



The viaduct was originally constructed between 1930 and 1932 by the Cincinnati Union Terminal Company in cooperation with the City of Cincinnati to grade separate Harrison and Queen City Avenues over the railroads. The 85-year old, double deck structure spans approximately 4,000 feet over State Avenue, Mill Creek, IR 75, three Norfolk Southern rail lines and the CSX Queensgate Classification Yard and Intermodal Terminal, which are among the largest facilities of their kind in the nation, as well as Spring Grove Avenue.

The easternmost section from Spring Grove Avenue to Central Parkway was demolished and replaced with a new steel plate girder structure (SFN 3105458) in 1961 as part the construction of IR 75. The spans over the interstate are anticipated to be replaced as part of the reconstruction of IR 75 as described in the Preliminary Alternatives Verification Report (PAVR) for the Brent Spence Corridor (PID 75119). Substantial portions of the Viaduct's superstructure were rebuilt in 1977. Original lighting and railings have been removed, and original street car tracks and dedicated transit ways were modified in the 1950's. Original reinforced cast in place concrete spandrel arch spans over the Mill Creek and Spring Grove Avenue remain in place. The Western Hills Viaduct is a primary transportation link connecting the principal arterials of Harrison, Westwood and Queen City Avenues on the west side of the Mill Creek Valley to IR 75, Spring Grove Avenue and Central Parkway on the east side of the valley. The viaduct serves approximately 55,000 vehicles and 250 buses each day and is considered a "Local Major Bridge" as defined by the Ohio Department of Transportation (ODOT) since it has a deck area greater than 35,000 square feet.

Regular maintenance repairs or improvements (including shoring of a portion of the lower deck) as described in the following sections have been undertaken since the 1970's rehabilitation. Both the original and rehabilitated portions of the Viaduct were constructed with details that are difficult or impossible to inspect. The Viaduct also includes non-redundant elements which could be susceptible to premature failure from repeated traffic loads. Preliminary structural analyses on selected elements indicate that some may not meet current structural design standards. Annual routine inspections have revealed that the Viaduct's condition has progressively worsened over the past twenty-five years. During the 1990's the primary bridge elements were in good or satisfactory condition with the exception of the upper level substructure which was downgraded to fair condition. In 2000, the lower level deck and substructure were both downgraded to fair condition. During 2007, while cleaning portions of the structure to be painted, section loss was discovered on several steel girders (floor beams). This section loss prompted the City of Cincinnati's Department of Transportation and Engineering (CDOTE) to analyze the girders to determine the effect of the section loss on their load carrying capacity. The analysis found stresses in some girders approaching the allowable inventory limit (CDOTE, 2007). Although the reduced capacity did not require immediately restricting loads on the bridge, CDOTE recommended that overweight loads not be permitted to use the Viaduct. The upper level superstructure was downgraded to poor condition and the lower level superstructure was downgraded to fair condition.

Bridge Length (ft): 2721

Number of Main Spans: 43

Max Span Length (ft): 120

Load Restrictions (TON): 300

Curb to Curb Width (ft): 48.20

Actual P&N for Western Hills Viaduct

Purpose Statement

The purpose of the proposed project is to improve facility deficiencies and preserve existing connectivity between either side of the Mill Creek Valley, specifically downtown/uptown neighborhoods, Spring Grove Avenue, and IR 75.

Need Element(s):

Facility Deficiencies (Primary Need)

Although the Viaduct has been maintained in a general state of good repair to ensure its structural integrity remains safe for the traveling public, the progressive structural deterioration of the Viaduct which has reached the end of its design life has required shoring portions of the lower deck. Installation of the temporary shoring initially avoided the need to restrict load limits. However, further deterioration of the structure's condition could require imposition of load limits in the near future and ultimately require partial or full closure, resulting in a loss of connectivity between surrounding neighborhoods. To monitor the structural adequacy of highway bridges, the Federal Highway Administration (FHWA) has established a National Bridge Inventory (NBI) condition rating system. A bridge that is considered "structurally deficient" has a condition rating of 4 or less (based on a scale from 0 [failed condition] to 9 [excellent condition]) for the deck, superstructure, or substructure. Please refer to the Bridge Condition Rating in the Project folder for a summary of current conditions. The Viaduct has a calculated structural appraisal of 4 or less, and is thus considered structurally deficient and a high priority for corrective action. Bridges are also given a sufficiency rating. The sufficiency rating, as developed by the FHWA, is an indicator of a bridge's sufficiency to remain in service and includes both structural and nonstructural items. The sufficiency rating is calculated using a formula which accounts for structural adequacy and safety; serviceability and functional obsolescence; and essentiality for public use. It ranges from 0 to 100 where a rating of 100 is entirely sufficient and 0 is considered deficient. ODOT has calculated a sufficiency rating of 2.0 for the Viaduct based on these factors. Any bridge with a sufficiency rating less than 50 is eligible for federal funding for rehabilitation or replacement.

System Linkage (Primary Need)

The viaduct is a critical element of the existing roadway network that provides a primary connection between the downtown/uptown businesses and neighborhoods on the east side of IR 75 and principal arterial routes, neighborhoods, and areas of industry and commerce on the west side of IR 75. Due to the current interchange spacing along IR 75, existing railroad facilities, topography and established roadway network effectively require a transportation link across the Millcreek Valley. Using alternative routes would require the use of State Avenue or Beekman Street to reach the heavily traveled Westwood/Queen City and Harrison Corridors. Based on future traffic projections, alternative routes across the Millcreek Valley would not adequately accommodate diverted traffic volumes.