Project Description/Purpose and Need Statement

Project No. 0051-0276
Replacement of Bridge No. 02110
Town of Farmington

Bridge No. 02110, built in 1924, carries Route 10 over Stream in the Town of Farmington. The bridge is located approximately 0.25 miles northeast of U.S. Highway 6 and 0.50 miles southwest of Route 4. The 2018 Average Annual Daily Traffic (AADT) for Route 10 is 12,200 vehicles, with 4% truck traffic.

The existing structure is a 5.5-foot wide by 4-foot high reinforced concrete arch culvert beneath approximately 15 feet of fill and with a skew of approximately 25 degrees. Reinforced concrete wingwalls are present at all four corners of the structure and an active 36-inch reinforced concrete roadway drainage pipe outlets through the northwest wingwall. There are several other abandoned drainage pipes that outlet above the west (outlet) spandrel wall. Scour walls of different configurations have been installed along intermittent lengths throughout the culvert via past maintenance repair projects. The culvert supports two (2) travel lanes with shoulders, one of each in each direction, and a sidewalk at a lower elevation than the west edge of roadway to which it is adjacent. Metal guide rail runs continuous across the bridge and both approaches. It terminates along the west edge of roadway approximately 75 feet north of the bridge at the intersection with Tunxis Street, a local road with no other outlet.

The contributing drainage area to this crossing is 0.66 square miles. According to the September 26, 2008 Panel 09003C0479F, Hartford County Flood Insurance Rate Map, this project is not located within a FEMA regulated floodplain. The existing structure is hydraulically inadequate.

There are numerous utilities beneath the roadway and the adjacent depressed sidewalk as well as overhead utilities along the east edge of the roadway which also cross the roadway to provide service at the intersection with Tunxis Street. A swale runs along the base of the southeast embankment which conveys flows from roadway drainage installations south of the bridge and along Route 10. Drainage Rights-of-Way and Rights-to-Slope in favor of the State of Connecticut were previously acquired for the drainage outlet in the northwest wingwall and the drainage swale along the southeast embankment.

The wearing surface was noted in Inspection Reports as having been recently replaced in 2020. There is a longitudinal crack in the pavement directly above a fractured section of the culvert that was open up to 2 inches wide. This crack was sealed and patched under a 2022 maintenance project and a concrete patch was placed adjacent to the curb to stabilize the embankment over the fractured section. Rip rap appears to also have been installed along the drainage swale along the southeast embankment to reduce embankment erosion.

The superstructure is in poor condition. Approximately 10 feet from the inlet, a portion of the arch is fractured resulting in vertical displacement of the full arch length of up to 3-1/8 inches. The fracture is open up to 2-1/2 inches wide with penetrations of up to 20 inches deep with exposed fill material. The overall rating for this component was improved as a result of the 2022 maintenance projects.

The substructure is in poor condition. Scour walls are undermined with penetrations of up to 42 inches. Wingwalls contain separation cracks open up to 5/8 inches wide for the full length of the walls with up to 5/8 inches of lateral displacement as well as undermined footings. The overall rating for this component was improved as a result of a 2022 maintenance project in which concrete, grout bags, and rip rap were installed to address voids, separations, and undermining of footings and scour walls as well as general scour within the channel.

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. The existing structure will be replaced by a 14-foot by 7-foot precast reinforced concrete box culvert with two (2) feet of

natural streambed material placed on the invert. The proposed culvert will be longer than existing and will have new reinforced concrete wingwalls to retain the roadway embankment with improved slopes. The existing drainage southeast of the culvert will be extended to outlet through the proposed southeast wingwall and the existing swale will be filled to improve grading and eliminate this maintenance concern. The proposed roadway cross-section at the culvert will provide two (2) 11-foot travel lanes with two (2) 5-foot shoulders and a new sidewalk will be constructed connecting to an existing sidewalk to the northeast and extending it along the east edge of roadway through the project limits and to the entrance of an apartment complex to the south.

Construction will be performed utilizing a roadway closure and full detour of approximately one (1) week to replace the majority of the culvert. Pre-closure and post-closure stages consisting of two (2) 11-foot travel lanes with two (2) 1-foot shoulders in each travel direction with temporary traffic barrier will be utilized to replace portions of the culvert and to relocate underground utilities to and from a temporary utility bridge. Pedestrian traffic through the project limits will be maintained during all periods when vehicular traffic is also allowed to travel through the project limits.