Project Description/Purpose and Need Statement

Project No. 0065-0116
Replacement of Bridge No. 01947
Town of Harwinton

Bridge No. 01947 carries Route 4 over Brook in the Town of Harwinton. The existing structure, constructed in 1927, consists of a single reinforced concrete slab measuring approximately 15 feet long by 31 feet wide. The slab is directly overlaid with bituminous concrete that runs continuous across both approaches. The slab is founded on reinforced concrete abutments and footings. Reinforced concrete wingwalls are located at all four (4) corners which support the roadway embankment as well as a driveway at the northwest corner of the structure. Metal beam rail is present with bridge attachments at all corners except for the northwest corner where a Private Driveway meets Route 4. There are no sidewalks on the bridge or the approaches. Overhead utilities are present along the south edge of roadway.

Route 4 at Bridge No. 01947 consists of one travel lane and a reduced shoulder in each travel direction and for a total width of approximately 28 feet – 7 inches and has an AADT (2020) of 13,700 vehicles with approximately 4% truck traffic.

The deck is in fair condition (overall rating = 5) with transverse and longitudinal cracks open up to 3/4 inches wide, delaminations along the curb lines up to 20 inches wide and a centerline paving seam open up to 1 inch wide. Reinforced concrete parapets exhibit light scale throughout, small spalls and hairline cracks.

The approaches are in fair condition (overall rating = 5) with dents and corrosion holes in the metal beam rail at the connection point with the bridge parapet. Approach pavements exhibit numerous cracks open up to 1 inch wide with some breakage and light to moderate raveling. Approach embankments contain area of minor erosion exposing edges of pavement in isolated locations. There is a 20-inch long by 20-inch wide by 9-inch deep sinkhole that has formed around a survey marker at the southeast embankment.

The superstructure is in fair condition (overall rating = 5) with spalled areas and exposed rusted rebar as well as adjacent hollow areas. The largest of these measures 3 feet long by 3 feet wide by 2 inches deep. Other areas of light scale are present.

The substructure is in poor condition (overall rating = 4). There are several areas of severe scale at and below the waterline along the full length of both abutments with adjacent hollow areas. Scale extends up to 16 inches high and up to 9 inches deep. Abutment faces exhibit horizontal and vertical cracks with efflorescence. Abutment footings are exposed up to 15 inches high for the full length of both abutments. Wingwalls exhibit areas of severe scale adjacent to footings up to 2 feet high and up to 5 inches deep, areas of scaling to a lesser degree, isolated spalls, and cracks with efflorescence. The northeast wingwall footing is exposed up to 15 inches high.

The channel is in fair condition (overall rating = 5). Contraction scour has exposed footings up to 15 inches high. There is a scour hole along the northwest wingwall at the inlet with water depths of up to 39 inches. Intermittent lengths of riprap are present along both abutments. Downstream embankments exhibit erosion up to 3 feet high with exposed tree roots. The channel approaches the structure from the northeast at approximately a 45-degree angle and narrows at it approaches the structure due to encroachment of the embankments and heavy vegetation. The channel exits perpendicular to the structure and exhibits mild siltation adjacent to the East Abutment downstream.

The contributing drainage area at the bridge is approximately 0.81 square miles. According to the February 17, 1982, Panel 0901470010B, Litchfield County Flood Insurance Rate Map, the project is located within a FEMA regulated Zone B floodplain.

The purpose of this project is to address the aforementioned structural deficiencies in order to provide a hydraulically adequate structure in a state of good repair that is capable of meeting current load rating and highway design standards. Replacement of this structure will be required to do so. This project is currently in the Rehabilitation Study Report phase of Design where different replacement alternatives are being investigated. The proposed replacement structure will consist of a 20-foot wide by 7-foot high precast concrete box culvert with 2 feet of natural streambed material placed in it. The roadway in the vicinity of the proposed bridge will be widened to provide one (1) 11-foot travel and one (1) 8-foot shoulder in each direction in order to accommodate future bicycle traffic. The vertical alignment of the roadway will be adjusted to provide a continuous slope across the bridge for adequate drainage to a new low point where new catch basins will be installed. Existing drainage structure along the west approach will be modified to accommodate widening of the west approach.

Replacement is anticipated to take place during an up to two (2) week closure of Route 4 during which traffic will utilize a detour of 20.3 miles consisting of all State Routes. Widening of the approaches may be done in advance of this closure. Widening of the roadway will require permanent relocation of the overhead utilities. The proposed structure will be within the State's Right-of-Way; however, temporary construction easements will be required to temporarily relocate the Private Driveway during construction as well as to complete other construction activities.