arch instabilities (both global and local), and construction sequencing and stability for both the arch ribs and the composite deck. In the role of ICE, SYSTRA IBT was also involved in reviewing structurally significant changes or defects that arose during construction.

ESSENTIALS:

Client/Owner: DDOT - District Department of Transportation

Contractor: South Capitol Bridgebuilders, a joint venture between Archer Western Construction LLC (Walsh Group) and Granite Construction Co.

Prime Engineer: AECOM

SYSTRA IBT's Role: Independent Checking Engineer of the arch bridge structure.