

State Project No. 0032-0150  
Replacement of Bridge No. 04446  
Hop River Road over Hop River  
Towns of Coventry & Columbia  
Permit for Regulated Activities

### Project Description

Bridge No. 04446, Hop River Road over Hop River, is scheduled for replacement as part of the Federal Local Bridge Program. The bridge is located approximately 0.3 miles north of Route 6 in Columbia. The Hop River defines the corporate boundary between Columbia and Coventry. The north approach of the bridge is located in Coventry and the south approach is in Columbia. Bridge No. 04446, built in 1955 and reconstructed in 1989, is a two-span structure consisting of a steel beam and reinforced concrete deck superstructure supported by stone masonry abutments and a central pier. The total structure length is 111 feet with a maximum span of 49 feet. The bridge has a curb-to-curb width of 12 feet and an out-to-out width of 15 feet 8 inches, providing one lane of stop sign controlled alternating one-way traffic. A dam structure is located approximately 50 feet upstream of the bridge. Associated with the dam embankment is a headgate conveying flows to a raceway that powered an old mill site. Hop River Road crosses both the raceway, conveyed by a twin 60-inch corrugated metal pipe culvert, and the main crossing of Hop River, Bridge No. 04446. The average daily traffic for Hop River Road at Bridge No. 04446 is approximately 250 vehicles per day.

The project site is surrounded by rural residential properties, forested town land and the Hop River State Park Trail. Hop River Road connects Route 6 (Willimantic Road) and Bunker Hill Road, servicing rural residential properties, agricultural land, and access to the Hop River State Park trail just north of the river.

Based upon field investigation and engineering analysis, the existing structure is found to be functionally obsolete due to substandard curb-to-curb width for the average daily traffic reported. For these reasons, the existing bridge is proposed for replacement.

The proposed project consists of replacing the existing structure with a 2-span continuous steel multi-girder superstructure supported by semi-integral abutments and a concrete encased steel pier cap. The steel girders will be topped with a reinforced concrete deck, membrane waterproofing, and bituminous concrete overlay. The new bridge structure will be approximately 130-feet long, consisting of two 65-foot spans. The proposed bridge will be constructed on a new horizontal alignment to improve the substandard curve radius. The existing superstructure will be removed and portions of the topside of the existing abutment stems will be removed. The existing center masonry pier foundation and portions of the stem are proposed to be rehabilitated in place. The existing twin 60-inch corrugated metal pipe culverts behind the south abutment will be replaced with an 8-foot by 6-foot precast concrete box culvert, wingwalls and retaining walls. The bridge will be widened to accommodate a curb-to-curb width of 24 feet, consisting of two 10-foot travel lanes and 2-foot shoulders. Open bridge rail will be installed along both sides of the bridge, terminating at end blocks. To accommodate the road widening, new catch basins and drainage pipe are proposed to the north of the bridge (Drainage Report attached).

The contributing drainage area at Bridge No. 04446 is 74.2 square miles. The regulated resources at the site include State Regulated Wetlands and Watercourses and Federally Regulated Wetlands and Waters of the U.S. The project is located within a FEMA mapped flood zone (A5) and FEMA floodway. Coordination

has taken place with CT DEEP Fisheries and recommendations have been incorporated to maintain unrestricted fish passage under the bridge upstream to the base of the Hop River Dam. Coordination with CT DEEP National Diversity Data Base (NDDDB) identified concern for state listed plants, turtles, and snakes. A qualified botanist and herpetologist will conduct site surveys to make a final determination of the presence of state listed species. CT DEEP NDDDB recommended Best Management Practices are incorporated into the project.

Hop River Road will be closed to vehicular traffic during construction and detoured around the site. To facilitate demolition of the structure and construction of the replacement, water handling will be performed in two stages. During Phase 1, raceway flow will be rerouted to the Hop River main channel in order to remove the existing culvert pipes and install a new concrete box culvert, wingwalls and retaining walls in the dry. The south abutment will also be constructed. Flow will be returned to the raceway prior to phase 2 work. During the second water handling phase, water handling cofferdams will be installed to complete work on the existing abutments and pier in the dry. The north abutment, wildlife shelf and dry hydrant will be installed. Expected construction machinery for the project will include cranes, excavators, concrete trucks, front loaders, roller/compactors, and paver dump trucks. Construction is expected to begin in April 2023 and take approximately 8 months.

Impacts to the stream will be minimized through adherence to CTDOT Form 818, Section 1.10 Best Management Practices and the 2004 Connecticut Stormwater Quality Manual. During removal of the superstructure, a temporary debris shield will be installed. Proper water handling measures will be implemented to allow work to occur in the areas confined within those water handling devices. Sedimentation and erosion control systems will be installed as necessary to limit disturbances to protect the wetlands and watercourses through adherence to the 2002 Connecticut Erosion and Sediment Guidelines. Excavated native streambed material will be replaced along the new culvert bottom to promote fish passage and a wildlife shelf will be constructed to promote riparian habitat. Any unconfined instream work within Hop River will be restricted to the period from June 1 to September 30, inclusive. All disturbed areas within the project limits will be stabilized and restored.

Total permanent impacts to state and federal regulated inland wetlands amount to 95 s.f. (0.002 ac). Total permanent impacts below the ordinary high water (OHW) line total 970 s.f. (0.022 ac). Permanent impacts result from installation of the raceway box culvert, dry hydrant pipe, and embankment grading. Total temporary impacts to state and federal regulated inland wetlands amount to 115 s.f. (0.003 ac). Total temporary impacts below the ordinary high water line amount to 3,815 s.f. (0.087 ac). Temporary impacts are a result of temporary construction areas associated with water handling.

The town line separating Coventry and Columbia runs through the center of the existing pier, jurisdictionally splitting the watercourse between the towns. The proposed activity impacts regulated areas for both towns.

Total impacts to regulated wetlands within Coventry town limits amount to 150 s.f. (0.003 ac). The wetland impacts are temporary and are due to installation of the dry hydrant pipe requested by the Town. There are no permanent wetland impacts. Temporary impacts to the Coventry watercourse (below OHW) amount to 1,035 s.f. (0.024 ac), along approximately 55 linear feet of the channel. These impacts are due to temporary work areas to install a dry hydrant and proposed work on the existing pier and north abutment. There are no permanent impacts to the watercourse proposed. Total impacts to Coventry Upland Review Area amount to 8,350 s.f. (0.192 ac). Upland impacts are permanent and result from

roadway and embankment work, installation of the north abutment, and new drainage structures and pipe. All disturbance is within the existing roadway corridor.

Total impacts to the Columbia Wetlands of Special Concern, a 200-foot buffer area landward of the Hop River ordinary high water line, amount to 8,045 s.f. (0.185 ac). Wetlands of Special Concern impacts are due to the replacement of the raceway culvert, installation of the south abutment, and roadway work for the improved alignment. The majority of disturbance is within the existing roadway corridor. Impacts to the Columbia watercourse (below OHW) amount to 3,750 s.f. (0.086 ac). Permanent watercourse impacts total 870 s.f. (0.02 ac) and result from installation of the raceway box culvert and roadway embankment. The remaining 2,800 s.f. (0.066 ac) of watercourse impacts are temporary, due to phase 1 water handling.

Replacement alternatives were assessed based on criteria including, but not limited to, construction cost, life cycle cost, constructability, environmental impact, safety design standards, connectivity, economic development, and traffic capacity. Two full replacement alternatives were considered in addition to the selected replacement project consisting of a steel girder and reinforced concrete deck superstructure on integral abutments and a precast concrete deck unit superstructure on integral abutments. Both alternatives would maintain the existing roadway alignment while improving the roadway width to accommodate two lanes of traffic. These alternatives were ultimately dismissed in favor of the proposed project which mitigates the south approach substandard horizontal curve at a similar construction cost. A secondary option was considered for maintaining the existing two cell pipe culvert conveying the raceway. While this would reduce costs and environmental impacts, the new box culvert will provide improved hydraulics, fish passage and longer design life in line with the new bridge. It is for these reasons the proposed project was selected.

Through coordination with the United State Army Corps of Engineers (USACE), it was determined that the proposed project will be covered under General Permit Self-Verification. The project incorporates USACE requirements for new bridges, specifically spanning the bankfull width by 1.2 times. The proposed structure is not considered hydraulically adequate in that the roadway overtopping at the north approach to the bridge is not alleviated from existing conditions. To achieve hydraulic adequacy would require raising the roadway profile and increasing the span length, requiring hundreds of feet of roadway work, ROW impacts to adjacent properties and Hop River Trail access, removal of hundreds of feet of historic stone wall, as well as potential for increasing upstream backwater and adverse impacts to the floodplain. The crossing carries a local road with low traffic volume and has an accessible alternate/detour route. The bridge travelway is close to the floodplain grade, the proposed structure does not adversely increase backwater and does not increase flooding potential on upstream properties. As part of this project, provisions in the form of a flood contingency plan will be prepared for municipal use and the roadway will be posted as being subject to flooding.